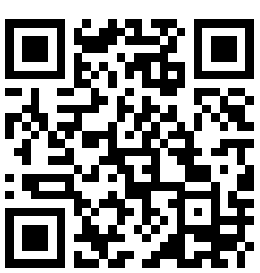

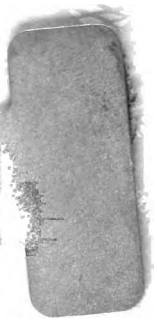

LOWER COLORADO RIVER BASIN PROJECT

HEARING

BEFORE THE

SUBCOMMITTEE ON IRRIGATION AND RECLAMATION

OF THE

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS HOUSE OF REPRESENTATIVES

EIGHTY-NINTH CONGRESS

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

AUGUST 23, 24, 25, 26, 27, 30, 31 AND SEPTEMBER 1, 1965

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NOTE.—The chairman, Hon. Wayne N. Aspinall, is an ex officio member of each subcommittee.

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H.R. 4671 AND SIMILAR BILLS TO AUTHORIZE THE CONSTRUCTION, OPERATION, AND MAINTENANCE OF THE LOWER COLORADO RIVER BASIN PROJECT, AND FOR OTHER PURPOSES

MONDAY, AUGUST 23, 1965

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 o'clock in room 1324, Longworth House Office Building, Hon. Wayne N. Aspinall presiding.

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation is now in session for the consideration of H.R. 4671 and similar or identical bills.

Without objection, H.R. 4671, together with the report under date of May 17, 1965, together, with correcting letter under date of August 20, 1965, signed by the Secretary of the Interior, Stewart L. Udall, will be made a part of the record at this point, with appropriate references made to the additional bills as sponsored by several Members from California and the State of Arizona.

(H.R. 4671 and accompanying material follow:)

[H.R. 4671, 89th Cong., 1st sess.]

A BILL To authorize the construction, operation, and maintenance of the Lower 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—LOWER COLORADO RIVER BASIN PROJECT: OBJECTIVES

SEC. 101. That this Act may be cited as the "Lower 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 Lower 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 supplemental water supplies, for municipal, industrial and other beneficial purposes, providing for adequate water quality, providing for basic public outdoor recreation facilities, improvement of conditions for fish and wildlife and other beneficial uses, and the generation and sale of hydroelectric 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 Lower Colorado River Basin or herein and hereafter authorized, may be coordinated and constructed with proper timing to the end that an adequate supply of water may be made available for mainstream and other Colorado River Basin projects herein or hereafter authorized and for the filling and refilling of Lake Mead and the reservoirs of the Colorado River storage project to optimum operating levels.

TITLE II—INVESTIGATIONS

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, of current water requirements in said basins, and of the rate of growth of water requirements therein to the year 2030.

(2) Investigate alternative sources and various methods including desalinization of water, weather modification, water renovation, and reduction in losses as means of supplying water to meet the current and anticipated water requirements in each basin, and prepare preliminary plans to accomplish such purpose. In planning works to import water into the Colorado River Basin from sources outside the natural drainage area of the Colorado River 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.

(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 Basin.

(5) Investigate means of providing for prudent water conservation practices to permit maximum beneficial utilization of available water supplies.

(b) The Secretary shall submit annually to the President and the Congress reports covering the investigations required by subsection (a) and, within three years from the effective date of this Act, the Secretary shall, after submission of his reports thereon to the affected States in accordance with section 1 of the Flood Control Act of 1944, recommend to the President and the Congress an initial group of projects and programs for authorization pursuant to paragraphs (2), (3), (4), and (5) of subsection (a) and shall submit feasibility reports on such projects and programs. Said initial recommendations and feasibility reports shall include projects, planned in accordance with paragraph (2) of subsection (a), capable of delivering annually not less than two million five hundred thousand acre-feet of water into the mainstream of the Colorado River below Lee Ferry from sources outside the natural drainage area of the Colorado River system.

TITLE III—AUTHORIZED UNITS: PROTECTION OF EXISTING USES

SEC. 301. In order to initiate the Lower Colorado River Basin project, herein referred to as the "project", and to further the comprehensive development of the water resources of the Colorado River Basin the Secretary shall construct, operate, and maintain the units of the project described in sections 302, 303, 304, 305, and 306.

SEC. 302. The mainstream reservoir unit shall consist of the Bridge Canyon and Marble Canyon projects, 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 so located as to minimize, so far as practicable,

adverse effects on scenic values in and near Marble Canyon and 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 Reservoirs 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. The central Arizona unit shall consist of the following principal works: (1) a system of main conduits and canals, including a main canal and pumping plants (Granite Reef aqueduct and pumping plants) for diverting and carrying Colorado River water from Lake Havasu to Orme Dam (McDowell Dam) on the Salt River above Granite Reef diversion dam; (2) Orme Dam (McDowell Dam) Reservoir, and power pumping plant; (3) Buttes Dam and Reservoir; (4) Hooker Dam and Reservoir; (5) Charleston Dam and Reservoir; (6) Tucson aqueducts and pumping plants; (7) Salt-Gila aqueduct; (8) canals, powerplants, and electrical transmission facilities; (9) related water distribution and drainage works; and (10) appurtenant works. It shall be a condition of each contract under which water is provided under the central Arizona unit that (1) there be in effect measures, adequate, in the judgment of the Secretary, to control expansion of irrigation from aquifers affected by irrigation in the contract service area, and (2) the canals and distribution systems through which water is conveyed after its delivery by the United States to the contractor shall be provided and maintained with linings, adequate in his judgment to prevent excessive conveyance losses. The Secretary may require as a condition in any contract under which water is provided under the central Arizona unit that the contractor agree to accept mainstream water in exchange for or in replacement of existing supplies from sources other than the mainstream but no such exchange or replacement shall require a contractor to bear any cost of said exchange or replacement water in excess of the costs that would have been incurred in connection with the continued use by the contractor of its existing supply, nor shall such exchange or replacement otherwise result in economic injury to the contractor.

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 mainstream 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 mainstream for the purposes of 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 mainstream water, and by users of the same character in Arizona and Nevada. This paragraph shall not affect the relative priorities, among themselves, of water users in Arizona, California, and Nevada which are senior to diversions for the central Arizona unit, or amend any provisions of the decree of the Supreme Court of the United States in Arizona against California.

(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 hundred thousand acre-feet of water into the mainstream 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 mainstream of the Colorado River is augmented 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 mainstream water in those States at the same cost, and on the same terms, as would be applicable if mainstream water were available for release in the quantities required to supply such consumptive use.

(d) If the importation of water into the Colorado River system makes available for release, as determined by the Secretary, sufficient water to satisfy annual consumptive use in Arizona, California, and Nevada, in excess of seven million five hundred thousand acre-feet, such excess consumptive use shall be apportioned in the manner provided in article II(B)(2) of the decree of the Supreme Court of the United States in Arizona against California, but only upon execution of contracts with the United States providing for payment for the storage and delivery of the imported water which is included in such excess, at rates and charges determined by the Secretary in accordance with the provisions of law otherwise applicable to the units of the project making such water available.

SEC. 305. The mainstream salvage unit shall include, to the extent the Secretary determines to be consistent with maintenance of a reasonable degree of undisturbed habitat for fish and wildlife in the area, programs for water salvage through phreatophyte control along and adjacent to the mainsteam of the Colorado River, and through ground-water recovery in the Yuma area but no groundwater program hereby authorized shall be undertaken in the Yuma area until the Secretary of State has reported to the President 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.

SEC. 306. The southern Nevada water supply unit shall consist of the following principal works: intake facilities, pumping plants, aqueduct and laterals, transmission lines, substations, storage and regulatory facilities, drainage facilities, and appurtenant works required to provide water from Lake Mead for distribution for municipal and industrial purposes in Clark County, Nevada. Construction of the unit shall not commence until a repayment contract has been entered into and its execution by the contractor shall have been finally affirmed by a decree of a court of competent jurisdiction. The Secretary may enter into a contract with the State of Nevada, acting through the Colorado River Commission of Nevada or other duly authorized State agency, providing among other things, that—

(a) the contractor shall operate and maintain the unit works;

(b) the construction costs allocable to municipal and industrial water supply shall be repaid by the contractor, with interest, in not more than fifty years (except such construction costs as are allocable to the furnishing of a water supply to Nellis Air Force Base and other Federal defense installations, which costs shall be nonreimbursable); and

(c) the contractor shall take delivery of water from Lake Mead at the intake works and shall sell and deliver such water at wholesale under contracts to be approved by the Secretary, which shall include an obligation on the part of each purchaser to exercise such powers as it may possess to levy and collect taxes or assessments for purposes of meeting the charges for service thereunder.

SEC. 307. 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. 308. (a) The Secretary shall provide for recreation and fish and wildlife development in connection with units herein and hereafter authorized as follows: 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; 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; conserve the scenery, the natural, historic, and archeologic objects, and the wildlife on said lands; allocate water and reservoir capacity to recreation and fish and wildlife purposes; and provide for the public use and enjoyment of lands, facilities, and water areas included in the authorized units, in a manner coordinated with the other purposes of the plan of development.

(b) The Secretary shall reserve not to exceed eighty-four thousand acre-feet

per annum of mainstream water for consumptive use in the lower basin, exclusive of California, by diversion or by exchange, for non-Federal fish and wildlife installations subject to rights existing on the effective date of this Act of users of mainstream water: *Provided,* That such water shall be put to use for fish and wildlife purposes within a period of fifty years from the effective date of this Act.

(c) 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 subjection. 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.

(d) The Secretary may transfer jurisdiction over lands included in the authorized units within or adjacent to the exterior boundaries of national forests 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 and 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.

(e) 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; and

SEC. 309. The Secretary shall integrate the Dixie project, authorized by the Act of September 2, 1964 (78 Stat. 848), into the project herein authorized as a unit 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. (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 308) of this Act.

(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 user fees or charges and proceeds received from recreation concessioners), and

(2) all 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: (A) surplus, as determined by the Secretary, to the operation, maintenance, and replacement requirements of those projects; (B) not needed for the purposes of the Colorado River development fund, established under subsection (d) of section 2 of the Boulder Canyon Project Adjustment Act (54 Stat. 775); and (C) not needed to reimburse the Upper Colorado River Basin fund, established under section 5 of the Act of April 11, 1956 (70 Stat. 107), as provided in the Glen Canyon filling criteria (27 Fed. Reg. 6851) for any expenditures made from that fund to meet deficiencies

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in generation at Hoover Dam during the filling period of reservoirs of storage units of the Colorado River storage project.

(d) All revenues collected and credited to the development fund pursuant to this Act shall be available, without further appropriation, for (1) defraying the costs of operation, maintenance, and replacements of, and emergency expenditures for, all facilities of the project, within such separate limitations as may be included in annual appropriation Acts; and (2) 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 and hereafter authorized in furtherance of the purposes of this Act.

(e) Revenues in the development fund in excess of the amount necessary to meet the requirements of clause (1) 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 the municipal and industrial water supply features of the project at a rate determined by the Secretary of the Treasury in accordance with the provision 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 payment required by clause (1) of subsection (d) and subparagraphs (1) and (2) of this subsection, costs incurred in connection with units herein or hereafter authorized, in providing (in any years in which insufficient Colorado River mainstream water is available for release, as determined by the Secretary, to satisfy consumptive use in Arizona of two million eight hundred thousand acre-feet, in California of four million four hundred thousand acre-feet, and in Nevada of three hundred thousand acre-feet) water to make up such deficiencies at costs to the users that would have prevailed had mainstream Colorado River water been available for consumptive use in the aforesaid amounts, such costs to be allocated among the purposes for which mainstream Colorado River water is made available and to be returned within the period specified in subparagraph (1) of this subsection: *Provided*, That water made available by such units that is not needed to make up the aforegoing deficiencies shall be disposed of by the Secretary at rates or for repayment determined in accordance with the provisions of law otherwise applicable to said units.

(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. 402. 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 feature to commercial power, irrigation, municipal and industrial water supply, flood control, navigation, water quality control, recreation, fish and wildlife, the depletion of Colorado River flows available for use in the United States, including river and reservoir losses, occasioned by performance of the Water Treaty of 1944 with the United Mexican States (Treaty Series 944) or 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 depletion of Colorado River flows available for use in the United States occasioned by compliance with the Mexican Water Treaty, and other authorized

nonreimbursable purposes shall be nonreturnable under the provisions of this Act. 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.

SEC. 403. 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. 564), and such costs as are beyond repayment capability of such lands shall be nonreimbursable.

SEC. 404. On January 1 of each year the Secretary shall report to the Congress, beginning with the fiscal year ending June 30, 1966, upon the status of the revenues from and the cost of constructing, operating, and maintaining the project for the previous fiscal year. The Secretary's report shall be prepared to reflect accurately the Federal investment allocated at that time to power, to irrigation, and to other purposes, the progress of return and repayment thereon, and the estimated rate of progress, year by year, in accomplishing full repayment.

SEC. 405. (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 50 years if contracting pursuant to clause (1) of said section and for the delivery of water over a period of 50 years if made pursuant to clause (2) thereof.

TITLE V—GENERAL PROVISIONS: DEFINITIONS

SEC. 501. (a) 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. 502. (a) Nothing in this Act shall be construed to alter, amend, repeal, construe, interpret, modify, or be in conflict with the provisions of the Colorado River compact, the Upper Colorado River Basin compact, the Act of April 11, 1956 (Colorado River Storage Project Act) (70 Stat. 105), the Water Treaty of 1944 with the United Mexican States (Treaty Series 994), the opinion and any decree entered by the Supreme Court of the United States in Arizona against California (373 U.S. 456), or except as otherwise provided herein, the Boulder Canyon Project Act (45 Stat. 1057) or the Boulder Canyon Project Adjustment Act (54 Stat. 774).

(b) In the operation and maintenance of all facilities under the jurisdiction and supervision of the Secretary in the Colorado River Basin, he is directed to comply with the applicable provisions of this Act, and of the laws, treaty, compacts, and decrees referred to in paragraph (a), in the storage and release of water from reservoirs in the Colorado River Basin. In the event of the 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 (which may in its discretion remand any such action to the United States District Court for the District of Columbia) and consent is given to the joinder of the United States as a party in such suit or suits, as a defendant or otherwise.

SEC. 503. (a) All terms used in this Act which are defined in the Colorado River compact, or in the Decree of the Supreme Court of the United States in Arizona against California (376 U.S. 340), shall have the meanings there defined.

(b) "User" or "water user" in relation to mainstream water 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 (376 U.S. 340), to use mainstream water when available thereunder.

TITLE VI—THE COLORADO-PACIFIC REGIONAL WATER COMMISSION

SEC. 601. (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;

(2) One member representing each of the States of Arizona, California, Nevada, New Mexico, and Utah, appointed by the Governor of the State, and one member representing each other State which the President may find to be affected, such member to be appointed by the Governor of such State; 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 further Federal, State, interstate, and local plans for the conservation, augmentation, and beneficial utilization of the water and related land resources of the Lower Colorado River Basin and affected areas;

(2) advise and consult with the Secretary of the Interior with respect to his responsibilities under title III 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 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 VII—APPROPRIATIONS

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

Other bills under consideration are: H.R. 4672 by Mr. Burton of California, H.R. 4673 by Mr. Tunney, H.R. 4674 by Mr. Hosmer, H.R. 4675 by Mr. Reinecke, H.R. 4676 by Mr. Rhodes of of Arizona, H.R. 4677 by Mr. Senner, H.R. 4678 by Mr. King of California, H.R. 4679 by Mr. Holifield, H.R. 4680 by Mr. Miller, H.R. 4681 by Mr. Hagen of California, H.R. 4682 by Mr. Moss, H.R. 4683 by Mr. Roosevelt, H.R. 4684 by Mr. Sisk, H.R. 4685 by Mr. McFall, H.R. 4686 by Mr. Corman, H.R. 4687 by Mr. Brown of California, H.R. 4688 by Mr. Cameron, H.R. 4689 by Mr. Edwards of California, H.R. 4690 by Mr. Hanna, H.R. 4691 by Mr. Hawkins, H.R. 4692 by Mr. Leggett, H.R. 4693 by Mr. Roybal, H.R. 4694 by Mr. Van Deerlin, H.R. 4695 by Mr. Charles H. Wilson, H.R. 4696 by Mr. Dyal, H.R. 4697 by Mr. Utt, H.R. 4698 by Mr. Bob Wilson. H.R. 4699 by Mr. Lipscomb, H.R. 4700 by Mr. Teague of California, H.R. 4701 by Mr. Smith of California, H.R. 4702 by Mr. Bell, H.R. 4703 by Mr. Talcott, H.R. 4704 by Mr. Del Clawson, H.R. 4705 by Mr. Cohelan, H.R. 4706 by Mr. Gubser, and H.R. 9248 by Mr. Johnson of California.

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., May 17, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs,
House of Representatives, Washington, D.C.

DEAR MR. ASPINALL: This responds to your request for a report on H.R. 4671-H.R. 4706, 36 identical bills to authorize the construction, operation, and maintenance of the Lower Colorado River Basin project, and for other purposes. These 36 bills share a common purpose of resolving the old stalemates blocking further lower Colorado River development. They combine features of the Pacific Southwest water plan draft bill we transmitted to the Senate Interior and Insular Affairs Committee on April 9, 1964, with the January 1964 Pacific Southwest water plan, bills now pending before your committee (H.R. 313, H.R. 1740, H.R. 2264, H.R. 2618, H.R. 2663, and H.R. 3176), and S. 75, of this Congress. A copy of our letter of April 9, 1964, is enclosed with this letter for your committee's information. Also enclosed is a copy of the letter of May 10, 1965, from Deputy Director Staats to Chairman Jackson of the Senate Committee on Interior and Insular Affairs setting forth the views of the Bureau of the Budget.

I am most pleased to endorse the goal of all of these bills, and I strongly recommend the enactment of H.R. 4671 or one of its counterparts subject to the following comments and recommendations.

The lower Colorado project bills have the same major objectives as were outlined in our Pacific Southwest water plan. They would provide the means to meet the immediate water needs of the Southwestern United States and lay the basis for developing a comprehensive program to solve the water supply problems of the Western United States which are related to the Colorado River by providing adequate water supplies in the Upper and Lower Colorado River Basin.

These bills would:

1. Authorize and direct the Secretary of the Interior to investigate sources and methods of providing water to meet current and long-range needs in the Colorado River basin and to prepare and submit reports to the Congress on comprehensive plans and projects to accomplish this objective.
2. Set forth standards to protect the interests of States and areas of origin of any water exported to the Colorado River Basin.
3. Establish a Lower Colorado River Basin development fund as the financial and accounting vehicle for the works required.
4. Authorize projects to meet immediate needs for water, power, and other purposes in the lower basin, and to initiate the "bank account" of the development fund.
5. Provide a priority to existing California Colorado River consumptive uses in the amount of 4,400.000 acre-feet annually and to existing main stream Colorado River consumptive uses and entitlements in Arizona and Nevada by limiting diversions from the main stream for the central Arizona

unit in any year in which the Secretary of the Interior determines that there is insufficient main stream Colorado River water available for release to satisfy annual consumptive use of 7,500,000 acre-feet in California, Arizona, and Nevada. This priority is to last until the President determines that works are in operation capable of delivering 2,500,000 acre-feet per year of water originating outside the Colorado River Basin into the main stream of the Colorado River below Lee Ferry.

6. Provide that water, imported or salvaged under this bill which augments the supply otherwise available in the Colorado River to satisfy annual consumptive uses from the main stream of the Colorado of 2,800,000 acre-feet in Arizona, 4,400,000 acre-feet in California, and 300,000 acre-feet in Nevada, would be made available to users of main stream water at the same cost and on the same terms as prevail for main stream water naturally available.

7. Accommodate developments for recreation and fish and wildlife.

8. Establish a regional commission to assist and advise in the development of comprehensive resource plans.

One of the key features of the bill is in section 304. This section requires the Secretary of the Interior to limit diversions from the main stream of the Colorado River for the purposes of the central Arizona unit of the lower Colorado River project (authorized by this bill) in any year in which he determines that there is insufficient main stream Colorado River water available for release to satisfy annual consumptive use of 7,500,000 acre-feet in Arizona, California, and Nevada, to amounts which will assure the availability of water in quantities sufficient to provide for (1) the aggregate annual consumptive use in California by holders of present perfected rights, by other users therein served under existing contracts with the United States by diversion works heretofore constructed, and by other existing Federal reservations therein, of 4,400,000 acre-feet of main stream water, and (2) annual consumptive use by users of the same character in Arizona and Nevada.

The foregoing protective provisions are to be operative until works are proclaimed by the President to be 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 Lee Ferry from sources outside the natural drainage of the Colorado River system. It should be clear that this is a statement of the condition which terminates the priority; it is not a commitment to the construction of import projects. The latter would be studied by the National Water Commission discussed infra.

These provisions in section 304 have evolved from the efforts of Arizona and California to accommodate their differences.

Other priority proposals have been suggested. The Senate Committee on Interior and Insular Affairs in reporting S. 1658 in the 88th Congress provided a flat 25-year priority for 4,400,000 acre-feet of annual consumptive use in California as against the central Arizona unit. Twenty-five years, considering the hydrology of the Colorado River, is about the time remaining before the assured flows of the Colorado River available to the lower basin will diminish to the point where diversions for the central Arizona unit would have an impact on existing uses within the basic allocation of 7,500,000 acre-feet, assuming that salvage works authorized by section 305 are accomplished.

This bill formulates the priority provisions in connection with an affirmative program for insuring that the statutory priority will not have to be invoked, rather than as a mere prohibition. The National Water Commission studies discussed, infra, would look toward the same goal. Because of this constructive approach, all interested parties will be working toward obtaining the needed supplemental water for the Colorado River, and not merely defending the status quo.

We are confident that the means of augmenting the Colorado's flows can be accomplished within the approximately 25 years remaining before diversions for the Central Arizona project will have an impact on existing uses within the basic allocation of 7,500,000 acre-feet. Therefore, we believe the statutory priority provided by the bill will not have to be invoked. We commend the willingness of both Arizona and California to moderate their previously held positions in order to resolve the impasse which has blocked consideration of lower Colorado River development for so many years.

I am most gratified to note that the bill states as its objective the provision of adequate water supplies for the use of the Upper as well as the Lower Coloradio River Basin. Given the history of the Colorado River and the pattern

of its development, it is far better to treat the upper and lower basins together when planning long-range water resource developments.

The Bureau of the Budget believes that in lieu of the authorization for investigations provided for in title II of the bills and the regional commission authorized by title VI, the long-range water problems of the Pacific Southwest, together with the long-range problems of other areas of the country—the Great Lakes area and the Northeast, as examples, should be studied, within a period of not more than 5 years, by a National Water Commission which it recommends be established.

Specifically, with respect to the Colorado, the Bureau proposes that the Commission study the proposals to guarantee areas of origin of imported water against increased costs arising from exports, and the desirability as well as the feasibility of import projects. It is proposed, however, that the Commission should develop, using the full resources available to it by the Federal Government and State and local governments, specific plans for review by the President and the Congress to resolve the water supply problems of the Colorado Basin. The Commission's Colorado studies should, the Bureau recommends, cover the proposal for Bridge Canyon Dam, allocation of an additional 84,000 acre-feet of main stream water for fish and wildlife purposes, and any additional steps required to develop an effective program for the use and control of ground and surface water.

The Commission would not be intended to eliminate the planning and investigative authority of existing Federal resource agencies in the geographic areas it undertakes to study. Indeed, it is proposed by the Bureau of the Budget that the Commission should utilize to the maximum possible extent the resources of the Federal water resources agencies.

I am advised that the Bureau of the Budget intends shortly to submit a draft of legislation embracing the administration's recommendations regarding the National Water Commission. If this proposal is adopted, in addition to elimination of titles II and VI, it is suggested that the statement of policy in section 102 be revised by striking the language commencing with the last word in line 12, page 2, and continuing through the word "agencies" in lines 15 and 16 and by inserting the words "be developed" after "authorization," in line 17. The words "additional and" in line 10, page 1, might also be stricken as redundant.

The 2,500,000 acre-feet of augmenting water which is the amount that terminates the priority provided in section 304, is the equivalent of the Colorado River supply this Government is bound to deliver to Mexico under the Water Treaty of 1944, plus all river losses in the Colorado River from Hoover Dam to the international border. Satisfaction of the Mexican Water Treaty can quite reasonably be treated as a national and not a regional or sectional obligation. When the Mexican Treaty was entered into, it was considered that 1,500,000 acre-feet could be delivered to Mexico annually without impairing the availability for use in the upper and lower basin of the quantities allocated by article III(a) and III(b) of the Colorado River compact. The reason for this optimism is apparent from the report of the Senate Foreign Relations Committee on the treaty. The committee stated that "according to all the testimony, the average annual virgin runoff from the Colorado River Basin is approximately 18 million acre-feet a year." (Senate Ex. Rept. No. 2, 79th Cong., 1st sess., p. 4.) Based on runoff records to date, however, the Bureau of Reclamation has determined that the long-term average annual virgin runoff of Colorado River is approximately 16 million acre-feet, or 2 million acre-feet less than that upon which the treaty was predicated.

Although the Department's Pacific Southwest water plan contemplates the construction of Bridge Canyon Dam, we concur in the recommendation of the Bureau of the Budget that authorization should be deferred pending a reevaluation. Deferral of the Bridge Canyon project will affect only the magnitude of surplus revenues in the development fund, and will not adversely affect the financial feasibility of the other units of the Colorado River project authorized at this time. Meanwhile, a moratorium should be imposed on the issuance of a license to any non-Federal entity for the construction of a dam at this site.

Section 302(4) avoids any implication that authorization of Marble Canyon Dam under the bill is a congressional sanction of the Kanab project.

The amounts of water specified in section 304(c) are those adjudicated by the Supreme Court in *Arizona* v. *California, et al.* to have been apportioned for use in the three States respectively out of the first 7,500,000 acre-feet of main stream water available for consumptive use in the Lower Colorado River Basin. The

section does not constitute the United States an insurer of the availability of the augmenting water. The United States traditionally has not, as a matter of law, warranted the achievement of the purposes of water resource projects.

Section 304(c) does include, however, a price guarantee with respect to water imported into the Colorado River system. The Bureau of the Budget in its May 10 letter recommended against any Federal commitment to Colorado River imports at this time. With respect to a price guarantee to lower basin users in the event of import, the Bureau of the Budget believes that if the Congress undertakes this commitment it should be only after most careful consideration. The Bureau recognizes that the Mexican Treaty imposes an important demand on the Colorado River and it suggests that if the Congress decides that the situation in the Lower Colorado River Basin is unique, the price guarantee in the pending legislation should be limited to the importation of not more than 1,500,000 acre-feet of water per annum, with the costs being met from the development fund. A cost guarantee of up to 1,500,000 acre-feet per annum would, as the Bureau of the Budget points out, make minimal the chances that any imported water would carry a price higher than main stream water, at least through the year 2030. To accomplish the limitations proposed by the Bureau of the Budget would require the following modifications in the legislation:

(1) On page 9, line 17, change the period at the end of subsection 304(c) to a colon and add "*Provided*, That the amount of additional water from outside the Colorado River system made available at such cost shall not exceed one million five hundred thousand acre-feet in any given year".

(2) On page 17, line 9, insert after the word "power" the phrase ", the replenishment of Colorado River flows available for use in the United States occasioned by performance of the Water Treaty of 1944 with the United Mexican States (Treaty Series 944),".

(3) On page 18, line 7, insert after the word "deficiencies" the phrase "up to a maximum of one million five hundred thousand acre-feet from outside the Colorado River system in any given year".

(4) On page 19, lines 13–14 and 24, change the word "depletion" to "replenishment".

(5) On page 19, line 15, strike the phrase ", including river and reservoir losses".

(6) On page 19, line 23—page 20, line 1, strike the phrase commencing with the word "the" through the word "other".

An alternative approach, of course, to assure the maintenance of main stream prices for not to exceed 1,500,000 acre-feet of imported water per annum would be to retain the nonreimbursable allocation, now provided for in section 402, to replenishment of deficiencies in main stream water occasioned by Mexican Treaty deliveries, with the limitation that the nonreimbursable costs be limited to those associated with the importation of not to exceed 1,500,000 acre-feet for replenishment purposes. In the Bureau of the Budget's view this alternative, too, would be applicable if the Congress considered the Lower Colorado River situation unique. This alternative would call for the following modifications in the bill:

(1) On page 9, line 13, after the word "water" insert the phrase ", including not to exceed one million five hundred thousand acre-feet from outside the Colorado River Basin,".

(2) On pages 17–18, omit subsection 401(e)(3).

(3) On page 19, line 15, strike the phrase ", including river and reservoir losses,".

(4) On page 19, line 24, after the word "of" insert the phrase "up to a maximum of one million five hundred thousand acre-feet in any one year of,".

(5) On page 19, lines 13–14 and 24 change the word "depletion" to "replenishment."

With respect to fish and wildlife, two points in particular should be noted. One is the incorporation in section 305 of an affirmative requirement that main stream water salvage programs shall be consistent with maintenance of a reasonable degree of undisturbed habitat for fish and wildlife. Second, is the reservation of 84,000 acre-feet annually of Colorado River water (sec. 308(b)) for non-Federal fish and wildlife installations. This 84,000 acre-feet is in addition to the reservations for fish and wildlife purposes made in the Supreme Court decision. The Bureau of the Budget has recommended that the reservation of 84,000 acre-feet be deferred for further study, and we have no objection to that procedure.

The following other amendments to the bill are recommended:

(1) On page 5, line 16, delete "Bridge Canyon and", and change "projects" to "project".

On line 17, change "dams, reservoirs, powerplants" to "dam, reservoir, powerplant".

On line 18, delete "Coconino and" and make the word "reservoirs" singular.

On lines 19 to 24, delete all of clauses (1) and (2) and renumber clause (3) as clause (1).

On page 6, line 4, renumber clause (4) as clause (2).

An line 5, delete "either Bridge Canyon or".

On line 6, change "Reservoirs" to "Reservoir".

On lines 7 to 10, delete the entire sentence and substitute "The Federal Power Commission shall not entertain or consider any application for the construction, operation or maintenance of a dam or other project work under the Federal Power Act (41 Stat. 1063), as amended (16 U.S.C. 791), at the site on the Colorado River between the Marble Canyon project and Lake Mead except as specifically authorized by the Congress."

The purpose of all of these changes is to delete the authorization for the Bridge Canyon project, and to impose a moratorium on Federal Power Commission licenses at that site.

(2) On pages 10–11, delete section 306 and renumber present sections 307, 308, and 309 as sections 306, 307, and 308.

As the southern Nevada water supply project is being handled by separate legislation, it may be omitted from this bill.

(3) On page 12, line 23, delete all of subsection (b).

The purpose is to defer the reservation of 84,000 acre-feet of water for fish and wildlife purposes for further study.

(4) On page 20, line 7, change the period to a colon and add:

"*Provided, however*, That all of the separable and joint costs allocated to recreation and fish and wildlife enhancement at the Dixie project and the mainstream reservoir unit shall be borne by the United States and shall be nonreimbursable."

Section 402 of H.R. 4671 contemplates that the administration's policy for allocating recreation and fish and wildlife enhancement costs at Federal water resource projects, as set forth in the proposed Federal Water Project Recreation Act (H.R. 5269 and S. 1229) will apply to the Lower Colorado River Basin project. Under this policy, non-Federal public bodies are encouraged to share the separable costs allocated to recreation and fish and wildlife enhancement and to take over the administration of such facilities, except in those areas where Federal management is determined to be appropriate.

The proposed Federal Water Project Recreation Act does not specifically designate any such areas but contemplates that special provisions for nonreimbursability of recreation and fish and wildlife enhancement costs will be made in project legislation where it is determined that Federal administration should be retained. The Marble Canyon unit of the Lower Colorado River Basin project is, in our view, such an area.

The Marble Canyon Dam site would be 12½ miles above the Grand Canyon National Park boundary, and the reservoir would extend upstream to Glen Canyon Dam. The upper 20 miles of the Marble Canyon Reservoir would be within the area surrounding Glen Canyon Dam now administered for recreation and fish and wildlife enhancement by the National Park Service. Logically, Marble Canyon should be similarly administered.

Thus, by providing for Federal administration of the facilities for recreation and fish and wildlife enhancement at the Marble Canyon unit, a fully developed recreation area, extending from below Davis Dam to above Lake Powell, consolidated under National Park Service administration, will be possible in this otherwise arid and recreation-limited region. We do not believe that this unique potential should be wasted.

The Dixie project was authorized by the 88th Congress (78 Stat. 848) and is, by section 309 of H.R. 4671, expressly integrated into the Lower Colorado River Basin project. Section 6 of the Dixie project legislation authorizes the Secretary to provide basic recreation facilities and to acquire such lands as are necessary for this purpose. The foregoing proviso would dispel any doubt as to whether this authority continues and would make clear that the Dixie project would not be subject to the proposed Federal Water Project Recreation Act.

(5) On page 12, line 8, delete "basic".

To so restrict outdoor recreation facilities at these projects is not consistent with the proposed Federal Water Project Recreation Act. The latter bill will establish its own criteria with respect to separable costs for recreation and fish and wildlife enhancement.

(6) On page 22, after line 3, add a new section 406 as follows:

"SEC. 406. Notwithstanding any other provisions of law no contract relating to an irrigation water supply from the mainstream of the Colorado River shall commit the United States to deliver such supply for a basic period or irrigation block exclusive of any development period authorized by this Act, nor shall such a contract carry renewal or conversion rights or entitle the contractor to water beyond expiration of the delivery periods specified therein. In negotiating new contracts for delivery of such mainstream water, the Secretary shall consult with representatives of the State in which the use of such water is apportioned by any decree of the Supreme Court of the United States entered in *Arizona* v. *California, et al.*, 373 U.S. 546, and the Secretary shall take into consideration the overall water supply and needs of the project involved. The provisions of this section shall not apply to any user who on the effective date of this Act has in force a contract with the United States for mainstream water, or to mainstream water decreed for Indian lands in *Arizona* v. *California, et al., supra.*"

Until such time as sufficient water is available to meet all demands, it is important that legislation authorizing new projects using lower basin Colorado River water include the mechanisms whereby the availability of water as between irrigation and municipal and industrial uses can be further considered from time to time. Irrigation water contracts should be of a definite term—long enough to justify investments and development to put the water to use, but nevertheless with a finite time limit—to provide the opportunity for reappraisal of the water situation at the end of the contract period looking to the dedication of water to its highest use at that time. We recognize that this is a departure from the permanent service requirement of the Boulder Canyon Project Act and the provisions of the act of July 2, 1956 (70 Stat. 415) providing for renewal of irrigation water delivery contracts. It is, however, in our view justified by the conditions now prevailing in the Southwest.

(7) On page 23, lines 9–11, delete the parenthetical phrase "(which may in its discretion remand any such action to the United States District Court for the District of Columbia)".

It is believed that if such a waiver of immunity is to be retained, it should be limited to suits in the Supreme Court as is the case under the similar provision in section 14 of the Colorado River Storage Project Act, 70 Stat. 110, 43 U.S.C. 620m. In addition, article IX of the Supreme Court's decree in *Arizona* v. *California* provides for retention of jurisdiction by the Supreme Court. While we believe such waivers of immunity are undesirable, no objection is offered in view of the inclusion of a similar provision in the Colorado River Storage Project Act and other Colorado River legislation.

(8) Renumber section 503 as 504 and add new section 503. New section 503 should read as follows:

"SEC. 503. Notwithstanding any other provision of this Act, water made available by or to units of the project herein or hereafter authorized shall not be made available directly or indirectly for the irrigation of lands not having a recent irrigation history as determined by the Secretary, except in the case of Indian lands, national wildlife refuges, State-administered wildlife management areas with the approval of the Secretary, and the Dixie project, Utah (not to exceed 11,615 acres), unless and until otherwise provided by the Congress."

This new section is designed to limit the expansion of irrigated acreage using water made available under the bill. It is justified by the concept of protecting existing economies that underlies the provision of water at Colorado River costs to maintain the lower basin supply of 7,500,000 acre-feet of water for annual consumptive use from the main stream of the Colorado River. (See January 1964 report, Pacific Southwest Water Plan, p. 30.)

(9) Earlier presentations to the Senate committee by this Department recommended that legislation such as this include language authorizing the Secretary to "continue construction of irrigation distribution and drainage facilities on the Colorado River Indian irrigation project, Colorado River Indian Reservation, and construct diversion and distribution facilities to develop approximately 3,200 acres of new land on the White River project, Fort Apache Indian Reservation." The facilities referred to in the foregoing language are presently au-

thorized under existing legislation pertaining to Indian projects and the foregoing language was included as part of our legislative drafting in the interest of presenting a complete projection of the Department's proposed water resource activities in the Pacific Southwest. Because these facilities are authorized, it is not necessary that this provision be included in this legislation.

(10) On page 25, line 11, the reference to title III should be to title II.

Although as noted earlier in this report, it is proposed that titles II and VI be eliminated in favor of a "National Water Commission," we call this evident typographical error to the committee's attention.

In my report of April 9, 1964, reporting on S. 1658 and transmitting the Department's Pacific Southwest water plan report of January 1964, I stated:

"As spokesman for the administration, I can state that we have bent every effort to develop the framework of a regional plan which would be eminently sound in its conception and which would serve as a vehicle for common cooperation. This comprehensive plan represents the largest and most complex planning job ever undertaken in a single river basin by this Department or any other administration.

"I am not prepared today on behalf of the administration to present a final and conclusive report and set of recommendations to your committee for two reasons, and for two reasons only. First, there are several major issues which are still under study by the administration and which need further analysis. The second reason relates to our uncertainty whether the people of the Pacific Southwest and their representatives in the Congress are prepared to support and work for a specific regional plan. Many voices have been heard in the region during recent months. A general consensus has developed in favor of a regional approach but no broad agreement has been evident as to a specific type of regional plan.

"Obviously, our extensive planning efforts will have been wasted unless sufficient unity can be attained by the water leaders of the respective States and their representatives in the Congress.

"If such unity is forthcoming, I can say with confidence that the final decisions will be made and the administration will give its full support to a sound regional plan that will achieve the objective of water sufficiency for the Pacific Southwest."

That unity has been largely achieved. The administration has concluded its study. The program recommended in this report is a sound approach to the water problems of the Colorado basin. It poses no threat to the interests of any other region. It is responsive to the call made in your letter to me of November 27, 1962, and in your address of September 28, 1963, to the Arizona Reclamation Association.

The Bureau of the Budget has advised that there is no objection to the submission of this report from the standpoint of the administration's program.

Sincerely yours,

STEWART L. UDALL,
Secretary of the Interior.

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D.C., May 10, 1965.

Hon. HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs,
U.S. Senate, Washington, D.C.

DEAR MR. CHAIRMAN: This is in reply to your letter of February 25, 1965, requesting a report from the Bureau of the Budget on S. 75 and S. 1019, similar bills to authorize the construction, operation, and maintenance of the Lower Colorado River Basin project, and for other purposes.

The Bureau of the Budget submitted a report to Congress on April 9, 1964, commenting on the Department of the Interior's Pacific Southwest water plan and on S. 1658, a bill to authorize, construct, operate, and maintain the central Arizona project, Arizona-New Mexico, and for other purposes. Although the Bureau of the Budget was unable to recommend authorization of S. 1658 or the Pacific Southwest water plan, we concluded that the Department of the Interior's tentative plan would benefit from review and criticism by the Congress and the people of the region, and from the continuing review which is going forward within the administration.

The legislation now under consideration, developed from the earlier proposals, demonstrates that the representatives of the States principally involved have worked intensively and cooperatively toward the resolution of the problems which have arisen in the consideration of this extremely important matter. Any proposal which holds forth the hope of composing the differences between Arizona and California deserves the most careful consideration.

During the past several months the executive branch agencies concerned have carefully reviewed the provisions of S. 1019 and S. 75. The Bureau of the Budget's comments and recommendations on these bills, reflecting the results of this review, are presented below:

1. Central Arizona project

The bills would authorize a number of conveyance and related facilities needed to bring 1,200,000 acre-feet of water annually to the central part of Arizona from the Colorado River at a cost estimated at $499 million. Construction of these facilities is designed to enable Arizona to receive water to which it is entitled under the Supreme Court decision of 1963 which allocated a total of 7.5 million acre-feet of water among the Lower Colorado Basin States, based on an assumed availability of water for consumptive use as follows: 4.4 million acre-feet to California, 2.8 million acre-feet to Arizona, and 300,000 acre-feet to Nevada.

Assuming the continued availability of the additional 1,200,000 acre-feet of water, the cost-benefit ratio for the central Arizona project is 1.76 to 1 based on direct benefits only. Irrigation users would repay approximately 85 percent of the costs allocated to irrigation, exclusive of interest on the Federal investment.

The project meets the evaluation standards approved by President Kennedy in 1962 (S. Doc. No. 97). Accordingly, the Bureau of the Budget has no objection to the authorization of this project.

2. Lower Colorado River Basin development fund

The bills would establish a development fund consisting of surplus revenues available after repayment of the power investment in the existing Hoover and Parker-Davis Dams and anticipated surplus revenues from such other Federal dams as may be subsequently constructed in the basin. The fund would be used to underwrite the relatively small amount of irrigation assistance necessary for the Arizona project and could be used to provide financial assistance for such future projects as may be be authorized. There are a number of precedents for the establishment of such basin accounts and the Bureau of the Budget perceives no objection to a similar account for the Lower Colorado River Basin.

3. Authorization of Bridge and Marble Canyon Dams

Both bills would authorize the construction of hydroelectric dams at Bridge Canyon ($511 million) and Marble Canyon ($239 million). These dams would be used in part to provide for necessary pumping required in connection with the irrigation facilities which would be authorized as the central Arizona project. In addition, they would provide a source of funds for the Lower Colorado River Basin account to assist in irrigation repayment and possible additional works to be authorized in the future.

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. The President has emphasized on many occasions the importance of preserving and enhancing natural beauty of this Nation, notably in "A Message on Natural Beauty of Our County" transmitted to the Congress on February 8, 1965.

Bridge Canyon Dam, as proposed in both bills, would be authorized at the normal high water surface elevation of 1,866 feet—designed and located to produce a maximum amount of power. At this elevation the reservoir would extend through the canyon section of the Grand Canyon National Monument and for a 13-mile stretch of the Grand Canyon National Park.

It is recognized that the lake formed by the dam would provide access by water to an area which has been heretofore relatively inaccessible. Moreover, the Congress, in authorizing the Grand Canyon National Park in 1919, anticipated the possible need of balancing water development values and park preservation values at some future date.

At the same time, there is no disagreement that the dam would alter the wilderness character of this part of the river. Deferral of a decision on Bridge Canyon Dam would enable the Federal Government to reevaluate the scenic considera-

tions involved—preferably by a group of outstanding citizens—and would make it possible to consider the dam from the standpoint of the need for additional power as well as revenues desired for the Lower Colorado River Basin account.

4. Priority of water use

Section 304(a) of S. 1019 would grant California a priority for the use of 4.4 million acre-feet annually until such time as the President proclaims "that works had been completed and are in operation, capable in his judgment of delivering annually not less than two million five hundred 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."

While the Federal Government has an obvious interest in the allocation of interstate waters, the question of priority of use of water in this case is primarily of concern to the States involved. If the assignment of this priority is agreeable to the States involved, the administration would have no objection to assigning California this priority.

The subject of importation of additional water into the basin is dealt with later in this letter.

5. Price guarantees to the Lower Colorado Basin

Title II of S. 1019 directs the Secretary of the Interior to submit within 3 years from the effective date of the act "an initial group of projects and programs for authorization" capable of "delivering annually not less than two million five hundred 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."

Any water imported from outside the natural drainage area of the Colorado River system would be made available to California, Arizona, and Nevada "at the same cost, 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" to meet a total entitlement of 7,500,000 acre-feet of water. It is our understanding that, in the event such works are not constructed, California would continue to receive 4.4 million acre-feet of water at main stream prices. Title IV of the bill authorizes the use of revenues in the development fund to maintain existing main stream prices for the amount of imported water needed to assure 7.5 million acre-feet for consumptive use in the lower basin.

Long-term estimates of water availability and costs in the lower basin obviously will be affected by many factors. The Bureau of the Budget, therefore, is concerned about the principle of an assurance or commitment by the Federal Govrenment to guarantee present prices—even though limited by the availability of revenues in the basin account as provided in title IV. Committing the Federal Government to future obligations of unknown amount—particularly if this were looked upon as a precedent for other situations—is a decision which should be taken only after the most careful consideration.

The Bureau does recognize, however, that one of the important demands on the river is to provide water necessary to meet commitments made by the U.S. Government to the Republic of Mexico in the treaty of 1944. Should the Congress decide that the situation is unique, we believe that the price guarantee should be further limited to not more than 1.5 million acre-feet of water annually, the amount required to meet the U.S. treaty obligation. With this proviso, the chances would appear minimal, based on Department of the Interior estimates, that any imported water would have to carry a price higher than main stream water—at least in the period through year 2030.

6. Development of plans to meet future long-term requirements

With the construction of the central Arizona project, as contemplated in both bills, the Bureau of the Budget and the Department of the Interior believe that the water in the Colorado River should be adequate until at least the year 1990 to meet entitlements under the Supreme Court decision. At the same time, there is agreement that the Pacific Southwest area is faced with future long-term water problems of a serious nature. Both bills, therefore, authorize studies and the formulation of projects to augment the water supply of the lower Colorado River—

(*a*) Title II of S. 1019 directs the Secretary of the Interior to prepare within 3 years estimates of long-range water supply available for consumptive use in the upper and lower basins of the Colorado River based on the estimated growth of water requirements to the year 2030.

(*b*) Title VI of S. 1019 would establish a Colorado-Pacific Regional Water Commission to advise and consult with the Secretary in carrying out the

above study, assist in the coordination of Federal, State, and local plans and programs, and recommend long-range priorities for plans and projects to meet water and related land resources requirements for the region.

The Bureau of the Budget has the following comments and recommendations with respect to a review of long-range water supply and requirements:

(*a*) We believe that the bill appropriately requires the long-range study to investigate alternative sources and various methods of augmenting water supplies including desalting of water, weather modification, water renovation, and reduction in losses to meet the current and anticipated water requirements. It would appear that major and relatively low-cost sources of water are available to the Lower Colorado Basin through conservation and better use of existing supplies—particularly irrigation canal linings and improvement in irrigation practices. We believe that the Lower Basin States should make special efforts to use existing resources more efficiently including innovations to encourage the highest economic use of such water.

(*b*) While the long-range water problems of the region are recognized as serious, they are by no means limited to this area. They are becoming increasingly critical for other parts of the country—the Great Lakes area, the Northeast, and the Southwest are examples. Under these circumstances, the Bureau of the Budget believes that this is the appropriate time to review the water resource development problems and opportunities of the Nation as a whole. Therefore, the Bureau recommends establishment of a National Water Commission to review water supplies and requirements on a national basis. Only a national commission can effectively assess the many common aspects of water problems that we face, and only such a commission can outline the consistent courses of action which must be followed if this Nation is to achieve the most efficient utilization of its precious water resources.

The commission should be composed of distinguished persons drawn from outside the Federal Government. It must, in our opinion, be adequately financed, and should utilize to the maximum possible extent the resources of the Federal water resources agencies. Finally, the commission should be given adequate time to make such studies as may be appropriate, taking up to 5 years to do so.

(*c*) The national commission should be requested to review, among other things, the proposal contained in S. 1019 to guarantee areas of origin against higher prices because of the exportation of water to another river basin. We believe the guarantee contemplated in the bill needs further study and that it would be premature to provide such a guarantee at this time. Similarly, the Bureau believes that it would be unwise for the Federal Government to commit itself to the importation of water pending the completion of the study. We agree, however, that the commission should develop—utilizing the full resources available to it by the Federal Government and State and local governments—specific plans for the review of the President and the Congress.

(*d*) Section 308(b) of S. 1019 would direct the Secretary of the Interior to reserve not more than 84,000 acre-feet of water annually for consumptive use, exclusive of California, for non-Federal fish and wildlife installations. It is not clear whether this amount is in addition to reservations made and recognized in the Supreme Court's decree in *Arizona* v. *California*. If it is an addition to amounts already reserved, the Bureau of the Budget would recommend that this issue be reserved for further study by the national commission.

(*e*) The 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.

(*f*) The commission should review any additional steps required to develop an effective program for the use and control of ground and surface water. For example, the depletion of ground water reserves, recognized as a serious problem in the Department of the Interior's 1947 report on the central Arizona project, has increased since that time.

Separate legislation has been introduced (S. 32) to authorize the southern Nevada water supply project which would also be authorized under S. 75 and S. 1019. The Bureau of the Budget is submitting a separate report on this bill.

If amended to reflect the above comments and recommendations, the Bureau of the Budget would have no objection to enactment of S. 1019 and S. 75.

Sincerely yours,

ELMER B. STAATS, *Deputy Director.*

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., April 9, 1964.

Hon. HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs,
U.S. Senate.

DEAR SENATOR JACKSON: This responds to your letter of March 23, announcing the initiation of hearings on April 9 and 10 on S. 1658, a bill "To authorize, construct, operate, and maintain the central Arizona project, Arizona-New Mexico, and for other purposes" and upon the Pacific Southwest water plan. In order that the committee may have before it the results of the thinking in the Department of the Interior to date upon these matters, I am enclosing herewith the Department's Pacific Southwest water plan report of January 1964 and a draft of bill entitled "To approve a regional approach to the development of the water resources of the Pacific Southwest, to authorize features of the initial Pacific Southwest water plan, and to establish a Pacific Southwest Regional Water Commission."

As it would be authorized by S. 1658, the central Arizona project would combine a dam and reservoir at Bridge Canyon on the mainstream of the Colorado River above Lake Mead with a system of aqueducts, storage reservoirs, and other facilities to divert approximately 1,200,000 acre-feet of Colorado River water annually for conveyance to the central region of the State.

Such a central Arizona project was first reported feasible by this Department in 1948, but authorization of that project—or, for that matter, any project to develop the waters of the lower Colorado River—was not forthcoming for the reason that rights to the waters of the mainstream have been continuously in controversy. The decision of the Supreme Court of the United States last June in *Arizona* v. *California, et al.*, 373 U.S. 546, however, has resolved the principal issues in dispute and the stage at last has been set for action.

While a central Arizona project is vitally necessary to alleviate water supply deficiencies of major dimension which are continually worsening, it is clear that the serious problems of water supply that confront the people of the central Arizona area are only one element in a complex of water problems facing the entire Pacific Southwest—the region that depends in major part on the lower Colorado River for its basic water supply. It is likewise clear that in and of itself, the central Arizona project will not solve even Arizona's water problem.

The draft of bill submitted herewith is based on the premise that projects to serve any portion of the region must be related to a program to serve the needs of the entire region. The bill includes authorization of the central Arizona project, as well as the Dixie project (S. 26) and the southern Nevada water supply project (S. 2388), as component parts of a comprehensive attack upon the water supply problems of the Pacific Southwest region.

This treatment of the central Arizona project is not made by reason of any doubt as to the engineering, economic or financial feasibility of an independent central Arizona project as set forth in S. 1658. Bureau of Reclamation investigations have demonstrated the feasibility of such an independent project. But the time when the water problems of the Pacific Southwest were suited to a piecemeal approach on the basis of individual projects—no matter how feasible standing alone—has long since passed. A regional effort is essential. The old quarrels must now be consigned to the archives of history. In their place, today's problems call for constructive water statesmanship.

Since January 1963, under my direction, the best resource experts available in my Department—including the best water planners in the Bureau of Reclamation—have been at work under instructions to prepare a regional water development plan for the Pacific Southwest designed to encourage united action by the five States of the Lower Colorado Basin. The affected States have submitted their comments and recommendations, as provided by law—and in recent weeks all of the Federal agencies have submitted their comments and recommendations concerning the plan. As an interim report I am submitting the plan, in its current form, to this committee today.

As spokesman for the administration, I can state that we have bent every effort to develop the framework of a regional plan which would be eminently sound in its conception and which would serve as a vehicle for common cooperation. This comprehensive plan represents the largest and most complex planning job ever undertaken in a single river basin by this Department or any other administration.

I am not prepared today on behalf of the administration to present a final and

conclusive report and set of recommendations to your committee for two reasons, and for two reasons only. First, there are several major issues which are still under study by the administration and which need further analysis. The second reason relates to our uncertainty whether the people of the Pacific Southwest and their representatives in the Congress are prepared to support and work for a specific regional plan. Many voices have been heard in the region during recent months. A general consensus has developed in favor of a regional approach but no broad agreement has been evident as to a specific type of regional plan. The administration needs to know—before the final decisions are made on the plan itself—whether there is sufficient support in the region for a particular regional plan.

Obviously, our extensive planning efforts will have been wasted unless sufficient unity can be attained by the water leaders of the respective States and their representatives in the Congress.

If such unity is forthcoming, I can say with confidence that the final decisions will be made and the administration will give its full support to a sound regional plan that will achieve the objective of water sufficiency for the Pacific Southwest.

The testimony which I am today presenting to the committee will analyze in detail the initial Pacific Southwest water plan as it has been developed by my Department to date.

A section-by-section analysis of the attached bill is enclosed. There are a number of provisions in the draft bill which relate to contracting for water and to the specifics of the individual projects involved. These would apply with equal force to any individual legislation affecting those projects.

Sincerely yours,

STEWART L. UDALL,
Secretary of the Interior.

A BILL To approve a regional approach to the development of the water resources of the Pacific Southwest, to authorize features of the Initial Pacific Southwest Water Plan, and to establish a Pacific Southwest Regional Water Commission

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

TITLE I—INITIAL PACIFIC SOUTHWEST WATER PLAN

SEC. 101. (a) It is the policy of the Congress that a comprehensive, multiple-purpose, regional water plan, including a development fund, be initiated for the conservation, augmentation, and beneficial utilization of the limited water supplies of the Pacific Southwest to serve as the framework under which projects to meet that region's present and future water needs may be authorized, coordinated, and constructed with proper timing. Initial basic objectives of such a plan are (1) the continued availability for consumptive use in the States of Arizona, California, and Nevada of the equivalent or 2,800,000, 4,400,000 and 300,000 acre-feet of water per annum, respectively, from the mainstream of the Colorado River; (2) the authorization of specific features and programs consistent with that plan as adequate studies are made to define them in detail and to demonstrate their financial and engineering feasibility; and (3) the promotion of prudent water conservation practices to provide maximum beneficial utilization of available water supplies.

In keeping with the foregoing policy the Initial Pacific Southwest Water Plan (hereinafter referred to as the "Initial Plan") is hereby approved substantially in accordance with the recommendations of the Secretary of the Interior (hereinafter referred to as the "Secretary") set forth in — Doc. —, 88th Congress, 2d Session, for the following purposes; to furnish water supplies of suitable quality for municipal, industrial, irrigation (supplemental, except as otherwise authorized herein), recreation, fish and wildlife, and other beneficial purposes; to enhance recreation opportunities; to conserve and develop fish and wildlife resources; to promote the development of Indian reservations and economically depressed areas; to improve navigation and to control floods; to protect and assist areas of origin from which water may be exported to the region; to make available each year through direct deliveries, or by replacement or exchange, up to approximately 1,900,000 acre-feet of water per annum (including water made available by programs undertaken pursuant to section 103(b) of this Act) as may be required to make up deficiencies in mainstream Colorado River water available to satisfy consumptive uses in the States of Arizona, California, and Nevada in the following amounts in accordance with the opinion of the Supreme Court of

the United States in *Arizona* v. *California, et al.*, 373 U.S. 546, and any decree of the court entered therein:

Arizona	2,800,000 acre-feet
California	4,400,000 acre-feet
Nevada	300,000 acre-feet

at costs to the users that would prevail if mainstream Colorado River water were available for consumptive uses in the aforesaid amounts; and to provide for the generation, transmission, and sale of electric power and energy to help meet the growing needs of the region and to aid and assist financially in the accomplishment of the objectives of the plan.

(b) This Act may be cited as the "Pacific Southwest Water Plan Act".

SEC. 102 DEVELOPMENT FUND. (a) There is hereby established a separate fund in the Treasury of the United States to be known as the Pacific Southwest Development Fund (hereinafter referred to as the "Development Fund") which shall remain available until expended as hereafter provide for carrying out the provisions of section 103 (except subsections (g) and (h)) of this Act.

(b) All appropriations made for the purpose of carrying out the aforesaid provisions of section 103 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 all revenues collected in connection with the operation of facilities under the Initial Plan (except entrance, admission, and other recreation user fees or charges, proceeds received from recreation concessioners, and monies collected in connection with work mentioned in subsection 103(h) of this Act) and all revenues from the Boulder Canyon and Parker-Davis projects which, after completion of repayment requirements, are surplus to the operation, maintenance and replacement requirements of those projects and not needed to reimburse the Upper Colorado River Basin Fund (70 Stat. 105, 107) as provided in the Glen Canyon filling criteria (27 Fed. Reg. 6851) for any expenditures made from that fund to meet deficiencies in generation at Hoover Dam during the filling period of reservoirs of storage units of the Colorado River Storage project.

(d) Such revenues shall be available, without further appropriation, for (1) defraying the costs of operation, maintenance, and replacements of, and emergency expenditures for, all features of the Initial Plan, within such separate limitations as may be included in annual appropriation acts; (2) payments as required by subsection (e) of this section; and (3) payments as required by subsection (f) of this section. Revenues credited to the Development Fund shall not be available for construction of features of the Initial Plan authorized by or pursuant to this Act.

(e) Revenues in the Development Fund in excess of the amount necessary to meet the requirements of clause (1) of subsection (d) of this section shall be paid annually to the general fund of the Treasury to return—

(1) the costs of each feature of the Initial Plan allocated to commercial power or municipal and industrial water supply within a period not exceeding fifty years from the date of completion of each such feature;

(2) the costs of features of the Initial Plan allocated to irrigation within a period not exceeding fifty years from the date of completion of each such feature, exclusive of any development periods authorized by this Act; and

(3) 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 Initial Plan at a rate determined by the Secretary of the Treasury in accordance with the provisions of subsection (g) of this section; and interest due shall be a first charge.

(f) Revenues in the Development Fund in excess of the amount necessary to meet the requirements of clause (1) of subsection (d) of this section and subsection (e) of this section shall be—

(1) paid to the appropriate agency (or in the case of a Federal project to the general fund of the Treasury) to carry out the provisions of section 103(d)(2)(iii) of this Act; and

(2) paid to the general fund of the Treasury to carry out the provisions of section 103(d)(2)(ii) of this Act.

(g) The interest rate applicable to each project and program in the Initial Plan, including the Federal payments under section 103(d)(1) of this Act, 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 project or program, or for making the initial payment thereunder, 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.

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

SEC. 103. INITIAL FEATURES. In partial accomplishment of the Initial Plan the Secretary shall—

(a) construct, operate, and maintain the Mainstream Reservoir Division comprised of the Bridge Canyon and Marble Canyon projects consisting of dams, reservoirs, powerplants, transmission facilities, and appurtenant works, including the Coconino and Paria River silt-detention reservoirs: *Provided*, That 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, and that 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.

(b) undertake programs for water salvage through phreatophyte control along and adjacent to the mainstream of the Colorado River and through groundwater recovery in the Yuma area at an average annual rate not in excess of the average annual rate of recharge in the area from waters of the mainstream of the Colorado River: *Provided*, That no funds authorized by this Act may be expended for installation of any works for such recovery of groundwater until the Secretary of State has reported to the President on consultations which he may have had with the government of Mexico pursuant to the requirements of the water treaty of 1944 and the President has approved a definite plan report on the groundwater recovery portion of the program.

(c) construct, operate, and maintain the Central Arizona project consisting of the following principal works: Maxwell dam, reservoir, and pumpplant; Buttes dam and reservoir; Charleston dam and reservoir; Hooker dam and reservoir, New Mexico; Granite Reef aqueduct and pumping plants; Tucson aqueducts and pumping plants; Salt-Gila aqueduct; canals, powerplants and transmission facilities; water distribution and drainage facilities; and appurtenant works. It shall be a condition of each contract under which water is provided under the project that (1) there be in effect measures, adequate in the judgment of the Secretary, to control expansion of irrigation form aquifers affecting the contract service area, and (2) the canals and distribution systems through which water is conveyed after its delivery by the United States to the contractor shall be provided and maintained with linnigs, adequate in the judgment of the Secretary, to prevent excessive conveyance losses. The Secretary is authorized to require as a condition in any contract under which water is provided under the project that the contractor agree to accept mainstream water in exchange for or in replacement of existing supplies from sources other than the mainstream but no such exchange or replacement shall require a contractor to bear any cost of said exchange or replacement water in excess of the costs that would have been incurred in connection with the continued use by the contractor of its existing supply, nor shall such exchange or replacement otherwise result in economic injury to the contractor.

It shall be a condition of the availability of water under the Central Arizona project for the San Carlos Irrigation and Drainage District that the District, in addition to entering into a contract for a water supply, shall enter into a new repayment contract with the Secretary in lieu of the existing repayment contract of June 8, 1931, as amended and supplemented. Such a new repayment contract shall provide for repayment, without regard to the repayment provisions of the Act of June 7, 1924 (43 Stat. 475), the Act of March 7, 1928 (45 Stat. 210), and the Acts of June 5, 1934 (48 Stat. 881) and July 14, 1945 (59 Stat. 469), within the basic repayment period specified in section 107(c) of this Act, of all San Carlos project costs determined by the Secretary to be properly allocable for return by the District; and shall, as nearly as may be practicable, otherwise conform with and be subject to the provisions of the Federal reclamation laws applicable to irrigation repayment contracts.

(d)(1) negotiate and, upon reaching agreement, enter into a contract with the State of California providing for the enlargement of the California State Water project aqueduct in order that an additional amount of approximately 1.2 million acre-feet of water annually may be conveyed through

the Tehachapi Mountains from Wheeler Ridge to Cedar Springs and providing for the marketing and delivery of such water on behalf of the United States for the purposes of this Act. Pursuant to such contract the Secretary is authorized to pay on behalf of the United States an equitable share of the costs of construction, operation, and maintenance of the enlarged section of the aqueduct either by way of reimbursement for expenditures incurred or in annual installments during the construction period, each of which installments shall bear approximately the same ratio to total expenditures during the year as the total of the United States' share bears to the total cost of the enlarged section of the aqueduct: *Provided*, That such contract shall not obligate the United States beyond the incremental cost of construction of the joint-use facilities included in the enlarged section of the aqueduct pending authorization of the facilities referred to in paragraph (2) of this subsection. The Secretary may make advances to the State in order to maintain a timely construction schedule. To the extent that water is delivered by the State to make up deficiencies in mainstream Colorado River water, as provided in section 101 of this Act, the charges therefor shall be based on the standard specified in said section and the deliveries thereof shall be subject to the provisions of the Boulder Canyon Project Act.

(2) complete feasibility reports as expeditiously as funds are made available therefor on features of the Initial Plan for the conservation and storage of water in the north coastal areas of California, and for related conveyance and other facilities including enlargement of the potential East Side division of the Central Valley project, to make available to the Pacific Southwest up to approximately 1,200,000 acre-feet of water per annum to make up deficiences in mainstream Colorado River water as provided in section 101 of this Act and for interim disposition pending its need for that purpose. Said reports shall be submitted promptly to the affected States, and thereafter to the President and the Congress. The planning, construction, and operation of all such features shall be subject to the following conditions: (i) diversions shall be subordinate to all existing and anticipated future needs for consumptive uses within the watersheds of origin, including the future retention of additional water in the watersheds of origin if the original estimates of future needs for consumptive uses prove insufficient; (ii) financial assistance of the character provided under the Federal reclamation laws shall be available from the Development Fund for the construction of any future projects in the watersheds of origin if such assistance is not otherwise provided; and (iii) additional costs of future projects, caused by the pre-emption of lower-cost water sources which otherwise would benefit the areas of origin, or the State of California insofar as the water supply therein is diminished, shall be offset by assistance from the Development Fund to the end that the costs chargeable to such projects shall be no greater than they would have been had there been no export under the Initial Plan: *Provided*, That the financial assistance under (ii) and (iii) above shall not exceed that available under section 102(f) of this Act.

(e) (1) construct, operate, and maintain the Southern Nevada Water Supply project, the principal works of which shall consist of intake facilities, pumping plants, aqueduct and laterals, transmission lines, substations, storage and regulatory facilities, drainage facilities, and appurtenant works required to provide water from Lake Mead for distribution for municipal and industrial purposes in Clark County, Nevada. Construction of the project shall not commence until a repayment contract has been entered into and its execution by the contractor shall have been finally affirmed by a decree of a court of competent jurisdiction. The Secretary may enter into a contract with the State of Nevada, acting through the Colorado River Commission of Nevada or other duly authorized State agency, providing among other things, that—

(i) the contractor shall operate and maintain the project works;

(ii) the construction costs allocable to municipal and industrial water supply shall be repaid by the contractor, with interest, in not more than 50 years (except such construction costs as are allocable to the furnishing of a water supply to Nellis Air Force Base and other Federal defense installations, which costs shall be nonreimbursable); and

(iii) the contractor shall take delivery of water from Lake Mead at the intake works and shall sell and deliver such water at wholesale

under contracts to be approved by the Secretary which shall include an obligation on the part of each purchaser to exercise such powers as it may possess to levy and collect taxes or assessments for purposes of meeting the charges for service thereunder.

(2) construct, operate, and maintain the Moapa Valley Pumping project, Nevada, the principal works of which shall consist of pumping plants, storage facilities, aqueducts, transmission lines, drainage facilities, and appurtenant works to supply supplemental irrigation water to approximately 3,300 acres and provide a new water supply for irrigation of approximately 6,000 acres: *Provided*, That construction shall not be undertaken until the Secretary has determined, and has submitted to the President and to the Congress a feasibility report demonstrating, that the project has engineering feasibility, that its reimbursable costs can probably be returned as provided by this Act, and that its benefits will exceed its costs.

(f) construct, operate, and maintain the Dixie project, Utah, the principal works of which shall consist of the Virgin City dam, reservoir, and powerplant, a dam on the Santa Clara River near Gunlock, Utah, tunnels, canals, siphons, pumping plants, hydroelectric plants, transmission facilities, drainage facilities and appurtenant works. The Dixie project shall be coordinated with the Cedar City water development program which includes the diversion of the waters of Crystal Creek into the Kolob Reservoir, and after completion of the Dixie project said waters of Crystal Creek and of the natural watershed of said Kolob Reservoir shall be exported for use of Cedar City and vicinity in accordance with an agreement entered into by Cedar City and Iron County, Utah, on the 26th day of August 1953, with Kolob Reservoir and Storage Association, Incorporated, and Washington County, Utah. The project shall include as reimbursable costs such measures for the disposition of saline waters of La Verkin Springs as are necessary in the opinion of the Secretary to insure the delivery of water at downstream points along the Virgin River for water users in the States of Arizona, Nevada, and Utah of suitable quality for irrigation, or provision shall be made to indemnify such water users for any impairment of water quality for irrigation purposes directly attributable to Dixie project operations.

(g) provide for recreation and fish and wildlife development as follows: 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 Initial Plan and facilities for the conservation and development of fish and wildlife; 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 Initial Plan; conserve the scenery, the natural, historic, and archeologic objects, and the wildlife on said lands; allocate water and reservoir capacity to recreation and fish and wildlife purposes; and provide for the public use and enjoyment of lands, facilities, and water areas included in the Initial Plan in a manner coordinated with the other purposes of the Plan.

The Secretary shall reserve not to exceed 84,000 acre-feet per annum of mainstream water for consumptive use in the region, exclusive of California, by diversion or by exchange, for non-Federal fish and wildlife installations included in said Initial Plan, subject to rights existing on the effective date of this Act of users of mainstream water: *Provided*, That such water shall be put to use for fish and wildlife purposes within a period of 50 years from the effective date of this Act.

The Secretary is authorized to 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 the Initial Plan, 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.

The Secretary is authorized to transfer jurisdiction over lands included in the Initial Plan 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 Secretay of Agiculture, the lands involved shall become national forest lands: *Provided*, That the lands and waters within the flow lines of any reservoir or otherwise needed or used for the operation of the Initial Plan for other purposes shall continue to be administered by the Secretary of the Interior to the extent he determines to be necessary for such operation.

Nothing herein shall limit the authority of the Secretary of the Interior granted by 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.

(h) continue construction of irrigation distribution and drainage facilities on the Colorado River Indian Irrigation Project, Colorado River Indian Reservation, and construct diversion and distribution facilities to develop approximately 3,200 acres of new land on the White River project, Fort Apache Indian Reservation.

SEC. 104. PRIORITY PLANNING. In carrying out further investigations of projects to be added to the Initial Plan, the Secretary shall give priority to completion of feasibility reports on tributary projects within the Pacific Southwest where undeveloped local water supplies are available or can be made available by replacement or exchange and on other projects, including Indian projects, in Arizona, California, and Nevada which can utilize water by diversion from the mainstream or which can utilize other water which can be developed either directly or through exchange to meet water deficiencies in the area. Similar priority in planning shall be given to projects in areas of origin of import supplies and, subject to appropriate modifications, relating to disposition of the conserved water, of existing contracts with the United States, to completion of a feasibility report on the lining of the All-American Canal system.

SEC. 105. CONTINUING STUDY. The Secretary, in cooperation with the States and with the Pacific Southwest Regional Water Commission, shall maintain a continuing review of the hydrology of the Colorado River, groundwater pumping, and projections of future water supply and demand in the region, and report thereon to the Congress, such reports to be made complementary to the reports on water quality required by section 15 of the Act of June 13, 1962 (P.L. 87-843) and section 6 of the Act of August 16, 1962 (P.L. 87-590).

SEC. 106. COST ALLOCATIONS. Upon completion of each project or separable feature thereof, the Secretary shall allocate the total costs (excluding any expenditures authorized by subsection 103(h) of this Act) of constructing said project or separable feature thereof to commercial power, irrigation, municipal (domestic and industrial) water supply, flood control, navigation, area redevelopment, recreation, fish and wildlife, or any other purposes authorized under reclamation law: *Provided*, That costs of means and measures to prevent loss of and damage to fish and wildlife resources shall be considered as project costs and allocated as may be appropriate among the project functions. Allocations of construction, operation, and maintenance costs to area redevelopment and to other authorized nonreimbursable purposes shall be nonreturnable under the provisions of this Act. On January 1 of each year the Secretary shall report to the Congress for the previous fiscal year, beginning with the fiscal year 1966, upon the status of the revenues from, and the cost of, constructing, operating, and maintaining features of the Initial Plan. The Secretary's report shall be prepared to reflect accurately the Federal investment allocated at that time to power, to irrigation, and to other purposes, the progress of return and repayment thereon, and the estimated rate of progress, year by year, in accomplishing full repayment.

SEC. 107. GENERAL PROVISIONS. (a) The Federal reclamation laws (Act of June 17, 1902, 32 Stat. 388, and Acts amendatory thereof and supplementary thereto) shall govern the construction, operation, and maintenance of the Initial Plan except as otherwise provided herein.

(b) Waters furnished by or through the plan shall not be used for the irrigation of lands not having a recent irrigation history as determined by the Secretary, except in the case of Indian lands, national wildlife refuges, State-

administered wildlife management areas with the approval of the Secretary, the Dixie project (not to exceed approximately 11,615 acres), and the Moapa Valley Pumping project (not to exceed approximately 6,000 acres).

(c) Irrigation repayment contracts shall provide for repayment of the obligation assumed thereunder 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 this Act; 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 not more than fifty years; 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 miscellaneous purposes if and to the extent that such water is not required by the contractor for irrigation purposes.

(d) Development periods may be provided only for the Dixie and Moapa Valley Pumping projects.

(e) Notwithstanding any other provisions of law, no contract relating to an irrigation water supply from the mainstream of the Colorado River shall commit the United States to deliver such supply for a basic period of more than fifty years for each project contract unit or irrigation block exclusive of any development period authorized by this Act, nor shall such a contract carry renewal or conversion rights or entitle the contractor to water beyond expiration of the delivery periods specified therein. In negotiating new contracts for delivery of such mainstream water, the Secretary shall consult with representatives of the State in which the use of such water is apportioned by any decree of the Supreme Court of the United States entered in *Arizona* v. *California, et al.*, 373 U.S. 546; and the Secretary shall take into consideration the overall water supply and needs of the project involved. The provisions of this subsection shall not apply to any user who on the effective date of this Act has in force a contract with the United States for mainstream water, or to mainstream water decreed for Indian lands in *Arizona* v. *California, supra.*

(f) The Secretary shall determine the repayment capability of Indian lands within, under, or served by the Initial Plan. Construction costs allocated to irrigation of Indian lands (including provision of water for incidental domestic and stockwater uses) and within the repayment capability of such lands shall be subject to the Act of July 1, 1932 (47 Stat. 564), and, in recognition of the fact that Indian assistance is a national responsibility, such costs as are beyond the repayment capability of such lands shall be nonreimbursable.

(g) Contracts relating to municipal water supply may be made without regard to the limitations of the last sentence of section 9(c) of the Reclamation Project Act of 1939 (53 Stat. 1194; 43 U.S.C. 485h(c)). Such contracts shall provide for repayment over a period of not more than fifty years if made pursuant to clause (1) of said section and may provide for delivery of water for a period of not more than fifty years if made pursuant to clause (2) thereof.

(h) 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.

(i) Before recommending any project for addition to the Initial Plan, the Secretary shall determine that its reimbursable costs can reasonably be expected to be returned from revenues anticipated to accrue thereunder and to the Development Fund within the repayment periods specified in this Act.

(j) Whenever Indian lands are acquired in connection with implementation of the Initial Plan, the Secretary shall submit recommendations to the Congress for appropriate payments to the Indians in addition to amounts paid as just compensation for land acquired.

SEC. 108. SAVING PROVISIONS. Nothing contained in this Act shall be construed to alter, amend, repeal, construe, interpret, modify, or be in conflict with the provisions of the Colorado River compact, the Upper Colorado River Basin compact, the Colorado River Storage Project Act (70 Stat. 105), the Treaty with the United Mexican States (Treaty Series 994), the opinion and any decree entered by the Supreme Court of the United States in *Arizona* v. *California, et al.*, 373 U.S. 546, or, except as otherwise provided herein, the Boulder Canyon Project Act (45 Stat. 1057) and the Boulder Canyon Project Adjustment Act (54 Stat. 774).

SEC. 109. DEFINITIONS. As used in this Act—

(a) "Pacific Southwest" and "region" means the drainage basin of the Colorado River from Lee Ferry to the Mexican border plus the portion of California

bounded on the north by the Ventura-Santa Barbara county line and the Tehachapi Mountains, and on the west by the Sierra Nevada Mountains northward to and including Mono county.

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

(c) "Consumptive use" means diversions from the stream less such return flow thereto as is available for consumptive use in the United States or in satisfaction of the Mexican treaty obligation.

(d) Consumptive use from the mainstream within a State shall include all consumptive uses of water of the mainstream, including water drawn from the mainstream by underground pumping, and including but not limited to, consumptive uses made by persons, by agencies of that State, and by the United States for the benefit of Indian reservations and other Federal establishments within the State.

(e) "User" or "water user" in relation to mainstream water means the United States, or any person or legal entity, entitled under any decree of the Supreme Court of the United States entered in *Arizona* v. *California, et al.*, 373 U.S. 546, to use mainstream water when available thereunder.

SEC. 110. APPROPRIATIONS. There are hereby authorized to be appropriated such sums (but not more than $90,000,000 for the partial accomplishment of the features authorized by section 103 of this Act) as are necessary to carry out the purposes of this Act.

TITLE II—PACIFIC SOUTHWEST REGIONAL WATER COMMISSION

SEC. 201. (a) There is hereby established the Pacific Southwest Regional Water Commission (hereinafter referred to as the "commission") composed of members appointed as follows:

(1) a chairman appointed by the President who shall also serve as chairman and coordinating officer of the Federal members of the commission and who shall represent the Federal Government in Federal-State relations on the commission: *Provided*, That in the event the chairman is the head of a Federal department or agency, he may appoint a deputy to act in his stead during his absence;

(2) one member representing each of the States of Arizona, California, Nevada, New Mexico, and Utah appointed by the Governor of the State; and

(3) one member appointed by and representing each of the Secretaries of Agriculture, the Army, Health, Education, and Welfare, Interior, 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; except that if the chairman is not a Federal official, his compensation shall be determined by the President, but when employed on a full-time annual basis shall not exceed the maximum scheduled rate for grade GS–18 of the Classification Act of 1949, as amended; or when engaged in the performance of the commission's duties on an intermittent basis such compensation shall be not more than $100 per day and shall not exceed $12,000 in any year.

SEC. 202. (a) The functions of the commission shall be to—

(1) serve as the principal agency for the coordination of further Federal, State, interstate, and local plans for the conservation, augmentation, and beneficial utilization of the water and related land resources of the Pacific Southwest;

(2) coordinate with State and Federal agencies the preparation of a comprehensive, coordinated, joint plan for the further Federal, State, interstate, and local conservation, augmentation, and beneficial utilization of the water and related land resources of the region: *Provided*, That the plan may include alternatives and it may be prepared in stages, including recommendations with respect to individual projects;

(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) advise and counsel on such studies of water and related land resources, including water quality, in the region as are necessary in the preparation of the plan described in clause (2) of this subsection.

(b) State members of the commission shall elect a vice chairman, who shall serve also as chairman and coordinating officer of the State members of the

commission and who shall represent the State governments in Federal-State relations on the commission.

(c) Vacancies in the commission shall not affect its powers but shall be filled in the same manner in which the original appointments were made: *Provided*, That the chairman and vice chairman may designate alternates to act for them during temporary absences.

(d) In the work of the commission every reasonable endeavor shall be made to arrive at a consensus of all members on all issues; but failing this, full opportunity shall be afforded each member for the presentation and report of individual views: *Provided*, That at any time the commission fails to act by reason of absence of consensus, the position of the chairman, acting in behalf of the Federal members, and the vice chairman, acting upon instructions of the State members, shall be set forth in the record: *Provided further*, That the chairman, in consultation with the vice chairman, shall have the final authority, if necessary, to fix the times and places for meetings, to set deadlines for the submission of annual and other reports, to establish subcommittees, and to decide such other procedural questions as may be necessary for the commission to perform its functions.

SEC. 203. The commission shall—

(1) engage in such activities and make such studies and investigations as are necessary and desirable in carrying out the policy set forth in section 101 of this Act and in accomplishing the purposes set forth in section 202(a) of this title;

(2) submit to the Governor of each participating State and to the President for transmission to the Congress a report on its work at least once each year. After such transmission, copies of any such report shall be sent to the heads of such Federal, State, interstate, and international agencies as the President or the Governors of the participating States may direct;

(3) submit to the President for transmission to the Congress and to the Governors and the legislatures of the participating States a comprehensive, coordinated, joint plan, or any major portion thereof or necessary revisions thereof, for the conservation, augmentation, and beneficial utilization of the water and the related land resources of the region. Before the commission submits such a plan or major portion thereof or revision thereof to the President, it shall transmit the proposed plan or revision to the head of each Federal department or agency, and the Governor of each State, from which a member of the commission has been appointed. Each such department and agency head and Governor shall have ninety days from the date of the receipt of the proposed plan, portion or revision to report its views, comments, and recommendations to the commission. The commission may modify the plan, portion or revision after considering the reports so submitted. The views, comments, and recommendations submitted by each Federal department or agency head and Governor shall be transmitted to the President with the plan, portion or revision; and

(4) submit to the President at the time of submitting such plan, any recommendations it may have for continuing the functions of the commission and for implementing the plan, including means of keeping the plan up to date.

SEC. 204. (a) For the purpose of carrying out the provisions of this title, the commission may—

(1) hold such hearings, sit and act at such times and places, take such testimony, receive such evidence, and print or otherwise reproduce and distribute so much of its proceedings and reports thereon as it may deem advisable;

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

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

(4) employ and compensate such personnel as it deems advisable, including consultants at rates not to exceed $100 per diem;

(5) arrange for the services of personnel from any State or the United States, or any subdivision or agency thereof, or any intergovernmental agency;

(6) make arrangements, including contracts, with any participating government, except the United States, for inclusion in a suitable retirement and employee benefit system of such of its personnel as may not be eligible for or

continuing in another governmental retirement or employee benefit system, or otherwise provide for such coverage of its personnel;

(7) purchase, hire, operate, and maintain passenger motor vehicles; and

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

(b) The chairman of the commission, or any member of the commission designated by the chairman thereof for the purpose, is authorized to administer oaths when it is determined by a majority of the commission that testimony shall be taken or evidence received under oath.

(c) To the extent permitted by law, all appropriate records and papers of the commission shall be made available for public inspection during ordinary office hours.

(d) Upon request of the chairman of the commission, or any member or employee of the commission designated by the chairman thereof for the purpose, the head of any Federal department or agency is authorized (1) to furnish to the commission such information as may be necessary for carrying out its functions and as may be available to or procurable by such department or agency, and (2) to detail to temporary duty with the commission on a reimbursable basis such personnel within his administrative jurisdiction as it may need or believe to be useful for carrying out its functions, each such detail to be without loss of seniority, pay, or other employee status.

(e) The chairman of the commission shall, in accordance with the general policies of the commission with respect to the work to be accomplished by it and the timing thereof, be responsible for (1) the appointment and supervision of personnel employed by the commission, (2) the assignment of duties and responsibilities among such personnel, and (3) the use and expenditures of funds available to the commission.

SEC. 205. (a) The commission shall determine the proportionate share of its expense 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 President 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 a commission against State appropriations for which delay is anticipated by reason of later legislative sessions. All sums appropriated to or otherwise received by a commission shall be credited to the commission's account in the Treasury of the United States.

(b) The commission may accept for any of its purposes and functions appropriations, donations, and grants of money, equipment, supplies, materials, and services from any State or the United States or any subdivision or agency thereof, or intergovernmental agency, and may receive, utilize, and dispose of the same.

(c) The commission shall keep accurate accounts of all receipts and disbursements. The accounts shall be audited at least annually in accordance with generally accepted auditing standards by independent certified or licensed public accountants, certified or licensed by a regulatory authority of a State, and the report of the audit shall be included in and become a part of the annual report of the commission.

(d) The accounts of the commission shall be open at all reasonable times for inspection by representatives of the jurisdictions and agencies which make appropriations, donations, or grants to the commission.

SEC. 206. Nothing in this title shall be construed—

(a) 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, or limit 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; nor to limit the use of other mechanisms, if preferred by the participating governmental units, in the water resources field;

(b) as superseding, modifying, or repealing existing laws applicable to the various Federal agencies which are authorized to develop or participate in the development of water and related land resources, or to exercise licensing or regulatory functions in relation thereto; nor to affect the jurisdiction, powers, or prerogatives of the International Boundary and Water Commission, United States and Mexico.

SECTION ANALYSIS

A BILL To approve a regional approach to the development of the water resources of the Pacific Southwest and to authorize features of the initial Pacific Southwest water plan, and to establish a Pacific Southwest Regional Water Commission

TITLE I—INITIAL PACIFIC SOUTHWEST WATER PLAN

Purposes

Section 101 establishes as congressional policy a regional approach to the water problems of the Pacific Southwest. This regional approach includes the creation of a regional development fund for pooling water and power revenues from projects in the region to underwrite regional development.

In furtherance of this policy, the initial Pacific Southwest water plan is approved substantially as recommended by the Secretary of the Interior for, among other purposes, the supplying of up to 1,900,000 acre-feet of water annually to make up deficiencies in Colorado River water available for consumptive use in the amounts of 2,800,000, 4,400,000, and 300,000 acre-feet in Arizona, California, and Nevada, respectively, at costs to users no greater than if water were available in the main stream of the Colorado River for consumptive uses in those amounts in accordance with the decision of the Supreme Court in *Arizona* v. *California, et al.* (373 U.S. 546). The amounts of water are those recently adjudicated by the Supreme Court in *Arizona* v. *California, et al.*, to have been apportioned for use in the three States respectively out of the first 7,500,000 acre-feet of mainstream water available for consumptive use in the Lower Colorado River Basin. To achieve this objective the initial plan and the bill propose the authorization of certain works and programs which, on the basis of hydrologic assumptions made, would provide the necessary water. Authorization and construction of works in furtherance of this purpose will not constitute the United States an insurer of the availability of water. The United States traditionally has not, as a matter of law, warranted the achievement of the purposes of water resource projects. The legal responsibility that would be undertaken by the United States in this regard, then, would be no different than that which it has undertaken in connection with other water resource projects. Any specific liability of the United States to water users would be determined ex contractu and, under the Federal reclamation laws, liability for the delivery of water has consistently been subject to its availability for the purpose. Also stated as an objective is the achievement of more prudent practices in the beneficial use of existing supplies.

Subsection (b) gives the legislation the short title of the "Pacific Southwest Water Plan Act".

Development Fund

Section 102 establishes the Pacific Southwest Development Fund, which is patterned after the Upper Colorado River Basin Fund created by the Colorado River Storage Project Act (70 Stat. 105, 107; 43 U.S.C. 620d). All appropriations for carrying out the features of the initial Pacific Southwest water plan authorized by section 103 of the bill would be credited to and expended from the fund, except for certain specialized recreation, fish and wildlife, and Indian programs.

All water and power revenues received from authorized regional projects will also be credited to the fund, as well as surplus revenues from the Boulder Canyon (Hoover Dam) and Parker-Davis projects that are available after fulfillment of repayment requirements and after reimbursement to the Upper Colorado River Basin Fund of any expenditures made therefrom to meet Hoover power deficiencies during the filling period of the storage unit reservoirs of the Colorado River storage project. These revenues will be available for: (1) payment of reimbursable operation, maintenance, replacement, and emergency (but not construction) costs; (2) interest where provided for; (3) return to the Treasury of all reimbursable construction costs within 50 years, including irrigation costs beyond the ability of the water users to repay and the added costs involved in supplying water under the 7.5 million acre-feet objective referred to in section 101; and (4) payments as provided in clauses 103(d)(2) (ii) and (iii) that might be required to provide financial assistance for areas of origin from which water supplies are exported to the Pacific Southwest region. Interest rates would be set for each project according to the formula applicable under the Water Supply Act of 1958.

Initial features

Section 103 authorizes the Secretary of the Interior to construct, operate, and maintain the following features of the initial Pacific Southwest water plan:

(*a*) *Main stream Reservoir division.*—This consists of the "high" Bridge Canyon Dam at the head of Lake Mead and the Marble Canyon Dam below Glen Canyon on the Colorado River. Also included are the small Coconino Dam on the Little Colorado River to control deposit of silt and debris in the Grand Canyon, and the Paria Dam on the Paria River to control deposit of silt and debris in the Marble Reservoir.

(*b*) *Water salvage.*—This program of water salvage through phreatophyte control along and adjacent to the main stream and groundwater recovery in the Yuma area, generally as set forth in the Secretary's report, would supplement work undertaken as a part of the Colorado River front work and levee system pursuant to the act of June 28, 1946 (60 Stat. 338), as amended. The Department of State regards the United States as obligated by the Mexican Water Treaty of 1944 to discuss the ground water recovery program in all its related aspects with the Government of Mexico through the International Boundary and Water Commission before any construction is undertaken under the program. To provide adequate assurances to the Government of Mexico and to comply with the treaty, the bill would not authorize construction until the program has been discussed with the Government of Mexico and the President has approved the plans for its execution.

(*c*) *Central Arizona project.*—Hooker Dam and Reservoir, N. Mex., is included among the project works on the assumption that the water rights problems will be resolved. Delivery of central Arizona project water to any service area is made conditional on (1) the existence of effective measures that are adequate in the judgment of the Secretary to control expansion of irrigation from ground water aquifers affecting the contract service area, and (2) adequate lining of canals and distribution systems to prevent excessive conveyance losses. The Secretary also is authorized to require persons receiving water service under the project to accept additional Colorado River water in exchange for or replacement of their existing supplies derived from another source, provided that economic injury does not result from such exchange or replacement. The purpose of this arrangement is to extend the benefits of the central Arizona project to more of the State by releasing water in upstream tributary areas from downstream rights.

The bill also requires, as a condition of the availability of Colorado River water, the renegotiation of the repayment contract with the San Carlos Irrigation and Drainage District to cover repayment of its share of the outstanding reimbursable construction charges of the existing San Carlos project, amounting to about $8,563,000. Under the provisions of the present contract, these charges are repaid on a variable annual basis dependent upon the amount of stored water in the San Carlos Reservoir behind Coolidge Dam. The terms of this contract are in accordance with the repayment schedule set out in the act of July 14, 1945 (59 Stat. 469). During the 17 years that the present amended repayment contract has been in effect the average annual repayment credited to or made on construction charges by the district has been about $16,900. This averages out to be about 34 cents per acre per year. At this rate of repayment, assuming no further increase in the construction charges, the repayment period will extend for more than 500 years.

Authorization of the central Arizona project presents two additional factors that may prolong the repayment period under the existing contract even further. First, lining of the San Carlos project canals and laterals has been included under the Pacific Southwest water plan as part of the central Arizona project because of the unique relationship between the Indian and non-Indian use of joint works facilities and the financial condition of the San Carlos project. If these costs are to be repaid under the existing contract at the current rate, the payout period would be extended to about 800 years. Second, the operation of Hooker Reservoir, so as not to impair downstream rights, would entail, among other things, the delivery of exchange or replacement Colorado River water to the San Carlos project in lieu of Gila River water which could have been stored in the San Carlos Reservoir. This will further reduce the amount of water which could have been stored in the reservoir and in turn reduce the annual repayment obligation of the district under the present contract, thus prolonging the payout period still further.

We are not unmindful of the financial plight of the San Carlos project which has been caused by lack of an adequate water supply for the full 100,546 acres. As a matter of fact the purpose of bringing in supplemental Colorado River water and lining the distribution system is to ease that plight. With the central Arizona project in operation, it seems clear that the San Carlos project can be made financially self-sufficient. Moreover, with a firm water supply assured, we believe the district's lands will have a repayment capability for debt retirement adequate to support payout in 50 years. Accordingly, we believe that the existing contract, in addition to a new contract covering supplemental water from the central Arizona project, should be renegotiated on terms generally conforming to Federal reclamation laws, such as those relating to excess land, land classification, and variable charges.

(*d*) *Development of additional water supplies in California.*—The initial plan contemplates the importation of water from the north coastal region of California to the southern California part of the Pacific Southwest. A very significant economy in the importation development can be achieved at this time through the authorization in paragraph (d)(1) for the Secretary to contract with the State of California for enlargement of the Tehachapi crossing (Wheeler Ridge to Cedar Springs Reservoir—a distance of approximately 130 miles) of the State water project aqueduct and tunnels. Under the bill, the United States would bear "an equitable share" of the costs of this enlarged section. The estimate of $240 million given in the Department's Pacific Southwest water plan as the Federal share of the capital costs represents the average between a division of costs on the basis of proportionate capacity and on the basis of proportionate use. This method of cost sharing is similar to the method used to determine cost sharing between the State of California and the United States for the joint-use facilities of the San Luis unit of the Central Valley project authorized by the act of June 3, 1960 (Public Law 86-488).

The San Luis legislation employs the same statutory term, i.e., "equitable share," as the basis for division of costs between the State and the United States. Pending autthorization of the facilities required for the storage and conveyance of the water, the Federal payment toward the cost of the enlarged section would be limited to the incremental cost of the enlargement.

The contract also would provide for the State to market and deliver the additional water for purposes of the act. Central to these purposes is the objective of making up deficiencies, to the extent of 1,200,000 acre-feet annually in main stream Colorado River water available for consumptive use in the States of Arizona, California, and Nevada in the amounts of 2,800,000, 4,400,000, and 300,000 acre-feet respectively at costs to users equivalent to those that would prevail were water available in the Colorado River for consumptive use in those State in those amounts.

Paragraph (2) of subsection (d) directs that the balance of the north coastal storage and conveyance system designed to make up to 1,200,000 acre-feet annually available for the Pacific Southwest, shall be planned on an expedited basis. Conditions are included to give protection to the areas of origin of these water supplies as follows: (1) exports are subordinated to the consumptive use needs of watersheds of origin if other waters are not available for satisfaction of those needs; (2) financial assistance will be available from the development fund for future irrigation projects in the watersheds of origin, if necessary and not otherwise provided; and (3) financial support will be available from the development fund to offset added costs, if any, resulting to future projects for the benefit of areas of origin, or for the benefit of the State of California insofar as the State's total water supply is diminished, that result from preemption of lower cost sources.

(*e*) *Southern Nevada water supply project and the Moapa Valley pumping project, Nevada.*—In the case of the southern Nevada water supply project, the provisions relative to a contract with the State of Nevada, acting through its Colorado River Commission or other duly authorized State agency, are designed to provide for such an arrangement on terms essentially similar to those prevailing under the usual conservancy or master-type district arrangement with the Bureau of Reclamation. The Moapa Valley pumping project would be conditionally authorized pending completion of a feasibility grade report.

(*f*) *Dixie project, Utah.*—Authority is included for necessary measures as a reimbursable cost to dispose of the saline waters from LaVerkin Springs or to indemnify downstream water users.

(*g*) *Recreation and fish and wildlife.*—This subsection authorizes recreation and fish and wildlife developments as part of the initial plan. It is similar in

scope and purpose to section 8 of the Colorado River Storage Project Act, but has been modified in light of the proposed Federal Water Project Recreation Act (H.R. 9032). A specific reservation of Colorado River water is directed for non-Federal fish and wildlife uses in the region outside of California. The total of 84,000 acre-feet annually for this use would be reserved as follows: Arizona, 57,000 acre-feet; Nevada, 22,000 acre-feet; and New Mexico, 5,000 acre-feet. Availability of this water in each State will be dependent upon the amounts of main stream water required to supply rights under the decree of the Supreme Court in *Arizona* v. *California et al.*, existing on the date of enactment of this act. California is excluded from the reservation because water for this purpose as proposed in the fish and wildlife report would be available under the decree only on an interim basis in the absence of modification of the California Colorado River water delivery contracts through accommodation among the California water users. Availability of water for this purpose in New Mexico will require modification, by agreement of the appropriate parties, of the decree in *Arizona* v. *California et al.* Recreation is not included because consumptive use of water solely for this purpose is nominal. No further statutory authority is required to reserve water for these purposes in connection with Federal programs, subject to the decree in *Arizona* v. *California et al.*

(*h*) *Indian irrigation projects.*—Extension of the Colorado River and construction of the White River Indian irrigation projects are included as part of the regional plan.

Priority planning

Section 104 directs that priority shall be given in planning projects on tributaries of the Colorado where local water supplies exist or can be made available by replacement or exchange, such as is contemplated under the central Arizona project. Also, planning for projects which will utilize water by diversion from the main stream or otherwise meet water deficiencies shall be expedited. The investigations will establish, among other things, the amounts of main stream water that should be reserved for diversions for new uses in Arizona counties abutting the Colorado River.

Similar priority would be given to projects in areas of origin of import supplies and to completion of feasibility reports for lining the All-American Canal system, subject to appropriate contract modifications.

Continuing study

Section 105 directs the Secretary, in cooperation with the States and the regional commission, to maintain continuing studies of the water supply and demand in the region, the reports thereon to be complementary to the studies he is required by law to make of water quality in the basin.

Cost allocations

Section 106 provides for allocations of project costs to the customary categories, with the addition of area redevelopment and joint costs for recreation. Contemporary practice would be followed in this regard with one exception, namely, costs of measures to mitigate fish and wildlife damage would not be allocated to that function but would be distributed among the project purposes. This change in reclamation law has been recommended by the administration in the proposed Federal Water Project Recreation Act (H.R. 9032) now pending before the Congress.

General provisions

Section 107 enumerates certain provisions of general application to the plan. These include a proscription applicable to all projects in the plan, with certain minor exceptions, against expansion of irrigated acreage with project water or water made available because of a project. A basic 50-year repayment period for irrigation repayment contracts is established, which has been customary practice for many years. Contracts entered into under section 9(e) of the Reclamation Project Act of 1939 (43 U.S.C. 485h(e)) would be limited to providing water for not more than 50 years, and if the water to be provided thereunder is no longer needed for irrigation purposes during the term of the contract, the Secretary would be empowered to make the water available for municipal or other purposes. This latter provision is included to facilitate changes in form of use from agricultural to municipal use caused by urbanization and at the same time secure municipal rates for the water.

Inasmuch as the initial Pacific Southwest water plan would not provide a full water supply for the needs of the central Arizona area—both for irrigation and

for municipal and industrial uses—until such time as sufficient water is available to meet all demands, it is important that any legislation dealing with this project include mechanisms whereby the availability of water as between these purposes can from time to time be further considered. As one means of accomplishing that objective, subsection 107(e) contains provisions which would permit transfer of water from irrigation to other purposes upon the expiration of each irrigation water supply contract. It is realized that this is a departure from existing law as reflected by the requirement of the Boulder Canyon Project Act that all contracts be for permanent service, and by the provisions of the act of July 2, 1956 (70 Stat. 483) providing for the renewal and conversion of irrigation water delivery contracts. This proposed solution is tentative and is included for the purpose of stimulating examination of the problem.

Allocated costs within the repayment ability of Indian lands served by a project are to be charged to them subject to the Leavitt Act, which defers collection so long as the lands are in Indian ownership. Costs in excess of repayment capability of Indian lands are made nonreimbursable. Acquisition of substantial acreages of Indian land will be necessary, particularly in connection with reservoir construction. Recognizing the special status of Indians and their peculiar affinity to lands historically theirs, this bill contemplates compensation to the Indians for these intangible losses as well as relocation and rehabilitation in addition to the customary just compensation for the land itself.

Costs allocated to recreation and to fish and wildlife enhancement, including the costs of supplying water for non-Federal fish and wildlife facilities, shall be nonreimbursable within the limits of section 1(c) of the proposed Federal Water Projects Recreation Act (H.R. 9032).

Saving provisions

Section 108 is the saving clause to assure that the Pacific Southwest water plan will be carried out in consonance with the "law of the river."

Definitions

Section 109 defines certain terms used in the act. The definitions for "mainstream," "consumptive use," and "consumptive use from the mainstream within a State," which relate particularly to the objective of making 7.5 million acre-feet of water available for consumptive use in the States of Arizona, California, and Nevada, are taken from the decree in *Arizona* v. *California, et al.*

Appropriations

Section 110 authorizes appropriations to carry out the provisions of the act. A ceiling of $900 million is imposed on appropriations to undertake the initial features authorized by section 103. Inclusion of this limit will afford the legislative committees of Congress an opportunity to review the program as the ceiling is approached.

TITLE II—PACIFIC SOUTHWEST REGIONAL WATER COMMISSION

Title II establishes a Pacific Southwest Regional Water Commission for the purpose of coordinating the further comprehensive planning for the conservation, augmentation, and beneficial utilization of the water and related land resources of the Pacific Southwest. The Commission would be composed of representatives of the five States in the region and interested Federal agencies. The Chairman would be designated by the President, and could be a Federal official, such as the Secretary of the Interior, or an individual not otherwise employed by the United States. The provisions of the title are substantially identical with those of title II of the proposed Water Resources Planning Act (S. 1111), which passed the Senate on December 4, 1963.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., August 20, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs,
House of Representatives, Washington, D.C.

DEAR MR. ASPINALL: It has come to my attention that inadvertently some words were dropped from an amendment proposed in our report to you of May 17, 1965, on the lower Colorado River bills, H.R. 4671 and H.R. 4706.

In the proposed new section 406, set out on page 10 of our May 17 letter, the fifth line should read "period *of more than 50 years for each project contract unit* or irrigation block exclusive of any development." The italic words were inadvertently omitted in the text as set out in our May 17 report.

This oversight is very much regretted.

Sincerely yours,

STEWART L. UDALL,
Secretary of the Interior.

Mr. ASPINALL. The gentleman from Texas, Mr. Rogers, is unable to be present this morning, and has requested that the chairman of the full committee start the proceedings.

Because of certain statements which have been made concerning my action programing this legislation, I believe I should make a short statement at the commencement of these hearings.

We are considering bills which provide for the authorization of the Lower Colorado River Basin project. These bills include many and various facilities and authorizations. Any individual or group of individuals interested in all or any part of this legislation has a right to be heard. Our witness list is unusually long and, accordingly, the time programed for the hearings is necessarily extended. I am hopeful the members will be in attendance as much as possible.

The legislation incorporates and would authorize, among other facilities, what has been referred to for the past 18 years as the central Arizona project. The first bill for such project was introduced in the House on February 3, 1947. Consideration of such legislation was postponed on April 18, 1951, until adjudication of the water rights of the Lower Colorado River Basin.

It was not until June 4, 1963, 1 day after the Supreme Court decision ending the controversy between Arizona and California, that new legislation was introduced in the House. On that date a new central Arizona bill was placed before Congress. There is no central Arizona bill, as such, before the committee. At this time, on April 22, 1964, the first Southwest water plan legislation was placed before the House. This was followed by the introduction into this Congress on February 9 of this year of the Lower Colorado River Basin project legislation, the bills which are now before us. The Department of the Interior has changed its position on at least two major provisions of this legislation since it was introduced.

As soon as I could determine that the supporters of the legislation were ready to stand on the provisions contained in the bills, I addressed letters to the various Governors of the Colorado River Basin requested them to prepare for these hearings their evaluations of the water available to the use of the proposed Lower Colorado River Basin project. As soon as Congressman Rogers of Texas, the chairman of this subcommittee, and I were assured that the information requested in my letters to the Governors would be ready, we called these hearings. Availability of the necessary amount of water is the first factor of the most important feasibility requirement of any reclamation project. The history of the Colorado River as to amounts of water in its basin has been and still is a matter of much controversy. This committee must be agreed that there is sufficient water to which Arizona, or any other State in the basin for that matter, is entitled to guarantee the success of a project before we can honestly report such authorizing legislation to the House.

In closing, may I say that I supported central Arizona project legislation in the 81st and 82d Congresses, and, as recently amended, this morning. It pleases me to see in the group of people here in the committee room my former colleague, my former chairman, chairman of this committee, the Honorable John Murdock, who was one of the chief supporters and, may I say, indefatigable worker for this project in those days. He was left at home largely because of the fact that the people in Arizona did not understand what the problems were. He has been interested in this project ever since that time. I am glad to see you here this morning, John.

I desire to support this project in the 89th Congress, and I shall make every constructive effort to get the job done. But it must be done not only in recognition of agreements in the lower basin, but also in complete recognition and compliance with the provisions of the Colorado River compact and the acknowledged right of the upper basin States to use the waters legally allotted to them and at the times when their entitlements can be used.

At this time I call on the Honorable Morris K. Udall for a joint statement. May I say that Congressman Udall, Congressman Rhodes, and Congressman Senner have been very diligent in their prosection of the legislation. We are glad to have them here en banc and en bloc.

STATEMENTS OF HON. MORRIS K. UDALL, HON. JOHN J. RHODES, AND HON. GEORGE F. SENNER, JR., REPRESENTATIVES IN CONGRESS FROM THE STATE OF ARIZONA

Mr. UDALL. We have prepared and have before each member of the subcommittee a complete and carefully drafted statement. It is important for a number of reasons that it be in the record in full as though it had been read in full, but in the interest of the committee's time and the presentation of other witnesses who have come from long distances, we would prefer to highlight it informally and then respond to questions.

Mr. ASPINALL. Do I understand this is the statement of each one of you?

Mr. UDALL. It is a completely joint statement, and I present it on behalf of all three of us.

Mr. ASPINALL. Unless there is objection, the statement will be printed in the record, and the Members from Arizona will be permitted to make statements in accordance with their wishes.

(The statement follows:)

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

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

For more than 40 years the need for optimum utilization of the water resources of the Colorado River and the need for additional water to augment supplies in the Colorado River Basin States has been recognized. In November of last year, this committee traveled to Arizona to see at firsthand our desperate water situation. Record 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. In summary, however, I think the Phoenix hearings clearly made these points:

1. The economy of Arizona, one of our fastest growing States, is threatened with disaster unless new water is brought in from the Colorado River.

2. This bill is a rescue operation which will not bring any new lands into production but will simply help us to save a part of the lands now irrigated.

3. This water will not be used to increase the supply of surplus crops and a substantial portion of it will, in fact, go to municipal and industrial uses.

4. Arizona's water uses greatly exceed the supply. The central Arizona area now uses roughly 4.5 million acre-feet every year. Rivers and surface sources provide 1 million acre-feet. We are now pumping from the underground about 3½ million acre-feet a year. A million acre-feet returns to the underground as recharge. This leaves us an annual deficit each year of approximately 2½ million acre-feet which we are, in effect, mining from an underground water-bank accumulated over thousands of years.

We believe that the proposed legislation presents a plan—well adapted to accomplish many of the objectives that the State of Arizona has been seeking for more than 40 years. Although it has been a painful and arduous task to arrive at a workable solution to the numerous problems presented in harnessing and utilizing this great water resource, we believe that we now have a proposal which is suitable, not only to our own State, but to all of the basin States which are dependent upon the Colorado River system. And this is as it should be—and must be.

The first major and permanent uses of water from the lower stretch of the Colorado River apparently were in the Palo Verde area of California, and in the Yuma Valley of Arizona some years before the beginning of this century.

In central Arizona the story began with development of the Gila River tributaries—the Salt and Verde—under the National Reclamation Act of 1902, following years of struggle by Salt River Valley pioneers to divert irrigation water from these uncontrolled streams. Diversion rights on the Gila, Salt, and Verde were well established through various court decrees during the first two decades of this century.

Looking to development of the Colorado River's potential, in 1919 the seven Colorado River Basin States organized the League of the Southwest. Discussions thus begun led to the formation of the Colorado River Compact Commission under the chairmanship of the late Herbert Hoover. In 1922, the same year that Arizona was setting up an engineering commission to investigate possible Colorado River diversions, this commission, at Santa Fe, N. Mex., negotiated the first law of the river: The Colorado River compact.

Interstate conferences continued after the compact, resulting finally in passage of the Boulder Canyon Project Act in 1928. By the Project Act, as the Supreme Court has now ruled, Congress made an allocation of the lower basin's share of the river to Arizona (2.8 million acre-feet), to California (4.4 million acre-feet), and to Nevada (300,000 acre-feet).

Following passage of the Project Act, there began the litigation phase of Arizona's efforts to attempt to realize her rights to use her share of Colorado River waters. Arizona in 1931, 1934, and 1935 was before the U.S. Supreme Court on four occasions, but each time she failed to secure a judicial determination of her rights.

In 1944, turning away from litigation, Arizona resumed her efforts to achieve her rights by negotiation. In that year she became the seventh basin State to ratify the compact. In that year also, Arizona negotiated a contract with the Secretary of the Interior for delivery of 2.8 million acre-feet from storage in Lake Mead; and appropriated $200,000 for cooperative State and Federal investigations of a project to utilize Colorado River water in Arizona. The latter was the first of several major financial contributions made by the State of Arizona over the following several years; 1944 was also the year of the treaty with Mexico.

In 1947 the Bureau of Reclamation reported a feasible central Arizona project to the Congress, and its authorization was sought by bills in the 80th Congress.

During the 81st and 82d Congresses, the Senate twice passed central Arizona project authorizing legislation, but the measure languished and died in the House. Consideration was finally postponed indefinitely in 1951 when this committee directed that, until Arizona's entitlement to Colorado River waters was finally cleared up either through litigation or through a negotiated settlement with California, it would not consider the central Arizona project.

A negotiated settlement with California was impossible and so further litigation was inevitable. Thus, in 1952, *Arizona* v. *California et al.* was instituted.

The suit ended on June 3, 1963, with the Supreme Court's opinion, and was finally concluded on March 9, 1964, with entry of the Supreme Court's decree. By this opinion and decree Arizona finally secured an adjudication of her entitlement to Colorado Rivers waters as suggested by this committee in 1951.

By this opinion and decree, the Court in large measure adopted the views and contentions as advanced by Arizona.

The Court ruled that the apportionment of Colorado River water among the lower basin States was not controlled by the doctrine of equitable apportionment, nor by the Colorado River compact. In enacting the Boulder Canyon Project Act, said the Court the Congress intended to and did create its own comprehensive scheme for the apportionment among Arizona, California, and Nevada of the main stream waters of the Colorado River, leaving to each State the use of its tributaries. The Congress, said the Court, in effect, decided that a fair division of the first 7½ million acre-feet of main stream water available to the lower basin would give to California the use of 4.4 million acre-feet per annum; to Arizona the use of 2.8 million acre-feet per annum; and to Nevada, 300,000 acre-feet per annum, with the surplus to be divided equally between Arizona and California, and Nevada to participate in Arizona's share.

While Arizona, from 1951 to 1964, was carrying out the instructions of this committee, millions of acre-feet of water wasted down the river without providing the wealth and creating the opportunities they could have provided and created. At the same time, Arizona was becoming dependent upon ground water for two-thirds of its municipal, industrial, and agricultural supply. Millions of acre-feet have been pumped, and we continue to pump our way to early ground-water bankruptcy.

During this same 15-year period, Congress authorized major water and hydroelectric projects on the Colorado River to benefit other States in the basin. The representatives of these States have had the assistance of the Arizona delegation in seeking and obtaining such authorizations. And now, after finally resolving the substantial questions raised in our litigation with California, and with the decree establishing entitlements to the remaining water supply, we welcome the assistance and cooperation from our sister States of the Colorado River Basin in seeking authorization of the Lower Colorado River Basin project during this session of Congress.

I have alluded to the many substantial problems we have encountered in reaching agreement on a proposal. Not the least substantial of these problems has been that of reaching some synthesis of views as to the probable future water supply of the Colorado. The engineers of the States of Arizona, California, and Nevada have set forth these views in a memorandum entitled "Colorado River Water Supply" dated August 13, 1965. This memorandum was transmitted to the chairman of this committee by the Governors of Arizona, California, and Nevada on August 18, 1965. I ask consent to append that jointly signed memorandum to the record of these proceedings.

The conclusions reached by the Arizona, California, and Nevada engineers were stated as follows:

"We are unanimous in the opinion that the supply of the river will be insufficient to meet future demands, estimated to reach about 18 million acre-feet per annum by year 2000, or to meet apportionments of use of water made by the Colorado River compact to the upper and lower basins, and the Mexican treaty burden. It is simply a question as to how long it will take the demands to surpass the water available. Both basins are ultimately dependent upon substantial importations which should be made available by the last decade of the present century.

"We have concluded, however, that there is a 50–50 chance that the supply in the main stream will equal or exceed the amount needed to provide (1) 4.4 million acre-feet a year for California; (2) water for decreed rights and existing main stream projects in Arizona and Nevada and the southern Nevada water supply project; (3) water for increasing demands of the upper basin; and (4) a full supply of 1.2 million acre-feet per annum for the proposed central Arizona project until about the turn of the century, gradually reducing thereafter.

"Probability studies indicate a 95-percent chance that the future long-range average annual runoff will exceed 13.3 million acre-feet, and a 50-percent chance that it will equal or exceed 14.9 million acre-feet. With an even chance that there will be 14.9 million acre-feet available for present uses and commitments amounting to 12.7 million acre-feet, and with a water supply augmentation program pending, it is in the national interest to develop a portion of the remaining

unused water resources by enactment and implementation of H.R. 4671, 89th Congress (this and 36 other House bills are identical counterparts of S. 1019 in the Senate)."

This accord of engineering principles lends additional strength to this legislative proposal because, following construction of a central Arizona project, the area served would have three sources of supply; namely, tributary surface waters, ground waters, and Colorado River water. To the extent that Colorado River water is delivered, the overdraft on central Arizona's ground-water reserve will be diminished. To the extent that the overdraft is diminished, Arizona will be able to conserve her ground waters for future use. Some have predicted that, at some far-distant future date there will occur years in which there would not be sufficient water available to maintain a full aqueduct into central Arizona. In those years, Arizona would be in a position to revert temporarily to her utilization of ground-water reserves or draw upon water stored in lower basin reservoirs. In the interim, Arizona would have been enabled to reduce the permanent waste of Colorado River water to the Gulf of Mexico which will follow for many decades, absent a central Arizona project.

We are extremely gratified with the willingness of all seven States to work toward a general understanding on this vital water supply problem.

The long-range need for a supplemental water supply through importation is recognized by all States in the Colorado River Basin. In this regard, Arizona has an urgent need for water in excess of the 2.8 million acre-feet entitlement; and we, therefore, consider it appropriate that authorization of this project should contain adequate provision for the importation of substantial quantities of water for the long-range water supply and water requirements in both the upper and lower basins.

The six other basin States have a vital interest and a vital stake in this aspect of the proposal—an interest and a stake no less compelling than our own. California's need in this respect is obvious when—with an entitlement and guarantee of 4.4 million acre-feet under the decree—her actual diversions to meet current needs are in excess of 5.1 million acre-feet. Nevada's needs most certainly will exceed her allotment of 300,000 acre-feet in the not-too-distant future.

The need for additional water by the upper basin States is equally apparent. These needs can and must be met, in substantial part, by exchange when the importation of additional water is made.

There is a general recognition in the West that Arizona's water situation is only a part of a larger problem which confronts all of the States of the Colorado Basin. During the past week informed and experienced representatives of the seven Colorado River Basin States—Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming—met for several lengthy and fruitful sessions exploring the basin's water situation as it is affected by the legislation before the committee. We are gratified by the broad consensus of views on many fundamental factors.

This consensus, without affecting the accord heretofore arrived at among the lower basin States, as set forth in H.R. 4671, 89th Congress, expresses certain principles with respect to the rights, obligations, and requirements of each basin as against the other. These principles are:

1. The upper basin's right to the use of water of the Colorado River, pursuant to the Colorado River compact, shall not be jeopardized by the temporary use of unused upper basin water by any lower basin projects.

2. The importation of substantial quantities of water into the Colorado River Basin is essential to the adequate development of both the Upper and Lower Colorado Basins. It is recognized that this importation must be accomplished under terms which are fair to the areas of origin of the water so imported. The pending legislation should authorize the Secretary to construct importation works which will deliver not less than 2,500,000 acre-feet annually, upon the President's approval of the Secretary's finding of feasibility.

3. Such importation works should be planned and built so as to make the imported water available, if possible, not later than 1980. Water supply prospects on the Colorado River, based in part on the temporary use of the water allocated to the upper basin, appear adequate to furnish a full supply to the central Arizona project accompanied by the safeguards for existing projects agreed to by Arizona and California, until sometime during the last decade of the present century. Thereafter, the central Arizona project supply would diminish unless supplemented by importation.

4. Satisfaction of the Mexican treaty burden should be the first priority to be served by the imported water. The costs of importation allocable to the satis-

faction of that burden, which is a natural obligation, should be nonreimbursable.

It is hoped that with this general consensus on these basic issues we have established workable guidelines within which to arrive at final legislative language on all aspects of the bill.

I direct your attention next to the exchange principle which is embodied in the proposed legislation. Recognition of this exchange principle has been a matter of considerable importance to various areas of Arizona lying outside the area to be directly benefited by Colorado River waters. Present users of surface water recognize the importance of this exchange concept to Arizona, in general, and, particularly, to various communities throughout the mountainous northern part of our State. Many of those holding old water rights in the State have expressed their willingness to cooperate in working out water exchanges, but have pointed out certain limitations and restrictions beyond which they could not go.

Water law throughout the Western States has, since the beginning, recognized the principle of water exchanges—but always with the limitation and restriction imposed that the downstream user, whose water is being physically diverted upstream, is entitled to a replacement of such water without impairment of either quantity or quality. Present water users are not entitled to ask for more—nor are they obligated to accept less—than the protection afforded by the general law of the Western States.

With these understandings, as to the basis for exchange arrangements under the proposed legislation, we firmly believe that the benefits of the central Arizona project will be broadly extended throughout Arizona so that areas which could not otherwise be reached economically through direct diversions from the Colorado River will, by exchange, have their water supplies substantially augmented.

Looking to these possibilities the Bureau of Reclamation, under a contract with Arizona, is investigating possible small projects in the northern half of the State to impound exchange water for municipal uses in order that as little time as possible will be lost in bringing relief to water-short towns after the central Arizona diversion is authorized. Included also is a study of means of diverting water directly from the Colorado for the city of Kingman, the only northern city which cannot obtain water by exchange.

In addition to the protection extended to those water users holding "present perfected rights," the bill also directs itself to the protection of present uses under existing contracts with the United States for which diversion works have been constructed. All such existing uses in Arizona, pursuant to contracts, are located in Yuma County.

With respect to these, I should point out that it is the purpose of the bill to give present contract users—as well as those water users having "present perfected rights"—in both Arizona and Nevada the same degree of protection that is intended to be given to California users of the same character. It is intended that this existing users in Yuma County and in Nevada—just like those in California, within its 4.4 million limit—would not share shortages with the central Arizona unit but would be entitled to their full contract entitlement of main stream Colorado River water before releases, in times of shortages, are made to the central Arizona unit. Correspondingly, it follows, that in the administration of the central Arizona project in nonshortage years, the legal entitlements of Arizona's present contract users and holders of present perfected rights would not be curtailed in favor of the central Arizona unit.

By the same token, this protection is terminated in Arizona and Nevada—as it is in California—when the President proclaims that the importation works, capable of delivering not less than two and a half million acre-feet, have been completed.

We believe that the language contained in the bill will protect present uses of main stream water—within the limitations set forth—in all three States and will also fully protect the financial integrity of existing Bureau of Reclamation projects being operated under contracts in Yuma County, Ariz.

In emphasizing the need for additional water supply to be provided by the proposed lower Colorado River project, we must not overlook the related benefits to all Colorado River Basin States—and to the public generally—which benefits are certain to result from authorization and construction of the project. The Pacific Southwest region—if its water resources are properly planned and developed—contains unlimited opportunities for new recreational facilities and improved conditions for fish and wildlife. The project would also complete the river regulation and flood control system on the Colorado River as well as facilitate navigation.

Next, a word about electric power benefits flowing from the project. It is essential to realize that the region's baseload power requirements must be met in the future from thermal sources. Ambitious and farsighted plans are already underway to meet these requirements through the cooperative efforts of the Secretary of the Interior and both public and private power agencies in the Pacific Southwest region (west). All such planning assumes that the remaining feasible hydroelectric sites on the Colorado River will be developed for project pumping and will provide revenues from the sale of surplus power for peaking purposes. It is essential, in our view, that both hydroelectric and thermal power sources should be developed and integrated so as to maximize power potential and provide the necessary revenues for the basin fund.

I will not undertake to describe in detail the plan for producing and marketing surplus power from the Marble Canyon Dam, and—when eventually authorized—Bridge Canyon Dam, since this information will be fully developed in the testimony of Mr. A. Hennen Forman, executive vice president of Arizona Public Service Co. I will say, however, that we of the Arizona delegation are satisfied, on the basis of all information available, that the power produced at Marble Canyon and Bridge Canyon Dams will be salable and very much in demand to satisfy the peaking power requirements of the region.

We are also satisfied that the central Arizona project unit of the proposed regional plan is financially feasible and has a favorable cost-benefit ratio of 2.2 to 1 on the basis of 50 years, and 2.5 to 1 on the basis of 100 years, based on direct benefits only. Data respecting the cost-benefit ratio of the project is based upon the extensive study and analysis of the Bureau of Reclamation. These studies show conclusively that all reimbursable costs from the construction of the project facilities, and works to be included in the project can be repaid by revenues generated from the sale of water and power at favorable rates.

While the financial feasibility of the proposed regional plan is assured—whether or not Bridge Canyon Dam is authorized at this time—we would have preferred that the Bureau of the Budget had not withheld a favorable recommendation on Bridge Canyon Dam. We believe that Bridge Canyon Dam is highly desirable, and in the interest of all the Colorado River Basin States ought to be authorized. I make this statement and assert our view that authorization of Bridge Canyon Dam is highly desirable, fully recognizing the concern of the Bureau of the Budget and appreciating its reasons for recommending deferral of such authorization pending further study. In any event, this is a decision which cannot be made by us but must be made by the committee and by the Congress.

We of the Arizona delegation are grateful for the statesmanlike attitude and cooperation of the many representatives from all seven States who spent many long hours seeking to arrive at mutually acceptable solutions to the major problems encountered in the comprehensive planning and development of the water resources of the entire region. With this new spirit of cooperation between the seven States, we of Arizona cannot help but feel that, at long last, the final goal is in sight.

This committee has before it both a task and an opportunity. The task is not—and will not—be an easy one. The opportunity and challenge presented in this legislation is almost unparalleled in the annals of the development of the water resources of the West. I urge this committee and the Congress, as a whole to meet this challenge and to take early advantage of this opportunity—by immediate and favorable action on the pending bill.

The Lower Colorado River Basin Project

A Discussion by Congressman Morris K. Udall, Member of the House Committee on Interior and Insular Affairs

The Lower Colorado River Basin project is undoubtedly the most comprehensive project ever planned to meet the water needs of the American people. In only its very initial phase it will serve the interest of more than 11 million people in the Southwest, and in its ultimate development it can assure water security for the entire West for many years to come by a program of efficient utilization of water supplies.

For almost 50 years leaders in my State have discussed plans whereby Arizona's share of the Colorado River could be utilized in our area, which is the fastest growing and driest region of the country. Meanwhile they have given

their support to the development of water resources in every other river basin in the United States.

The legislation that is now before Congress emerged when people of the Pacific Southwest recognized their problems were common, and that they could only be solved by working together on concepts of regional and basin planning. Evidence of this common purpose is the fact that 37 Members of the Congress representing this area introduced indentical bills to authorize the Lower Colorado River Basin project.

These bills provide for two major control and hydroelectric power dams on the Colorado River, and pumping and diversion facilities to transport the water to the Salt River Valley area around Phoenix and on to Tucson in Arizona. Like all reclamation projects it would serve the multiple purpose of providing water storage needed for irrigation, for industry, and for municipal and domestic use. In addition to the stored water that generates power which helps pay for the project, the reservoirs would serve yet another valuable function: providing recreation and fish and wildlife habitats. Of the total Federal investment more than 90 percent will be repaid. Reclamation water development has demonstrated its ability to create prosperous, viable and self-sustaining local economies while, at the same time, recovering the taxpayers' money.

Every President of the United States since Theodore Roosevelt has given his wholehearted support to reclamation developments in the arid and semiarid western half of the Nation. When President Johnson recently signed legislation to authorize the Garrison diversion project in North Dakota he remarked, "I have never seen a bad investment in a dam or water project."

Without doubt a project of this magnitude does raise many questions, and I want to discuss these frankly with you.

Isn't the Colorado River now overly committed?

The Colorado River is a stream of widely fluctuating annual runoffs which make probable future water supply estimates very difficult. Using one period, for example 1906–59, the average annual yield was over 15 million acre-feet. Through the drought years of 1930–62 the yield was less than 14 million acre-feet.

Compounding this, of course, are future depletions in the upper basin States, commitments to the Mexican Government, anticipated salvage works, evaporation, and other factors.

Taking all this into account, the water engineers of the lower basin States—Arizona, California, and Nevada—have agreed there is an equal chance the supply in the main stream will equal or exceed the amount needed to provide (1) 4.4 million acre-feet a year for California, (2) water for decreed rights and existing main stream projects in Arizona and Nevada and the southern Nevada water supply project, (3) water for increasing demands of the upper basin, and (4) a full supply of 1.2 million acre-feet per annum for the proposed central Arizona project until about the turn of the century, gradually reducing thereafter.

Both basins, they conclude, are ultimately dependent upon substantial importations which should be made available by the last decade of the present century.

How really serious is the water situation in Arizona now?

Central and southern Arizona with less than 11 inches of annual rainfall and, consequently, a lack of sufficient surface water, have had to depend almost entirely upon underground water. Tucson, a city of some 300,000 people, is the largest city in the United States, if not the world, that derives its entire water supply from pumping. Arizona is mining from its underground reservoirs 2¼ million acre-feet more than is considered a safe withdrawal. So the water tables have dropped alarmingly, causing prominent earth fissures to develop, needed agricultural acreage to go out of production, and small communities to wither. Our only relief is through the use of our rightful share of the Colorado River which now runs to the Gulf of California.

Where will project water be put to use?

During the early years of the project it is estimated that 70 percent of the water would help sustain Arizona's agricultural economy. No new acreage would be brought into production, but the water would stabilize an agricultural economy whose products are predominately for the market and not for storage. The project area is the Nation's winter salad bowl, producing 95 percent of its lettuce, 70 percent of its cantaloupes, and similarly high proportions of other

fruits and vegetables. In fact, agriculture in this area generates far less surplus than the national average.

How will the project be paid for?

Under a 50-year repayment plan this investment in natural resources development would repay to the Government far more than its construction cost. The sale of water and power would return more than 90 percent of the project's cost * * * all costs except those allocated to such public benefits as fish and wildlife conservation. In addition, the Federal Government would receive more than half a billion dollars in interest during the repayment period. This is the essence of reclamation, in which electricity, from falling water, is turned into water for cities and farms at a price a user can pay.

What is the argument about the dams?

This Nation has taken pride in its abilities to plan and construct great wealth-producing hydroelectric power dams. We would have all been the losers if Congress had heeded the criticisms of some to delay the authorization of Hoover Dam 35 years ago to store water for diversion to southern California. Arizona surely would have been a disaster State had not farsighted men hastened the construction of the Salt River project's Roosevelt Dam that made possible the growth of Phoenix. People in the Northwest would have been the poorer if Grand Coulee hadn't been built.

And yet the criticism we hear most often about this project are about building the dams, and the critics have raised a number of doubts about their feasibility and merits. In the main they are—

Is the power marketable? Could it be produced more cheaply by steamplants?

Do such dams make more water available or just cause more water to be lost by evaporation? Would they become obsolete?

Would the dams destroy scenery?

I believe there are full and adequate answers to each of these questions. In this brief discussion space doesn't permit me to deal with every point and every aspect, but I will attempt to answer each of these main lines of criticism.

President Johnson, speaking on the subject of conservation and development of the Nation's water resources, observed that "the real wasters, the real spendthrifts, are those who by neglecting the needs of today destroy the hopes of tomorrow."

The dams on the Colorado River are our hopes for tomorrow. The revenues from the sale of hydroelectric power make the project feasible. These revenues plus revenues from Hoover and Parker-Davis Dams (available once their costs have been repaid a few years hence) will make possible the ultimate import of water into the basin. That is what millions of people have at stake in the dams on the Colorado River.

Why these particular sites?

The particular dam locations included in this project were selected and approved many years ago, as revealed in a letter written in 1933 to the Commissioner of Reclamation by Horace Albright when he was Director of the National Park Service. "As I see it," Albright wrote, "the Bridge Canyon project is in no way affected by the Grand Canyon National Monument proclamation * * * we have had it in mind all the time, the Bridge Canyon project."

The sites have been reevaluated many times since, and they are, in fact, the last remaining locations for power dams on the river.

Marble Canyon site is entirely outside and upstream of Grand Canyon National Park. Bridge Canyon site is located some 80 miles west and downstream of the Grand Canyon National Park boundary. Its reservoir would back up 13 miles, not into but along the boundary of the park, much as Fontana Lake, a manmade reservoir, forms a dramatic boundary for the Great Smoky Mountains National Park.

Why is hydroelectric power preferred?

It has been argued by those opposing the dams that cheaper power is available from fossil fuel operating plants. Both private and public power companies will testify they are eager customers for hydroelectric power. In fact, engineers predict there will be a shortage of such power in a few years if new dams are not built. "Peaking power," provided by hydroelectric dams, is needed to realize the most efficient operation of electric utilities depending on steam

plants for their "baseload" power.[1] The two types of generation do not complete with one another but are complementary; economic studies show that "peaking" hydroplants would produce the greatest return to the development fund.

It can be anticipated that thermal and atomic powerplants will improve in efficiency in the future, but it is highly unlikely they will ever approach the operating flexibility of hydropower.

The Federal Power Commission has current applications for non-Federal hydroelectric dams at both the Bridge and Marble sites, If the lower Colorado River project is not approved by the end of 1966, it is entirely possible that the FPC may grant licenses for construction of dams at these sites to State or private bodies.

What about evaporation, seepage, and water quality?

There has been considerable comment made about evaporation loss, seepage, and water quality. Granted there would be evaporation losses of approximately 85,000 acre-feet behind Bridge and another 15,000 acre-feet behind Marble, I should like again to emphasize that these wealth-producing power facilities would make it possible to bring into the river as much as 10 to 15 million acre-feet of water annually—100 times the loss from evaporation.

Seepage is a recognized fact, too, and critics have made an example of Lake Powell. But the water doesn't just disappear there once the sandstone has absorbed its limit. It is actually stored in the walls and will return to the river as Lake Powell fluctuates from time to time. It should be noted here that the level behind Bridge Canyon Dam would be maintained so it would not fluctuate more than 10 feet, but the point is that there is a limit to how much water would be absorbed.

Fears also have been expressed about increased salinity as a result of the dams, but the Department of Interior finds there is no evidence to support this claim. To the contrary, many professional people maintain that holding water in storage over extended periods of time improves water quality.

Do dams stay young?

It has been said that sediment problems will make the dams obsolete just a few years after completion. The heavy silt load of the Colorado has been studied by such agencies as the Geological Survey, the Coast and Geodetic Survey, the Bureau of Reclamation and the Department of the Navy since 1925. With the accumulation of all this information engineers have become convinced that the "life expectancy" of dams on the Colorado can be extended indefinitely.

Do dams destroy scenery?

By far the most often-heard claim is that the Grand Canyon would be damaged and the river forever lost if this project were built. Those who make this claim lose sight of the following:

1. Construction of these dams has been contemplated ever since Grand Canyon National Park was established in 1919.

2. Grand Canyon would not be flooded. The only water backing into the park would be along the park boundary for 13 miles in a remote area never visited or seen by the public.

3. Neither dam would be constructed in Grand Canyon. Bridge Canyon lies 80 miles west of the park boundary. Marble Canyon Dam, lying upstream of the park, couldn't possibly contribute to "flooding" Grand Canyon.

4. The Colorado River ceased to be a natural, "wild" river many years ago, and most recently when Glen Canyon Dam was constructed. However, construction of these dams actually would transform the river below Marble Canyon from a widely fluctuating, muddy river to a clear, uniformly flowing river for more than 100 miles through the park. Thus, for the first time, the river would provide a superb habitat for fishing and a safe course for thrilling visits to the innermost reaches of the canyon.

The Senate Committee on Interior and Insular Affairs concluded in its report on the Lower Colorado River Basin project, dated August 6, 1964, that "the reservoir's (Bridge Canyon) impact on the park is minimal. Over 98 percent of the land area in the park will remain in its natural condition * * * in the

[1] Very simply, generators run by waterpower can be readily regulated to meet fluctuations in demand for power while steamplants are best suited for constant, "baseload" operation.

committee's view it does no violence to the 'wilderness concept' which this committee vigorously espouses, to permit this unique opportunity to the public at large to glimpse at first hand, the matchless splendor of this most magnificent of American scenic treasures."

Imagine the sight of placid, clear blue lakes reflecting the majesty of sheer cliffs 1,500 to 3,000 feet high that form the inner gorge of Marble and Bridge Canyons, or picture miles of fjordlike views, all now within the reach of everyone to see. These are values not to be discounted or written off as "desecration" or "destruction." Reclamation lakes at Grand Teton and Glacier Parks have added to the public's enjoyment of these areas of natural beauty, and the same can be true of Bridge Canyon and Marble Canyon.

It is my position that these lakes and clear waters can enhance the beauty of these canyons and, what is more, make them accessible for the first time to the public for viewing and for unlimited recreation. Yet I do not suggest that this project should be constructed for this purpose; rather, I would emphasize that these benefits are subordinate to the greater purpose of bringing water to an area of critical need. My point is that these purposes are not in conflict.

SUMMARY

Throughout the history of man the control and use of water have guided his destiny, and civilizations have perished where water supplies failed. The present and proposed construction of dams on the Colorado River is essential to perpetuate much of the western economy. Because a long time is required to bring major water resource projects to completion, 1975 is tomorrow, and the time for action is now.

Mr. UDALL. As the chairman said, the subject of our presentation this morning is not a new one to this committee. It is not a new one to the predecessor of this committee. This important water project has been of the highest urgency to every Member of Congress from Arizona in modern times.

The chairman referred to the great John Murdock, who was chairman of this very committee. We have in the hearing room also the Honorable Ernest W. McFarland, former Governor and former majority leader of the U.S. Senate, former Senator, and now justice of our supreme court, who spent many years fighting for this. Also, former Governor Fannin, who spent many years on this project. I think if the three of us here were to spend another 50 years in Congress we would never have an opportunity or a responsibility more important and more vital to our State than the subject we take up with you this morning.

In a visit to Arizona a couple of years ago, the chairman of this full committee came before a group of Arizona leaders and I think very wisely and properly said to them on that occasion that we should not come before the Congress on this project unless we had statewide unity. I think the joint appearance of the three of us here this morning is evidence of that unity, and I can tell you that as nearly as possible, with a million and a half diverse and independent, fearless taxpaying citizens in Arizona—and we cannot get all of them to agree on anything—we have unity. I think few States have ever had the kind of unity that we have. We have unity between the political parties, between the economic groups, including public and private power, all sections of the State, different State agencies, and so on. I think this unity will be demonstrated as the hearing progresses, by the dozens of Arizonans who have come from all sections at their own expense to be here in this crowded room with us today and this week.

In the first part of our statement we refer to the hearings that were held in Phoenix last fall, on pages 1 and 2. We appreciate the com-

mittee's coming out there. We have before us a complete record of those hearings in Phoenix. Without going over them in any detail, I think we made 3 or 4 points out there in Phoenix which it will be unnecessary to belabor in these hearings.

First, that the economy of our State, which is one of the fastest growing in the Nation, is threatened with disaster unless something is done. Members of this committee saw with their own eyes acres and acres of land which had gone back to the desert, stores closed, homes abandoned, communities sick. I would emphasize that even if this project were authorized tomorrow morning—Mr. Chairman, we do not expect action quite that fast, although we would not reject it if the committee proposed to do that—but if the project were authorized tomorrow morning it would be 10 years before the first drop of water could come down this huge aqueduct that will have to be constructed over 250 miles of desert to bring the relief that we need.

Secondly, I think these hearings showed that this is not a bill to put new acres into production. It is a rescue operation. It will save only a part of the acreage we are now using in Arizona.

Third, this project will not increase the supply of surplus crops. Much of it will go to municipal and industrial uses, and the remainder will go largely to crops which are not in surplus, which are not price supported.

The last point we made in Phoenix which I would attempt to call back to your attention is the greatly expanded use of our water out there and how much it exceeds our supply. Let me put it very quickly this way for the convenience of the members. In the central Arizona area we are using 4.5 million acre-feet of water every year. One million of this comes from surface sources, rivers, lakes, and so on. Three and one-half million is pumped out of the ground. Of that 3½ million that comes out of the ground, Mother Nature is putting back about 1 million. This means that we are overdrawing on a waterbank that took thousands of years to accumulate for 2½ million acre-feet every year. If we continue this, the result will surely be disaster, and you will see in these hearings some further testimony from our Governor about the serious problem that this poses.

On pages 2 to 5 of the statement we have covered some of the history. I do not want to take your time to go into this in any detail. The chairman has had prepared a staff memorandum which I think is before the committee and will be a part of the hearing record, detailing the history of water development on the Colorado. Suffice it to say for our purposes——

Mr. ASPINALL. May I ask my colleague if he is in agreement with the memorandum which has been developed by Mr. McFarland?

Mr. UDALL. The chairman and the staff always prepare accurate memorandums, and we think it is an accurate and substantially complete statement.

Mr. ASPINALL. Without objection, it will be placed in the record immediately following the presentation and the questioning of the three gentlemen now before the committee.

Hearing no objection, it is so ordered.

Mr. UDALL. Suffice it to say the development on the Colorado goes back before this century began. One of the first major projects under the reclamation law was one that Teddy Roosevelt supported, the

Roosevelt Dam that made possible the development of Phoenix. The history shows that Arizona was in court three times in the 1930's. We were in court again in the 1950's and in the 1960's. The chairman referred to Congressman Murdock previously. It was a dark and very unhappy day for Arizona on April 18, 1951, when this committee resolved, on a motion by Mr. Saylor, that no further action would be taken on our project, despite the fact that the Senate had passed it twice, until such time as Arizona and California settled their differences. So, we started down a 13-year dusty road of litigation in the Supreme Court which resulted in a decision in 1963 and a decree in 1964 which in large part sustained the contentions of Arizona and finally resolved the legal differences between Arizona and California.

On page 5 of our statement we simply make the point that Arizonans in Congress have been builders. We have helped the upper basin States and the other lower basin States with their projects. We intend to continue doing that. We now ask for their support. We believe that water projects and reclamation projects are in the interest of all the people of this country. We can report to you that there is peace in the lower basin; there is harmony in the lower basin. We are working closely with our friends in Nevada and California on this legislation.

On pages 5 and 6 we discuss this vital problem of water supply. Is there enough water in the Colorado River to make this project feasible? Some of the engineers, the Bureau people, will take this up in more detail.

In summary, all we say is this: No man can tell with any accuracy how much snow will fall next year or how much water will run down the Colorado River next year or the year after that or any other year. But the engineers of the three lower basin States have made a synthesis of their views and have prepared a memorandum which the Governors of the three States will submit. Essentially, they say that there is no problem until sometime in the 1990's, that there will be sufficient water for all the existing uses and the upper basin rights and the central Arizona project until sometime about 30 years from now.

Mr. ASPINALL. I would like to interrupt at this point because this committee is very careful about placing documents in the record. Did either one of you gentlemen have anything to do with the preparation of this statement which is signed by people supposedly speaking for the lower basin, which is attached to your statement as an addendum?

Mr. UDALL. Mr. Chairman, of course the members of the delegation were consulted with regard to this. None of us are engineers.

Mr. ASPINALL. Without objection, then, this will not be placed in the record until some member having to do with the preparation of this document is before the committee.

Mr. HOSMER. Reserving the right to object, Mr. Chairman, have you gentlemen at the witness table read this document which has been signed by these water engineers and specialists?

Mr. UDALL. Yes.

Mr. HOSMER. Are you in accord with the views set forth therein?

Mr. UDALL. This statement was adopted by our Governor and our water people as a joint statement with the lower basin States. We stand on it.

Mr. HOSMER. But insofar as the witnesses at the table are concerned, do they stand on it?

Mr. UDALL. I am sure I can say that we do.

Mr. HOSMER. Thank you. I withdraw my objection.

Mr. UDALL. Mr. Chairman, on pages 6 and 7 of the statement we make the point that while the water supply at some future time, with all the upper basin uses, may not be fully sufficient at all time for the central Arizona project, we have a unique and a flexible situation. We can use water when it is available and draw on our underground bank when it is not. From this standpoint, we would reduce the waste of water into the Gulf of Mexico that will surely occur unless this project is built. We think this is a strong argument and a strong factor in supporting this project.

On pages 7 to 9 of the statement we discuss the regional aspects of this legislation. Let me emphasize this is not an Arizona bill. This is a regional bill. It sets up a lower Colorado regional fund to develop the water resources of the lower basin.

We recognize, as our friends in the entire Colorado River Basin do, that all of us have a vital stake in what goes on in that basin. The rainfall does not recognize State lines, and the States must cooperate and we are willing to cooperate.

We also emphasize that in water planning, a decade is tomorrow. You have to look ahead. I think we have seen and are seeing right now in the Northeast what happens when water planners and political leaders do not look ahead two or three decades down the road on important matters of this kind.

There is a general recognition, we find, in the West that Arizona's water situation is just part of a larger problem that confronts all seven States of this basin. I am happy to report that during the past week, informed and experienced water leaders from the seven States—Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming—met for a number of lengthy and fruitful sessions exploring the basin's water situation as it is affected by this legislation now before the committee. We were gratified by the broad consensus of views on many fundamental factors. I might say that probably more agreement resulted from these meetings than we have had in the basin in the last 25 years. This consensus, without affecting the accord heretofore arrived at among the lower States as set forth in the bill before you, H.R. 4671, expressed certain principles with respect to the rights, obligations, and requirements of each basin as against the other. I shall take just a moment to read these four principles.

1. The upper basin's right to the use of water of the Colorado River pursuant to the compact should not be jeopardized and shall not be jeopardized by the temporay use of unused upper basin waters in any lower basin projects, including the ones in this bill.

2. The importation of substantial quantities of water into the Colorado River Basin is essential to the adequate development of both the upper and lower basins. It is recognized that this importation must be accomplished under terms which are fair to the areas of origin of the water so imported. The pending legislation should authorize the Secretary to construct the importation works which will deliver not less than 2½ million acre-feet annually upon the President's approval of the Secretary's finding of feasibility.

3. Such importation works should be planned and built so as to make the imported water available, if possible, not later than 1980. Water supply prospects on the Colorado River, based in part on the temporary use of water allocated to the upper basin, appear adequate to furnish a full supply to the central Arizona project accompanied by safeguards for existing projects agreed to by Arizona and California, until sometime during the last decade of this century. Thereafter, the central Arizona project supply would diminish unless supplemented by importation.

4. Satisfaction of the Mexican Treaty burden should be the first priority to be served by the imported water. The costs of importation allocable to the satisfaction of that burden, which is a national obligation, should be nonreimbursable.

We hope that this general consensus on these basic issues has established guidelines within which the whole basin can arrive at final legislative language on all aspects of the bill.

Mr. ASPINALL. May I ask at this point, is it your understanding that there is an agreement among the representatives of all the Basin States on this, or is it your understanding that this was a consensus of the thinking of representatives of all the States of the Colorado River Basin without coming into final agreement?

Mr. UDALL. The latter, Mr. Chairman. We did not attempt to write a written agreement that people could sign and which official State agencies could approve. We tried to explore in a constructive way certain basic principles. This was a consensus rather than a formal agreement. I think you will hear more about this from the other States as the hearings proceed.

On pages 9 and 10 we simply point out that the whole State of Arizona will benefit from this bill, under this great principle of water exchange. Congressman Senner represents the mountainous northern part of Arizona, and water can be held up in areas of the north and be replaced down below in areas which now have the water rights, by water from the works to be constructed under this bill. We undertake to discuss this vital exchange principle on pages 9 and 10.

On pages 10 and 11 we point out that existing uses in California and in Arizona are protected by the language of the bill. In Arizona in particular, we have a number of old projects in Yuma County, some of them going back 50 and 60 years. It is intended by the language of this bill that these existing uses in Yuma County and in Nevada, just as California's 4.4 million use, would not share shortages with central Arizona project units, but would be entitled to their full contract entitlement of Colorado River water in times of shortage.

We believe that the language contained in the bill will protect present uses of main stream water within the limitations we have set forth in all three States, and will also protect the financial integrity of existing Bureau of Reclamation projects being operated in Yuma County.

On page 12 of the statement we point out that the electric power which will be generated by the works authorized in this bill is needed and can be used. We will have further testimony from Arizona and California witnesses on this subject.

On page 13 we point out that there is a benefit-cost ratio of this project of 2.2 to 1, on the basis of 50 years, and 2.5 to 1 on the basis of 100 years, a favorable ratio.

On page 13 we take up a somewhat controversial subject, the Bridge Canyon Dam unit of this project. I want to read this because it is important, and I want to be precise.

While the financial feasibility of the proposed central Arizona unit is assured—whether or not Bridge Canyon Dam is authorized at this time—we would have preferred that the Bureau of the Budget had not withheld a favorable recommendation on Bridge Canyon Dam. We believe that Bridge Canyon Dam is highly desirable, and in the interest of all the Colorado River Basin States ought to be authorized. I make this statement and assert our view that authorization of Bridge Canyon Dam is highly desirable fully recognizing the concern of the Bureau of the Budget and appreciating its reasons for recommending deferral of such authorization pending further study. In any event, this is a decision which cannot be made by us but must be made by the committee and by the Congress.

We in Arizona are grateful for the cooperative attitude of our friends in the lower basin and the constructive attitude of our friends in the upper basin, and we urge that this committee take favorable action on this very vital and important matter.

Mr. Chairman, any of us will be happy to respond to questions.

Mr. ASPINALL. The Chair will ask our colleague from Arizona, the senior member of the delegation, a former member of this committee, and one of its finest and most constructive members, by the way, we have ever had, also one of the most effective Members for the West and elsewhere in his congressional activities, the Honorable John Rhodes, if he has anything to add to what has been said.

STATEMENT OF HON. JOHN J. RHODES

Mr. RHODES. Mr. Chairman, I have a few points I would like to make, if I may.

First, I want to associate myself with everything my colleague, the Honorable Morris Udall, has just said. His statement I think was full and adequate. Certainly it meets with my approval 100 percent.

I particularly want to approve the part of the statement in which he paid tribute to the chairman of the Interior and Insular Affairs Committee, the gentleman from Colorado. In my opinion, when the history of reclamation is written for this part of the century, the name of Wayne Aspinall will be without peer among these who have contributed to the building of the West. I have said this many times, and it is particularly gratifying to me to have this opportuntiy to to say it again.

I also want to associate myself with the parts of the statement of the gentleman from Arizona concerning the Honorable John R. Murdock and the Honorable Ernest W. McFarland, gentlemen who have fought long and hard for the water interests of the entire West.

Mr. ASPINALL. If my colleague will permit, there is another gentleman, Charlie Carson, who may be included.

Mr. RHODES. I appreciate the chairman's bringing that name forward, because certainly Charles A. Carson was one of the great water

pioneers of the West. The chairman will recall that at the time this project was before the committee before, Charlie Carson was in the forefront of the ranks of those who were its proponents. We miss him.

I would like also, if I may, to ask permission of the Chair that at some place in the record a statement may be included from another Arizonan who has been in the forefront of the ranks of those who have worked long and faithfully to develop the resources of the West, and for the central Arizona project in particular, the former Senator, Barry Goldwater. If his statement may be included when it is received, I would appreciate it.

Mr. ASPINALL. Mr. McFarland, will you keep track of that.

Mr. RHODES. I fully believe the action which this committee will take will be a historic milestone in reclamation comparable to the authorization of Hoover Dam, Bonneville, and the upper Colorado River storage project. These are three of the great milestones. I think this milestone will rank in importance with them.

The facts are, of course, that since the failure of the Congress to authorize the central Arizona project in 1952, 15.6 million acre-feet of wet water has gone into the Gulf of California which could have been used on the lands of the West. This is not said in criticism. It is said merely to point out a fact. As I read those hearings, there was no doubt in anyone's mind that wet water was present for the project at that time. The main difficulty that the committee had with the project was whether or not that water supply would continue throughout the payout period of the project.

I think probably the case for the need for immediate relief of the State of Arizona was not completely convincing at that time. Otherwise there might, in my opinion, have been a different result. The case which will be made for the need for water at the present time cannot only be documented by statistics, but can be shown by the effect failure to bring in supplemental water has had on our water table and on the various physical aspects of the ground in the central part of Arizona. We will show the subsidence of the ground which has been caused in certain areas by overdrafts of water from the underground.

It is very important to me that we look at this project to determine whether or not wet water is there now and whether or not more wet water can be brought in.

The chairman of this committee comes before the Public Works Subcommittee of the Appropriations Committee every year to testify, and the burden of his testimony has always been that the West needs to have more money spent on reclamation. On those occasions I have always been more than eager to agree with him, and I agree with him at the present time. As long as there is water running into the Pacific Ocean unused, as long as there are water needs unsatisfied in the West, there will be a job for reclamation. It will be my duty as well as my pleasure to join hands with the chairman of this great committee and all of the other like-minded members of this committee and the Congress who feel as I do that we being interested in the future of reclamation is to be a cruasader for the welfare and best interests of our entire country.

Mr. Chairman, with great confidence in the fairness of this committee, I am willing to rest my part of the case at the present time. Thank you.

Mr. ASPINALL. Thank you very much.

Now we shall hear from the junior member of the delegation, who is fast making a name for himself here in the Congress. He has a difficult area to represent as far as this project is concerned. We shall be glad to hear from Mr. Senner at this time.

STATEMENT OF HON. GEORGE F. SENNER, JR.

Mr. SENNER. I thank the chairman and the distinguished members of the subcommittee for the opportunity to elaborate a little bit on the remarks made by my distinguished colleagues from Arizona, the Honorable Morris Udall and the Honorable John Rhodes. I think they have covered the subject matter fairly well and to the point. I am very satisfied that, even though projects are not included in the old central Arizona project bill, through the water exchange replacement principle and the lower basin fund, additional projects are now being studied for diversions, which would permit the thirsty cities of my Third Congressional District also to share and benefit in the provisions of H.R. 4671.

I, too, would like to praise the gentlemen whose names have been mentioned here by my colleagues for their outstanding work in the field of reclamation. I am sure that the chairman and the members of the committee, before the conclusion of these hearings, will fully understand the great need for bringing water into Arizona, and also for the importation of additional water into the Colorado River Basin so both the upper and lower basin States will share in that water.

With that, Mr. Chairman, I have nothing further to add, other than that I will be more than happy to answer any questions which might be propounded to me.

Mr. ASPINALL. I shall ask our colleagues to keep our questioning as brief as possible. The gentleman from Florida.

Mr. HALEY. Mr. Chairman, I want to say to my colleague, Congressman Rhodes, I notice the two Democrats have hemmed you in there so you could not back out.

I might say, Mr. Chairman, this State has certainly a fine delegation. They are all very able men. Certainly they do credit to the State and to the West.

Mr. RHODES. I would like to say as long as a Republican has to be hemmed in by two Democrats, I could not pick two better ones.

Mr. ASPINALL. The Congressman from California.

Mr. HOSMER. No questions, Mr. Chairman.

Mr. ASPINALL. The Congressman from Nevada.

Mr. BARING. No questions.

Mr. ASPINALL. The Congressman from Kansas.

Mr. SKUBITZ. No questions.

Mr. ASPINALL. The Congressman from California.

Mr. JOHNSON. No questions.

Mr. ASPINALL. The Congressman from Oregon.

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

Mr. ASPINALL. The Congressman from Idaho.

Mr. WHITE of Idaho. In deference to the remarks made by the chairman, I would like to ask Mr. Udall a question, if I may.

Mr. Udall, you made several references to importation in your statement as being necessary for the ultimate completion, to resolve the

problem in Arizona. When you speak of importation, just what do you have in mind?

Mr. UDALL. I was afraid the gentleman from Idaho might ask a question of that kind. Let me be as frank and as brief on this as possible.

The bill before you as now written simply sets up some studies for the Secretary of the Interior to determine how the Colorado River water supply can be augmented. Perhaps "augmentation" is a better word than "importation." We know that some areas of this country have surplus water, other areas are very short. The two aspects of our area which put us in such a special bind are these: we are the fastest growing part of the Nation, and we are the most arid part of the Nation. We have less rainfall. I would think there are sources of water that the Secretary might study, increased desalinization or programs of this sort along the ocean. There are surplus waters in Canada. There are surplus waters in other parts of this great Nation. I would hope that the Secretary would come up with some studies telling us how we can import water and from where we can augment the supply in the river.

I would only add if we get it from the gentleman's great section of the country and if importations are aimed in that direction, we will consult fully with him. We would protect all the rights of the people in the Northwest. We do not want any water that you need or you want. We are talking only about surplus water, water that there is no possibility the Northwest will ever need.

We point out to you, California and Arizona fought for 40 years over 1 million acre-feet of water, in essence. We are told 160 million acre-feet are wasted by the Columbia River into the Pacific Ocean every year. Not all of that 160 million is surplus, but if we had 2 percent or 3 percent or 5 percent of what is actually surplus, and protected all the Northwest rights, and it was determined this was the best place and the most feasible place to get the water and everyone was protected and satisfied, we would like to see this done.

Mr. WHITE of Idaho. I would like to compliment the gentleman on his statement and what he said with respect to the cooperation between the upper and lower basins and the result of litigation between Arizona and California and how it ultimately got to the point of cooperation. I think it would be incumbent upon the gentleman and the supporters of this legislation to try to come to the same type of understanding with those people who live in the Pacific Northwest, particularly my State of Idaho, where admittedly there is water that is not being used at the present time, part of it because of the very nature of the terrain from which it originates. However, there is some of it in the Snake River Valley that has yet to be put to consumptive use which should be looked at very carefully before any diversion of any kind is even contemplated.

The Columbia itself, with the origin of its water in the mountain region where there is no chance to use it because of the very nature of the topography, would be the more logical place to look for water, rather than to look to the irrigation potential which exists to a great degree in our area. We are interested in growing and are growing, perhaps not as fast as some of the areas in the gentleman's State of Arizona. Therefore, I would like to say to you that my interest will

be to try to work as cooperatively as I can with the gentleman from Arizona in support of this legislation, but my first obligation will be to the people that I represent.

Mr. UDALL. The gentleman fights for the people he represents. He is constructive and he is a builder. I want to work with him, and I will work with him. I want to help his State with its problems, too.

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

Mr. HANSEN. I enjoyed your remarks just now, Mr. Udall, which I am sure your fellow delegates from your State share. I know that you understand that we have a problem in our area. We have a tremendous amount of ground that will have to be taken care of. It is quite an arid area, despite the fact a good-sized river goes through it. We want to work with you in every way we can for the benefit of both of us, just so, as you have mentioned so well before, we are able to work on a basis that both areas come out for the better.

Mr. UDALL. The Southwest, as far as I know—and I am sure I can speak for Arizona—does not want a drop of water that you need now or that you need in the future. If this works out to be the feasible way, we want some small part of the surplus water. We are satisfied and in the bill we provide that if any water should be imported eventually from any area of this country, we write in the sort of thing they pioneered in California, which is area of origin protection language. You set up a fund so if the area from which the water is taken ever needs that water somewhere down the road, they are indemnified and made sure that secondary water sources are developed for them at a cost the same as if they had the primary source available in the first instance.

Mr. HANSEN. Mr. Chairman, this is the Arizona Highways magazine included in a brochure laid before us this morning. I would like to compliment these gentlemen on a very beautiful State. I hope you are successful in getting the water that you need.

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

Mr. BURTON. No questions.

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

Mr. REINECKE. Mr. Udall, I would like to get confirmation of a statement which you made, namely, that in speaking for the Arizona delegation you are willing to accept the present perfected rights as the standard at the present time, and that the time-honored concept of first in time, first in right, is the essence of what you are attempting to do here, regardless of whether it is interstate or intrastate. Is that correct?

Mr. UDALL. The Colorado River compact and the Supreme Court decision have rather well settled the rights in the West. This bill will not upset the allocations of water intrastate in California. It has no effect on that. You have allocated the water among your different water agencies by actions of the California Legislature and otherwise. This is not to be affected.

We have, as part of our great agreement with your State, agreed that the central Arizona project will be junior to the first 4.4 million acre-feet annual usage in California until such time as we make the river whole through importation or augmentation. These are the protections that existing users have, and we want to see that they get those protections.

Mr. REINECKE. So the shortages then will first come from somewhere in the Arizona project before depleting California's 4.4.

Mr. UDALL. Arizona will bear the risk until such time as we augment the river and make it whole. I think we will have it augmented before this time comes.

Mr. RHODES. If I may qualify that. By "made whole" my colleague refers to the figure of 2½ million acre-feet of water to be added to the resources of the Colorado Basin.

In the so-called priority this bill gives to California, it is stated that the water required to be brought into the basin must be introduced into the mainstream below Lees Ferry. Of course, we support the concept of making the river whole.

However, the technology of importing water seems to be advancing to the point where it may be more logical to bring in water to the coastal areas by Federal expenditure rather than bringing it into the main stream. We would expect to have language included in this bill to make it possible for such water to be credited to the required 2½ million acre-feet by exchange for the priority to disappear. This would have the effect of satisfying the conditions for the priority to disappear no matter where the water is furnished, provided that it has the net effect of increasing availability of water in the main stream.

Mr. REINECKE. If we do effect an exchange of this nature will this in your mind affect the basic water rights to the 4.4 prior to the shortages?

Mr. RHODES. No. In my opinion it would not. The only point to which I address myself is that point at which the artificial priority disappears. At that point, as I understand the law of the river, all of the uses of the lower basin then would be on the same footing except for those rights which will be determined by the Supreme Court to be prior existing rights.

Mr. REINECKE. I think the anticipation here has been that in the event California effects an exchange in this manner and it is adequately supplied with water, then at some future time due to the unusual growth of the area we may still be in position of acquiring more water, and we do not want to give up our rights to the 4.4 which we feel we are justly entitled to.

Mr. RHODES. California never loses its rights to the 4.4. They merely resume the status they are in now, prior to the passage of this legislation containing the artificial priority.

I would like to say, however, to my friend from California, we all realize California needs more than 4.4 million acre-feet of water. We also realize Arizona needs more than 2.8 million feet of water and the upper basin needs more water than it can get out of this river, too.

Mr. WHITE of Idaho. There is one point that should be put into proper focus here. I would like to ask my colleague from Arizona, Mr. Udall, if he can answer this for me.

Is not the entire project based on the concept of becoming whole? To do the job you have in mind there must be an importation of water into the Colorado River.

Mr. UDALL. Yes. We made the treaty with Mexico guaranteeing them water. We divided up the water in 1922. We took both these actions on a false premise, the premise being that based on the information the engineers then had we thought there was more water in the river than there actually turned out to be.

We want to make the river whole so there is enough water to meet our obligations to our good neighbor, Mexico, and enough water available to give each of the States the amount they clearly thought they would get.

Mr. WHITE of Idaho. I will concede the obligation to the country of Mexico which is a national obligation. At the time the original contract was entered into the people of the United States were thinking about the availability of water in the Colorado, and from no other source at that time.

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

Mr. TUNNEY. I have no questions.

Mr. ASPINALL. The gentleman from Washington, Mr. Foley.

Mr. FOLEY. I have no questions.

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

Mr. WHITE of Texas. As one of the nonauthors of a bill on this committee, by my association with Mr. Udall on this committee and my association with the other gentlemen on the floor of the House, their authorship and sponsorship surrounds this hearing with an aura of constructiveness.

I hope in the future that they will be generous as this project comes closer to west Texas and perhaps they will let us have some of the spillage.

Mr. ASPINALL. That is a qualified statement of support, I assume.

Mr. WYATT. Might I make this one comment in view of Mr. White's comments about the Snake River. I do not want these gentlemen to leave with the impression that we in the Northwest are not interested in the proposals.

I say to you that whatever is worked out I will attempt to cooperate in every way that I can, but I did not feel that you three gentlemen were the proper ones to interrogate as I feel I must some of the other witnesses with respect to these various proposals. However, I appreciate your statements.

Mr. ASPINALL. Mr. Udall, inasmuch as you did place into the record this consensus of opinion developed by representatives of all the Colorado River Basin States, I would like to know whether it is your understanding that in the No. 1 principle relating to this matter of the use of water pursuant to the terms of the Colorado River compact includes use by the procedure of transmountain diversion within the States of the upper basin?

Mr. UDALL. The chairman is referring to No. 1 on page 8 of my statement, the No. 1 general consensus and principle.

It always has been my position, and I guess the lawyers and others could haggle over this, but I think Arizona has taken the position that when a State has a certain entitlement under the compact it can put that water to use as it sees fit whether or not that is within the Colorado Basin. California has done it, Colorado has done it very constructively, and I wouldn't quarrel with that, and New Mexico is doing it.

Mr. ASPINALL. Arizona now intends to do it. Is that correct?

Mr. UDALL. Yes, sir.

Mr. ASPINALL. Is that your understanding, Mr. Rhodes?

Mr. RHODES. It depends on for what purposes the Gila River is part of the Colorado system.

Mr. ASPINALL. The river is a direct part of the Colorado River. This is fairly well understood so far as the amount of water is concerned.

Mr. RHODES. Geographically the water used by the central Arizona project will remain in the Colorado Basin.

Mr. ASPINALL. I understand that. What I am trying to find out is whether or not this is applicable to the other States in the basin so far as your thinking is concerned.

Mr. RHODES. I agree with the statements Mr. Udall and the chairman have made.

Mr. SENNER. I do not think Arizona should tell Colorado how they should use their allocated share of water.

Mr. ASPINALL. Let me ask this question and any of you can answer it. This is divided into two parts. If you wish to have it referred to others that is all right.

What do you consider, according to information which you have, is the amount of water presently available to Arizona considering the provisions of the Colorado River compact and taking into consideration present uses, illegal and otherwise, from the Colorado River in the lower basin, and is it possible under existing conditions to make the lower Colorado River project a success without the use of water to which the upper basin is entitled under provisions of the Colorado River project?

Mr. UDALL. These are rather carefully phrased questions. As the Chair can understand they are matters of some moment. I would suggest the Chair permit us to either file a written statement which is carefully worded and looked at or that we defer this to the water engineers and specialists.

Mr. ASPINALL. Whatever you wish to do. If you wish to file a statement after considering the questions that will be fine.

Without objection that permission will be granted.

If you wish to leave it to the engineers that will be fine, also. These are questions which the chairman of the committee wishes to have answered in this hearing so we understand exactly what we are doing.

Mr. RHODES. We will be very glad to file an answer.

AUGUST 30, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Interior and Insular Affairs Committee,
House of Representatives, Washington, D.C.

DEAR MR. ASPINALL: During our testimony concerning the Lower Colorado River Basin project before the Subcommittee on Irrigation and Reclamation on August 23, 1965, you posed the following question to us: What do you consider, according to information which you have, is the amount of water presently available to Arizona considering the provisions of the Colorado River compact and taking into consideration present uses, illegal and otherwise, from the Colorado River in the lower basin, and is it possible under existing conditions to make the Lower Colorado River project a success without the use of water to which the upper basin is entitled under provisions of the Colorado River project?

Enclosed is a memorandum dated August 30, 1965, entitled, "Answers of Arizona's Congressional Delegation to Chairman Aspinall's Questions." As ever, we stand ready to supply any additional information which will be helpful to you in considering this legislation.

Very truly yours,

PAUL FANNIN.
JOHN J. RHODES.
MORRIS K. UDALL.
GEORGE F. SENNER, Jr.

ANSWERS OF ARIZONA'S CONGRESSIONAL DELEGATION TO CHAIRMAN ASPINALL'S QUESTIONS

Chairman Aspinall has propounded the following questions to the Arizona delegation:

(1) What do you consider, according to information which you have, is the amount of water presently available to Arizona considering the provisions of the Colorado River compact and taking into consideration present uses, illegal or otherwise, from the Colorado River in the lower basin?

(2) Is it possible under existing conditions to make the Lower Colorado River project a success without the use of water to which the upper basin is entitled under provisions of the Colorado River project?

The answers of the Arizona delegation are as follows:

PREFATORY COMMENT

Arizona does now recognize, and will continue to recognize that to the extent that she may ever use Colorado River water which is within the upper basins compact entitlement, but which has not been put to use by the upper basin, such water is subject to recapture for upper basin uses in the future development of that basin.

ANSWER TO QUESTION NO. 1

Referring to page 2 of the joint statement on "Colorado River Water Supply" by the States of Arizona, California, and Nevada our engineers state that the present main stream uses and commitments in the Colorado River Basin, with California uses limited to 4.4 million acre-feet per annum,[1] are:

	Million acre-feet per annum
Upper basin	4.7
Lower basin	5.7
Mexico	1.5
Net losses after salvage (mean of estimates)	.8
Total	12.7

Both this report and the Tipton report[2] conclude that the mean year, and the average year will produce 14.9 million acre-feet per annum in the Colorado River. We believe then that the difference (14.9 minus 12.7 million or 2.2 million acre-feet are available for development). Arizona would be within its entitlement to use 1.2 million acre-feet for a central Arizona unit.

These figures will not be materially different in 1975, the expected first year of operations of a central Arizona unit. We recognize, however, that upper basin uses will exceed the present 4.7 million acre-foot use, and will probably, some time around the turn of the century, have grown to 5.5 million acre-feet.[3]

A lower basin mainstream supply of 7.1 million acre-feet a year is required to satisfy 4.4 million acre-feet of use in California, existing uses in Arizona and Nevada, and the central Arizona and southern Nevada projects. Opinions differ as to such matters as net channel and evaporation losses and the rate of future increase of upper basin depletions. Such differences affect only the estimate of the date when augmentation of the Colorado River must be accomplished. Deducting from the value of 14.9 million acre-feet a year the Mexican Treaty deliveries and the midvalues of current esimates of upper basin depletions and net channel and evaporation losses, indicates that a residue of at least 7.1 million acre-feet a year of the mainstream supply would be available to Arizona, California, and Nevada until about the turn of the century, and would reduce gradually thereafter.

	Millions acre-feet per year
Virgin flow at Lee Ferry	14.9
Net losses below Lee Ferry plus delivery to Mexico	2.3
Available for upper basin depletions and in mainstream for Arizona, California, and Nevada	12.6

[1] California's present uses are approximately 5.1 million acre-feet.
[2] Pp. 5 and 10 of the statement of Royce J. Tipton, consulting engineer of Denver, Colo.; re proposed legislation to authorize construction of the central Arizona project.
[3] Memorandum of Aug. 13, 1965, by engineers of lower basin States.

When upper basin depletions reach 5.5, water available for Arizona, California, and Nevada would be reduced to 7.1.

ANSWER TO QUESTION NO. 2

In the light of our answer to question No. 1, we believe the central Arizona unit is financially feasible and will be successful.

Mr. ASPINALL. Your presentation, gentlemen, has been very constructive. It has been put forth in a very fine and understanding manner before this committee.

Thank you very much.

(The following memorandum is inserted in accordance with the chairman's earlier instruction:)

AUGUST 18, 1965.

Memorandum to: Hon. Wayne N. Aspinall.
From: Sidney L. McFarland.
Subject: History of development on the Colorado River.

THE COLORADO RIVER BASIN

The Colorado River rises in the high snowcapped mountains of Colorado and flows in a southwesterly direction for approximately 1,400 miles through Colorado, Utah, and Arizona and along the Arizona-Nevada and the Arizona-California boundaries until it empties in the Gulf of California in Mexico. On its way to the sea, waters are added by tributaries which originate in the States of Wyoming, Colorado, Utah, Nevada, New Mexico, and Arizona. The river and its tributaries drain a vast area of approximately 250,000 square miles—about one-twelfth the area of the continental United States. Most of this large basin is so arid that it is largely dependent upon controlled and managed use of the waters of the Colorado River system to make it productive and inhabitable. There is an additional area of 7,800 square miles which includes the Imperial and Coachella Valleys in southern California, which is considered a part of the Lower Colorado River Basin. The basin is divided into the upper basin from which waters naturally drain into the Colorado River above Lee Ferry and the lower basin from which waters drain into the river below Lee Ferry.

EARLY DEVELOPMENT

The diversion of water from the Colorado River for agricultural purposes on a large scale started around the turn of the century in the lower basin. Works to divert water into the Imperial Valley were started in 1901 as a private undertaking. Large diversions in the Palo Verde Valley were also begun in 1901. After the passage of the Reclamation Act in 1902, investigations started immediately to determine the feasibility of large irrigation projects. The Yuma project was authorized in 1904 and the first water delivered in 1907. By 1920, irrigation primarily by private enterprise had expanded to the point where the unregulated flow of the Colorado River was completely utilized during periods of low flow, and further expansion was dependent upon construction of storage reservoirs on the river.

Also, as early as 1920, officials in the Upper Basin States started to view with alarm the rapidly increasing use of Colorado River water in the State of California. This led to organization of the League of the Southwest, the purpose of which was to promote the orderly and equitable development of the entire Colorado River.

Congress passed legislation in 1920 directing the Secretary of the Interior to make a full and comprehensive study and report on the diversion which might be made from the Colorado River. The report was completed and submitted to Congress in 1922. It presented engineering data on water supply, irrigated lands, irrigable lands, water requirements, potential power developments, and needed flood protection, as well as possible reservoir sites in both the upper and lower basins. The recommendations in this report led to the introduction on April 25, 1922, of the first bill to authorize construction of the Boulder Canyon Dam.

Before construction of Boulder Dam, the lower reaches of the Colorado River were annually subjected to floods. This tragic menace was fully realized in 1905 when the Colorado, swollen by floodwaters, broke through a cut 4 miles below the international boundary, and, for 16 months, poured its entire flow

into the fields and communities of the Imperial Valley. It enlarged the Salton Sea to a lake 488 square miles in area and threatened to engulf the entire valley. The break was finally closed with great difficulty and expense only after 30,000 acres of arable land had been inundated, farms ruined, homes destroyed, highways washed away, and railroad tracks destroyed. This tragic occurrence, indicating the need for flood control on the lower Colorado River, became a motivating reason for the construction of the Boulder Canyon Dam.

COLORADO RIVER COMPACT

During the period when the studies by the Secretary of the Interior were being conducted, negotiations were underway for an interstate agreement on the waters of the river—negotiations which led to the Colorado River compact. While it was recognized that storage on the Colorado River was essential, the Upper Basin States faced the possibility that water conserved by storage would be put to use in the lower basin more rapidly than the upper basin could utilize the normal flow. Thus, some agreement was needed to reserve water that would later be needed in the upper basin.

The negotiations among the States led to agreement that an interstate compact would be the best means for equitable apportionment of the water and protection of the upper basin. Prior to that time, an interstate compact had never been used for the allocation of waters for an interstate stream. Congress gave its consent to the negotiations by legislation enacted in August 1921 and the Colorado River Compact Commission convened for its first meeting in January 1922. The commission held 27 meetings before reaching final agreement on the compact which was signed in Santa Fe, N. Mex., on November 24, 1922.

The compact has several main provisions:

1. It divides the Colorado River Basin into two parts—lower basin and upper basin.
2. It apportioned from the Colorado River system in perpetuity 7,500,000 acre-feet a year to each of the two basins for beneficial consumptive use.
3. It authorized the lower basin the right to increase its beneficial consumptive use by 1 million acre-feet a year.
4. It recognized the rights of Mexico to waters of the Colorado. This share was to come from the surplus over the 16 million allocated to the two basins. The compact provided, however, that if sufficient surplus water was not available, the Mexico share would be met equally by the upper and lower basins.
5. It required the States of the upper basin to "not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75 million acre-feet for any period of 10 consecutive years * * *"

During January to April 1923 all the States of the basin with the exception of the State of Arizona ratified the compact. In 1925, numerous conferences were held in Arizona, California, and Nevada in an attempt to obtain Arizona ratification of the Colorado River compact and to effect a three-State compact for dividing the waters of the Lower Colorado River Basin. However, an agreement was never reached.

In 1927, the Governors of the seven Colorado River Basin States held a series of meetings in Denver in a further effort to settle the division of the lower basin water supply and bring about a seven-State ratification of the compact. Out of the Governor's conference came the proposal that the average annual 7.5 million acre-feet of water delivered by the Upper Basin States at Lee Ferry would be divided: 300,000 acre-feet to Nevada; 3 million acre-feet to Arizona; and 4.2 million acre-feet to California.

The proposal was not accepted by either Arizona or California.

The efforts to bring about a seven-State ratification of the compact and to settle the differences in the lower basin delayed action by the Congress on legislation to authorize construction of the Boulder Dam. However, after years of delay and consideration of many different versions of the legislation, the Boulder Canyon Project Act was finally passed even though there was no agreement on the lower basin division of water and Arizona still had not ratified the compact.

BOULDER CANYON PROJECT ACT AND CALIFORNIA LIMITATION ACT

In the Boulder Canyon Project Act, enacted in December 1928, Congress consented to the compact, waived the compact requirement of seven-State approval, and provided that, in the absence of seven-State approval, it would become

effective when approved by California and at least five of the other States, provided California would limit its consumptive use of Colorado River water. California met this requirement by passing the California Limitation Act in March 1929, thus accepting the limitation imposed by the Project Act of 4.4 million acre-feet a year of the 7.5 million acre-feet allocated to the lower basin, plus one-half of the surplus or excess water available. The Project Act with this limitation on California not only reserved lower basin water for the States of Arizona and Nevada but it provided protection to the upper basin States against California proceeding with unlimited development, and it provided assurance that the compact would not be nullified. The Boulder Canyon Project Act again invited the lower basin States to come into agreement on the division of water by the inclusion of a provision authorizing the three States to enter into an agreement apportioning the lower basin share between them as follows:

Nevada: 300,000 acre-feet annually: Arizona: 2.8 million acre-feet annually plus one-half of any surplus waters unappropriated by the compact and exclusive beneficial consumptive use of the Gila River and its tributaries; and California: 4.4 million acre-feet annually plus one-half of any surplus waters unappropriated by the compact.

This tristate apportionment agreement, however, was never entered into by the three States involved.

The Boulder Canyon Project Act was declared to be effective on June 25, 1929, by President Hoover, but it was 15 years later before Arizona finally approved and ratified the Colorado River compact.

In 1930, construction of the Boulder Canyon Dam was initiated. Legal attempts by the State of Arizona to stop construction failed and the dam started to impound water in February 1935.

MEXICAN WATER TREATY

Mexico began agitation for a permanent and assured share of Colorado River water prior to the time of the Colorado River compact, and discussions of water for Mexico occupied a prominent part of the negotiations for the compact. As mentioned hereinbefore the compact recognized the rights of Mexico to a share of Colorado River water. Negotiations of the treaty with Mexico with respect to the waters of the Colorado River was authorized by Congress in 1927. Negotiations were attempted in 1930 but without result. The negotiations which led to the consummation of the treaty were initiated in 1941 and continued through 1942 and 1943. The treaty was signed on February 3, 1944. The treaty guarantees annually to Mexico 1.5 million acre-feet of water provided that in times of surplus the United States would endeavor to deliver up to 1.7 million acre-feet and, in the event of extraordinary drought, the 1.5 million acre-feet would be reduced in the same proportion as consumptive uses in the United States were reduced.

With respect to compliance with the terms of this treaty, there is today a difference of opinion between the upper basin and the lower basin as to the requirements under the compact for delivering this water to Mexico. The upper basin takes the position that lower basin tributaries must be taken into account in computing the amount of the "surplus" which, under the compact, is to be used so far as possible for meeting the treaty requirements. Involved in this difference of opinion is up to 750,000 acre-feet of water or one-half the Mexican treaty amount which would have to be released by the upper basin States at Lee Ferry if the Mexican treaty water cannot be met from surplus supplies.

UPPER COLORADO RIVER BASIN COMPACT

In the upper basin, for various reasons, the problem of negotiating an interstate compact was less controversial than in the lower basin. On October 11, 1948, in Santa Fe, N. Mex., following preliminary meetings at other points in th basin, a compact among the five States having territory in the upper basin was executed. Except for the consumptive use of 50,000 acre-feet annually apportioned to the State of Arizona, the upper basin water was divided in terms of percentage as follows:

	Percent
Colorado	51.75
New Mexico	11.25
Utah	23.00
Wyoming	14.00

The apportionments made to each State included water necessary to supply all existing rights. In other words, these percentages are to be applied to the total amount of water available for upper basin use after deducting the 50,000 acre-feet for Arizona. The compact included 20 additional articles relating to other matters.

ARIZONA RATIFIES COLORADO RIVER COMPACT

The State of Arizona finally ratified the Colorado River compact on February 24, 1944, and in the same year entered into a contract with the Department of the Interior for 2.8 million acre-feet of water from the Colorado River, subject to its availability, pursuant to the provisions of the Boulder Canyon Project Act.

DEVELOPMENT ON THE RIVER

As hereinbefore indicated, Boulder Dam started to impound water in February 1935. Boulder Dam is located in Black Canyon 330 miles above the Mexican border and provides a reservoir with a usable storage capacity of 27,200,000 acre-feet. The dam has now been named Hoover Dam.

Parker Dam, located 155 miles below Hoover Dam, with a capacity of 648,000 acre-feet, first impounded water in June 1938. This is the diversion point on the river for the Colorado River aqueduct of the Metropolitan Water District.

Davis Dam, located 67 miles below Hoover Dam, with a capacity of 1,820,000 acre-feet, serves to reregulate releases from Hoover Dam and is primarily for power purposes. It first impounded water in January 1950.

There are five additional diversion dams on the river in the lower basin: Headgate Rock Dam is located 15 miles below Parker Dam and is for the diversion of water to the Colorado River Indian Reservation. The Palo Verde Dam, 42 miles below Headgate Rock Dam, was completed in 1957 and is for the diversion of water to the Palo Verde Irrigation District. The Imperial Dam is located 90 miles below Palo Verde and is the diversion point for the All-American Canal, the Yuma project, and the Gila project. Laguna Dam, located 5 miles below Imperial Dam, dates back to 1910 and was formerly the diversion point for the Yuma and North Gila Valley projects, but is no longer in operation. Morelos Dam is located on the river below California where the river is the boundary between Arizona and Mexico and serves as the diversion point for the Mexican Canal which supplies irrigation water to the Mexicali Valley.

The All-American Canal system was placed in operation in 1940. It replaced an existing, obsolete system. Diversions through this system for the Imperial and Coachella Valleys and for the Yuma project average more than 5 million acre-feet per year. Other principal lower basin water utilization projects diverting water from the main stream are the Gila project, the Palo Verde Irrigation District project, the Colorado River aqueduct, and works serving the Indian reservations.

In the upper basin, the storage reservoirs completed are Glen Canyon just above Lee Ferry, Flaming Gorge on the Green River, and Navajo on the San Juan River, and the construction of the Curecanti unit on the Gunnison River is well along.

PRESENT WATER USES IN THE LOWER BASIN

At the present time, as a result of the developments just described, net diversion of main stream Colorado River water to California averages something over 5 million acre-feet annually; Arizona net main stream diversions are a little over 1 million acre-feet; and Nevada diversions are around 26,000 acre-feet. The three-State total use in recent years under contracts with the Secretary of the Interior has averaged about 6.2 million acre-feet. In addition, latest estimates of unauthorized use of water from the Colorado River indicate that more than 160,000 acre-feet of water is illegally diverted every year to Federal, State, and private lands along the river below Hoover Dam. Additional uses are evaporation and diversions to Mexico under the treaty. Releases from Lake Mead have averaged about 8.5 million acre-feet which includes also river losses and uncontrollable flows.

ARIZONA VERSUS CALIFORNIA

The suit brought against California by Arizona was initiated in 1952. Arizona's complaint alleged that pursuant to the Colorado River compact and the Boulder Canyon Project Act, Arizona was entitled to the beneficial consumptive use of

2.8 million acre-feet of water each year from the Colorado River and that California be limited to 4.4 million acre-feet.

The United States and Nevada intervened and, on motion of California, New Mexico and Utah were added as parties in the case. The litigation extended over a period of 12 years. The master's report was issued in December 1960. The opinion of the Supreme Court was rendered on June 3, 1963, and the final decree was issued March 9, 1964.

The Supreme Court findings are summarized as follows:

The Colorado River compact essentially divided the water between the upper and lower basins. It did not seek to allocate water to individual States within each basin. The Court held that neither the compact, nor the law of prior appropriation nor the doctrine of equitable apportionment controlled apportionment in the current case, but that the Boulder Canyon Project Act provided a statutory apportionment of the lower Colorado River and hence must be used as a guide.

In ratification of this act, California covenanted by act of its legislature to limit its annual consumption of Colorado River water to 4,400,000 acre-feet plus one-half of any surplus. Arizona, under terms of the act, would receive 2,800,000 acre-feet and Nevada 300,000. Arizona would share equally with California in any surplus.

The apportionment of lower basin water was restricted to the mainstream of the Colorado and tributaries, above Hoover Dam. Each State retained exclusive use of its tributaries below Hoover Dam without charge to apportioned water. Thus, the all-important use of the Gila River in Arizona was awarded to that State without charge, a key issue in the dispute.

The Secretary of the Interior, within the confines of the act, has authority to allocate and distribute the waters of the mainstream of the Colorado in water short years.

The Colorado River Indian Reservation was given top priority for water to irrigate all of the practicably irrigable reservation lands, this water to be charged to Arizona's share.

COLORADO RIVER WATER SUPPLY

The flows of the Colorado River between the years 1896 to 1964 have ranged from about 4.4 million acre-feet to over 22 million acre-feet annually. The river is characterized by uneven and unpredictable flows. This makes it particularly difficult to determine what to expect in the future. The flows at Lee Ferry during the period 1909–29 averaging over 17 million acre-feet annually were used for consideration of the Boulder Canyon Project Act. However, since that act was passed, the virgin flows of the river at Lee Ferry have averaged only about 13 million acre-feet annually. Operation studies of the river have been made using various periods of available records as the basis for determining what amounts might be expected to be available in the future. Because the river has been so erratic, it is obvious that assumptions made as to the period of record will make a big difference in the expected future supplies. The availability of water is the most important issue involved in proposals for additional development in the Colorado River basin.

Mr. ASPINALL. Next is the gentleman from California, Mr. Johnson, author of H.R. 9248.

STATEMENT OF HON. HAROLD T. JOHNSON, REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. JOHNSON. Thank you, Mr. Chairman. In the interest of time, and considering all of the witnesses yet to testify, I will ask unanimous consent that I file my statement. My statement is supported by Hon. John Moss, of California, Hon. B. F. Sisk, of California, and Hon. John McFall, of California. We have all joined in a joint statement in support of the legislation which is now pending before the committee.

Mr. ASPINALL. Unless there is an objection it is so ordered.

(Congressman Johnson's statement follows:)

STATEMENT OF HON. HAROLD T. JOHNSON

Mr. Chairman, on behalf of a great number of the people of my home State of California, I welcome the opportunity to appear here today in support of H.R. 4671 and some 37 companion bills, all of which would authorize the construction, operation, and maintenance of the Lower Colorado River Basin project. Three of the cosponsors of this legislation, our good friends and colleagues, the Honorable John Moss, B. F. Sisk, and John McFall, join me in this statement.

As introduced, this legislation contains all that is needed to implement a regional solution to Arizona's immediate water problems and also the long-range water problems of the West and California, my native State.

After more than 40 years of antagonism and strife over the waters of the Colorado River, the States of California and Arizona have composed their differences and now today present a united front in urging enactment of legislation designed to erase their problems and lay to rest forever this conflict which has been plaguing our two neighboring States.

Certainly credit for achieving this harmony between the States of Arizona and California should be given to one of reclamation's greatest friends, the senior Senator from Arizona, the Honorable Carl Hayden. His statesmanship has unwavering support of reclamation in all of the West even in the face of opposition to urgently needed projects in his own State, his untiring efforts and dedication to the well-being of the entire West made possible the achievement of the agreement between Arizona and California which is incorporated in the legislation pending before us today. I would like to express my personal thanks to Senator Hayden for all that he has done for reclamation in California and in the West. That this feeling is shared by my colleagues from California is reflected by the widespread support which you will see here today from the California delegation of the U.S. Congress.

Over the years, this committee has become familiar with the water problems and the needs of my own State. Certainly no group of people has done more to solve these problems and serve the needs of California than the membership of the House Committee on Interior and Insular Affairs and its Subcommittee on Irrigation and Reclamation.

Simply stated, California shares a problem experienced in many areas of the Nation. Water is not where it is needed the most. It does not seem to collect naturally where and when it is needed the most.

As a result we have developed a major water conservation program throughout the State. These extend from the northernmost extremes of my own congressional district of Modoc, Siskiyou, and Trinity Counties where the Klamath and Trinity projects of the Bureau of Reclamation provide irrigation for many thousands of acres plus a substantial measure of desperately needed flood control—to the southernmost areas of the State where the All-American Canal runs parallel to the Mexican border carrying Colorado River water to thousands of acres of desert land. I should also point out that the great Los Angeles aqueduct carrying water to the metropolitan areas of southern California and the Great Central Valleys project in all its many aspects serves many areas throughout central California. This project has proven a true monument to the wisdom of this committee, and I would express my deepest appreciation for the favorable consideration recently given by this committee to the latest unit, the Auburn Dam-Folsom South Canal project, which I hope President Johnson will sign into law before the week is out.

You might say that the Second Congressional District, which I am proud to represent, could be considered the primary source of water for all of California. Certainly it has a key role in the development of Federal and State water programs and in municipal water development for the metropolitan areas of both southern and northern California. At private, local State, and Federal levels we have been working most diligently to solve our water problems. We can, therefore, appreciate the problems of other areas of the West who suffer from the same maldistribution of our water resources. We recognize that the only way to attack these problems is through massive development programs capable of moving vast quantities of water from areas of origin to areas of need. Here, basically, is what we consider today.

With this committee, I attended the field hearings held last November in Phoenix where we heard first hand about the immediate water problems faced by the people of central Arizona. We saw first hand the valuable agricultural lands which had been forced out of production because of the lack of water, lands

which returned to the parched desert because ground water resources were exhausted. These people need our help. There is no question about this. They need our consideration and I believe that the legislation which we have before us today can indeed offer them the assistance they need so desperately.

Mr. Chairman, in conclusion I do want to say that this legislation is of great importance to all the West. Through the comprehensive long-range examination of the water supplies and needs of the entire Colorado River Basin which would be demanded by enactment of this legislation, I feel that the water needs of the entire region would be met. I do not believe that we can delay any longer. Accordingly, I wholeheartedly support the legislation now before this committee.

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

STATEMENT OF HON. CRAIG HOSMER, REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. HOSMER. For the same reason stated by Congressman Johnson, of California, I, too, desire to submit my written statement to the committee and have it entered as a matter of record.

Mr. ASPINALL. Without objection it is so ordered.

(Congressman Hosmer's statement follows:)

STATEMENT BY REPRESENTATIVE CRAIG HOSMER, REPUBLICAN OF CALIFORNIA

Mr. Chairman, I appear before this committee to ask its speedy and favorable action on the Lower Colorado River Basin project. I am honored to have been asked to speak on behalf of 10 of my California colleagues and I wish to request that their names and the numbers of their companion bills to my bill H.R. 4674, appear in the record at this point: H.R. 4675, Ed Reinecke; H.R. 4697, James B. Utt; H.R. 4698, Bob Wilson; H.R. 4699, Glenard P. Lipscomb; H.R. 4700, Charles M. Teague; H.R. 4701, H. Allen Smith; H.R. 4702, Alphonzo Bell; H.R. 4703, Burt L. Talcott; H.R. 4704, Del Clawson; H.R. 4706, Charles S. Gubser.

I believe that this broad representation from throughout California, in addition to that represented by Mr. Johnson, is in itself a measure of the tremendous breadth and vast interest in the water resource development potential of this great proposal.

I would like also to say that it is a pleasure to appear in support of these bills together with my Arizona colleagues. These bills ended over five decades of controversy between our States. All of us in the Colorado River Basin have watched with concern as our water supplies have dwindled in relation to need and we must now convert the energy used for bickering to correcting the condition in harmony and with candor and mutual trust.

The Colorado's impact upon the coastal area in southern California has been immense. The fabulous growth of this area is part and parcel with the initiative and energy of those who over the years have brought water and put it on the land, in the homes, and in the factories. Its only limitation has been a meager local water supply.

A century ago the Los Angeles River flowed freely through vineyards and grazing lands as it crossed the Los Angeles Basin. Today when you can see water in the Los Angeles River, it's front page news. This is typical of our experience throughout southern California. Water which once rose to the surface under artesian pressure can now only be obtained through the continual deepening of wells.

These local resources were outstripped over 50 years ago. Our sporadic rainfall, varying substantially from year to year, is neither adequate for our economy's needs nor sufficiently dependable to permit orderly planning. However, there has never been any hesitation to accept the responsibility of providing for our water demand.

Before the turn of the century, the city of Los Angeles began looking for supplemental sources of water and by 1913 had constructed the first major aqueduct bringing water to southern California. Costing then $24.5 million it brings 320,000 acre-feet of water from the Owens Valley, over 240 miles, to meet better than half the needs of the city's 2¾ million inhabitants. This pipeline is now

being increased to carry an additional 150,000 acre-feet and is scheduled for completion in 1969 at a cost of $100 million. This additional construction will make the city of Los Angeles less dependent upon the Colorado than most of the rest of southern California.

But within scarcely a decade it was recognized that this would be insufficient and with the growth of many other coastal cities, planning began in earnest upon means of diverting large quantities of Colorado River water to the coast. The Colorado River Aqueduct of the Metropolitan Water District of Southern California was completed in 1941 and now serves municipal and domestic water to an area running from Ventura to the Mexican border. This aqueduct, America's longest and largest domestic water supply line now serves 118 cities in southern California including the major cities of Los Angeles, Long Beach, San Diego, Riverside, and Pasadena. In addition, some highly productive agricultural areas have benefitted from this aqueduct. Metropolitan has now invested half a billion dollars in its water system and is preparing to invest many times that amount in the next few years, a project I will discuss in a moment.

The impact of these man-made rivers upon our economy cannot be measured. But it can be truthfully said that in this arid land water has never been a limiting factor in growth. And it can also be said that despite the unparalleled growth to date, no end is in sight. If we use sheer numbers of people as our yardstick, the Metropolitan Water District expects to have over 19 million within its 4,500-square-mile service area by the turn of the century, more than double its present population of 9,500,000 within 35 years. Water demand from Metropolitan's facilities, not considering local sources and the Los Angeles Aqueduct, will exceed 3 million acre-feet per year from a present use of 1,200,000.

To stay in the race with this stream of people, the city of Los Angeles will increase its Owens Valley aqueduct by 45 percent within the next 5 years, as I mentioned previously, and Metropolitan will begin to receive the first deliveries in the early 1970's from what will be a gigantic river from northern California. This immense project is part of the California State water project which will develop 4,230,00 acre-feet for distribution throughout the State. Metropolitan is by far the largest contractor, entitled to receive some 2 million acre-feet which will cost over $2 billion in capital costs alone. As a matter of fact, over the 75-year life of this contract with the State of California, the total cost of Metropolitan, including enlargement of its own system, will run perhaps more than $6 billion. Yet with all this additional water development, the year 1990 will see demand exceed supply. Then who is to fill the gap?

The first step in that direction was taken by the chairman of the House Interior and Insular Affairs Committee when he wrote to Secretary Udall on November 27, 1962, requesting an outline for a comprehensive plan under which the Southwest's water and power needs might be satisfactorily provided for. Empty reservoirs can wreak havoc as we have seen this summer along the east coast. We are now asking that we be permitted to avoid a like crisis by building upon Mr. Aspinall's foresight.

The title of this bill is perhaps a misnomer. This is not a Lower Colorado River Basin project or a central Arizona project or any other project. It is more than merely a project or a combination of projects. This bill proposes a regional approach to resolving the rapidly deteriorating water picture with the seven-State Colorado River Basin. And the size of our job and the length of time within which it must be accomplished require that it be undertaken without delay. I say that our planning demands we find additional water by 1990. Our projections of future growth have always lagged behind actual growth and we have only 25 years in which to investigate, design, and construct whatever additional projects are necessary to provide the basin with a supply of water sufficient for the foreseeable future.

It is to be noted and emphasized that the Lower Colorado River Basin project addresses itself to the future. Contention relative to present water supplies in the Colorado River Basin is irrelevant to the project. Integral to the project however, is augmentation of these supplies to the point of adequacy. That is the concept on which the project is based. It is one that can and must be brought to reality.

Our future is limited only by our unwillingness to prepare for it. I urge the approval of the measure.

Mr. HOSMER. May I state to the chairman that this statement speaks not only for myself but 10 other Congressmen from California who happen to be on my side of the aisle.

Mr. ASPINALL. The Chair would like the gentleman from California to mention the names of those gentlemen together with the bills.

Mr. HOSMER. These are our colleagues: Mr. Reinecke, a member of the committee; Mr. Utt; Mr. Bob Wilson; Mr. Lipscomb; Mr. Charles M. Teague; Mr. H. Allen Smith; Mr. Bell; Mr. Talcott; Mr. Clawson; Mr. Gubser. Their bill numbers are in my statement.

May I state that in the length of time I have been in this Congress, Mr. Chairman, this is one of the most historic occasions I have enjoyed because for the first time there is unity between Arizona and California rather than a diversity.

I think, also, we are seeing a situation of companionship with the upper basin. This is actually the first major piece of legislation which has been brought before us which is not purely a device that tries to divide up water which already exists on some stream somewhere between competing people along the stream.

This project recognizes the fact that neither for the upper basin's ultimate development nor the lower basin's ultimate development is there sufficient water in this river, and it looks to augmenting the water supply, and it looks to augmenting it in a manner that will not be a burden on its neighbors in other basins. And it looks, also, to the matter of the water which is flowing in the river pending the creation of these works which are contemplated by the bill, both for use and for importation.

If while these works are being built we do not recognize that maximum use of the water must be made, then the situation mentioned by our colleague from Arizona, Mr. Rhodes, of wasting of water into Mexico, will continue. Some 5 years one way or the other from 1990, there will commence the period when there is not enough water for either the upper or the lower basin. Prior to that period we want to get maximum use out of the water that is there and we want to augment our supplies after that so both basins have what they need.

Why do we have to do this? When I came to Congress there were about 170 million people in the United States. Thirteen years later we have 200 million Americans living from our land and depending on the water supply sources of the Nation. We can no longer afford to let water run down the rivers into the sea. We have enough people and sufficient demand that we must now adopt philosophy which we have in this legislation which looks to the maximum use of the water pending the construction of new projects and the reallocation of the water resources between the basins of our country.

Mr. ASPINALL. The gentleman from California, Mr. Tunney, author of H.R. 4673.

STATEMENT OF HON. JOHN V. TUNNEY, REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. TUNNEY. Mr. Chairman, like my colleagues from California I would like to ask unanimous consent to submit my statement for the record.

My statement is joined in by the California Democratic delegation, although individual members of the Democratic delegation from California are submitting individual statements.

Mr. ASPINALL. Your statement and statements of other members will be made part of the record.

(Congressman Tunney's statement follows:)

TESTIMONY OF CONGRESSMAN JOHN V. TUNNEY, ON BEHALF OF THE SOUTHERN CALIFORNIA DEMOCRATIC DELEGATION

I would like to thank the members of the committee and the California Democratic delegation for giving me the opportunity to appear in support of 37 identical House bills which would authorize the Lower Colorado River Basin project. The bills before you have widespread support throughout California, and the California authors include members of both parties from the Oregon line to the Mexican border. Arizona, California, and the other Colorado River Basin States are at last working together toward the same end, the implementation of a regional plan and framework that will take care of the water requirements of all segments of the regional economy as the needs arise.

I am appearing here today primarily to reflect the clear expression of opinions received from my fellow Californians—both farmer and city dweller—who urge approval of the proposals contained in H.R. 4671 and the 36 other identical bills known as the Lower Colorado River Basin Project Act. I am the sponsor of one of these, H.R. 4673.

So that I may set those opinions, and my own, in the proper perspective, permit me first to touch on the physical characteristics of the area which I represent. The 38th District stretches from the city of Riverside on the west to the Colorado River in the east and south to the Mexican border. It embraces four of the six major water agencies in southern California represented on the Colorado River Board of California. They are the Palo Verde Irrigation District, the Imperial Irrigation District, the Coachella Valley County Water District and the Metropolitan Water District.

Within those three areas of service are more than a million acres of cultivated land which are dependent almost solely on the Colorado River as a source of water supply for irrigation and for industrial and domestic uses as well.

To the cities, towns, and farms in my district goes some 80 percent of the Colorado River water used in California. The annual value of food and fiber produced in this farflung land of abundance is in excess of $277 million. The average acre yield of lands is among the highest in Bureau of Reclamation records. The Imperial Irrigation District alone is the fourth most productive farming area in the United States; less than 70 years ago, it was a desert wasteland.

The history of California's developments and interests on the Colorado River is a long and interesting one covering a century of progressive planning.

California's active interests in, and rights to, the use of water from the Colorado River date from the 1870's when water was first appropriated for the Palo Verde area. In 1877 Thomas Blythe acquired about 40,000 acres in the Palo Verde Valley under the Swamp and Overflow Act, and made a water filing in the amount of 95,000 miners' inches on July 17, 1877. This was followed by numerous additional filings in subsequent years for irrigation and other purposes in the Palo Verde Valley and adjoining lands. The original Blythe filing, as far as is known, is the first of record on the lower Colorado River.

The present Palo Verde Irrigation District was created by special act of the State legislature in 1923 and it has the No. 1 priority to waters of the Colorado River. The district covers an area of 104,500 acres bordering and extending along the river for nearly 30 miles, and 17,500 acres of adjoining lands on the Palo Verde Mesa. The Palo Verde crops have a cash value of some $22 million a year.

The largest irrigation development in the desert area of southern California is that of the Imperial Valley area, which was initiated in the 1890's. The first filing was made on May 16, 1895, by E. I. Rockwell, for 10,000 second-feet of Colorado River water. Irrigation began in the Imperial Valley in June of 1901 when water was first diverted from the river to a newly constructed canal.

The Imperial Irrigation District, the largest single operating irrigation project in the Nation, was organized in 1911. It comprises more than 900,000 acres in gross area, of which some 430,000 acres are now irrigated with approximately 250,000 acres remaining to be developed for irrigation. Its annual crop yield is worth more than $213 million.

Because of the political obstacles and physical difficulties involved in operating the original canal, which was partially within the borders of Mexico, it was decided in the early 1900's to construct a substitute diversion canal entirely within U.S. territory. In 1919, a bill was introduced in the Congress to authorize the construction of the 80-mile All-American Canal and this was the forerunner of the Boulder Canyon project.

Irrigation of the Coachella Valley was contemplated early in conjunction with the Imperial Valley development. However, it was not included in the area irrigated by the works constructed by the California Development Co., one of the pioneering companies in the area. Nevertheless, irrigation development started in the Coachella Valley in 1902 by water supplies obtained from the artesian basin underlying the valley.

In 1918, the 608,000-acre Coachella Valley County Water District was organized for the initial purpose of conserving local supplies and replenishing the underground basin. But when it was shortly realized that this was insufficient to serve the irrigable area, the district turned its attention to the Colorado River and cooperated with the Imperial Irrigation District in planning the All-American Canal.

Colorado River water first reached the Coachella Valley in 1949 through the 75-mile Coachella branch of the canal. The total cash value of crops grown in the valley is more than $42 million annually.

I hope that the foregoing will serve to establish the fact that the State of California, and the 38th District in particular, has a very large and vital stake in the Colorado River. But what does the future hold for us?

The men who opened up California and the West were rugged individualists who took pride in being self-sufficient and going it alone. However, that is an era long past. Even the most rugged individualists have since learned that a lot of things require cooperative effort in this country of towering mountains and burning deserts.

Today we must adapt this pioneer necessity to modern conditions and band together, not merely in small communities, but in extensive groups of sovereign States if we are to assure our future. In the past, community cooperative effort was often necessary to literal survival: Today, interstate water resource planning is essential if we are to survive as a healthy, growing region.

We in the West have a special need for long-range planning and water development because we must meet not only the added requirements of the normal increase of our population, but also the accelerated growth due to the continuous migration from east to west.

However, additional supplies of water are required not merely to meet the obvious need of expanding populations. New sources of water are needed to improve the quality of much of our present supply. More and more of our available water is being used and reused, sometimes many times over.

Industry has learned to recycle its water supply and to use it over and over again and to treat its wastes rather than dumping them raw into the nearest stream. But even treated wastes require considerable dilution by fresh water to make them satisfactorily reusable.

The same applies to the treated sewage wastes of cities, the disposal of which is becoming an ever-increasing problem. A part of the answer must lie in the development of new fresh sources of water, supplies not now being used in their present location.

With the Colorado River rapidly becoming overcommitted, time is running out on the seven States which rely so heavily on "Big Red." In southern California alone, the population is expected to nearly double in the next quarter century—to 17 million people.

The comparatively simple and easy water projects have been constructed, but those which will have to be undertaken in the future are big and complex. The leadtime, the time between the formation of firm plans and the completion of the project, is measured in decades, and will tend to increase as still larger and more difficult projects are undertaken.

The developments which we must have to meet our expanding needs cannot be confined within the borders of any one State. If we do not get busy immediately with cooperative interstate planning, we cannot hope to implement our water supplies by the time they will be urgently needed. Delay at this point is to court an invitation to disaster.

An importation program of the required scope would entail lasting values for the entire West. It would benefit the areas of origin; it would benefit the States of the upper basin; it would benefit the Central Arizona project; it would

benefit other lower basin developments; and it would benefit our Mexican neighbors.

Enactment of H.R. 4671 which is now being considered, would have two primary objectives. First, it would provide the framework for a comprehensive plan to develop those water supplies necessary to meet present water deficits and future growth demands for both the Upper and Lower Colorado River Basins and for southern California. Second, enactment of the legislation would authorize for immediate construction those projects which are urgently needed and would constitute effectuating a solution to the larger water problems in the Pacific Southwest. It would also provide for the financial keystone of the plan by authorizing construction of the revenue-producing hydroelectric power projects on the Colorado River and integration of surplus power revenues from existing hydro powerplants at Hoover, Parker, and Davis Dams.

California has long depended upon the Colorado River for a substantial part of its water supply. Presently, more than 10 million people in an area covering more than 9,800 square miles with an assessed valuation of $19 billion rely on the Colorado River for most of their water needs. Facilities to make use of Colorado River water in California represent a total investment of $800 million—and have a replacement value more than twice that amount at present day prices. About 4 billion kilowatt-hours of electrical energy are delivered each year to southern California from hydroelectric plants on the Colorado—small in percentage of total use but large in necessity and value, because much of it is used to meet high peak demands of short duration that could not otherwise be met except by large additional capital investment.

In Riverside and Imperial Counties alone, Colorado River water serves more than 600,000 acres of cultivated land, and is also used for industrial and domestic purposes. To the cities, towns, and farms in this area go some 80 percent of the Colorado River water used in California. The annual value of food and fiber produced on these lands is about $300 million.

In addition to California, our sister States in the Colorado River Basin depend heavily upon the Colorado River. So far, the flow of the river has been equal to the demands upon it, but the river will sustain the present economy and provide for anticipated growth only for a relatively short period of years into the future. The States in the basin must now look ahead in terms of westwide regional water planning.

Without a history of regional planning of water resource development on the Colorado River, many of the 11 or 12 million residents in the Pacific Southwest would be living elsewhere. The lands which now provide us with winter vegetables and semitropical fruit would have remained a parched desert. The hamlets and oases would not have grown into major industrial cities. The dry desert climate, the mild winters, and the attendant benefits to industry and agriculture and everyday lving would have had to be foregone.

The heritage of my generation in the Pacific Southwest has been based upon the abilities of water leaders to compromise differences, to translate agreements into authorizations of projects, and then to convert authorizations to dams, aqueducts, and pumping plants. I do not think I would be boasting by saying that Californians have been leaders in these fields for many decades, and most particularly since World War II. As you know we are now in the process in California of building the greatest water project of all time, a project that soon must be dwarfed by even larger projects if the West is to achieve its destiny.

The State water project has been designed to meet the demand for water in a substantial part of California until 1990. However, very little of the agricultural area now served from the Colorado River will receive State project water. These areas face water deficiencies before 1990. The year 1990 lies but 25 years into the future.

At first glance it might appear to many of you that we in California can now turn our attention to other matters—that 25 years of blissful peace in the water wars, of relaxed decisionmaking, lies ahead. Nothing could be further from the truth. Our ever-expanding population and economy presage the need to construct even greater projects in the relatively near future. There is no escaping this message or the fact that experience has shown that a leadtime of 25 years is needed to plan, obtain authorization and financed, and to design and construct a major project.

It has been difficult to blueprint plans for existing projects on the Colorado and for the State water project. It has been even more difficult to translate those plans into actual works. As the population grows and the areas become

more crowded, the challenges of water development and conservation multiply in their complexity and their magnitude.

I believe every effort is being made to apply lessons already learned in the Colorado River Basin and in my State to the regional water problems we now face. Accord has been reached between the traditional Colorado River opponents, Arizona and California. Accord has been reached in all parts of the basin as to the need for an inportation of water. Valiant men hammered out the Arizona-California compromise, and men of vision and vigor have worked out the start of a regional solution now incorporated in the bills before the subcommittee today.

One example of Arizona and California cooperation is the provision in the legislation under consideration which provides that California's decreed entitlement to 4,400,000 acre-feet annually of Colorado River water shall be protected until the Presidents has certified that at least 2,500,000 acre-feet of water are available in the river from sources outside the Colorado River Basin. The 2,500,000 acre-feet is a minimum quantity required to assure continued protection for California's 4,400,000 acre-feet. However, near-future demands in the aggregate for the entire Colorado River Basin, indicate that water will have to be imported in quantities substantially greater than 2,500,000 acre-feet annually. Some of the water will be needed to improve the quality of much of the present supply.

Under the democratic processes, the only way to effect regional water development is to perfect plans which will properly distribute the benefits among all the affected areas and States, all segments of our population, and all the interests of that population. The plans must not only protect areas and States of origin, they must provide assurance of adequate water of good quality and at the cheapest possible cost so that the poor as well as the rich can afford this basic need of life and so the people as a whole may prosper instead of a few. Important objectives of water development that our population demands along with water for irrigation, domestic and industrial uses, include fish and wildlife protection and enhancement, recreation, scenic viewing, water pollution control, and navigation.

Secretary Udall stated on a recent television program that the water crisis in the area served by the Delaware River in the northeastern part of the country is the result of a temporary drought condition for which there had been inadequate preparation. President Johnson has also expressed his concern about the inadequate supply of water for our major population centers throughout the Nation. We, in the Colorado River Basin and elsewhere in the West, have had considerable experience with shortages owing to critical low runoff years, and have developed longtime holdover reservoirs like Lake Mead and Lake Powell to cope with them. What we must now plan to avoid is a permanent drought. The entire Colorado River Basin, most of the Great Basin, and large areas of the Columbia River Basin and Pacific coast basins face permanent droughts unless ways are found to effectively develop and utilize the existing supplies and then to import new supplies as needed.

I recently learned that if a man wanted to subsist on bread alone, he would need about 300 gallons of water per day to grow the wheat. If he wanted to live on beef alone, the water requirements to grow alfalfa to feed the cattle would be approximately 3,000 gallons per capita per day. In other words, if we want to become eaters of meat rather than bread, we need 10 times as much water. Population projections point to 75 million people residing in the 11 Western States within the next 50 years. If that population wants to have a rounded, bountiful diet, including substantial quantities of meat, the aggregate water requirements would be higher than generally believed.

For instance, if an average diet were assumed to require water for beneficial consumptive use midway between the amounts given above for bread and meat, and 75 million people are to be fed, the aggregate water requirement to raise food alone would be equivalent to about 10 Colorado Rivers, or almost 1 Columbia River.

Our civilization will not survive on bread and meat alone. Other essential water requirements—for municipal and industrial purposes, for growing necessary raw materials and other fibre, providing for navigation, for recreation, and fish and wildlife, and for transporting materials—must also be met.

No State in the West or in the Nation for that matter, can afford to hesitate concerning the need for regional water planning. Efforts must be made by all of us to understand the other's predicaments, to find ways to help, not only ourselves, but also our neighbors. The legislation before you provides all in the West that opportunity.

Mr. TUNNEY. I would like to say, Mr. Chairman, that I think that the tremendous value of this particular legislation before the committee today is that at long last we have a reconciliation of differences between the various States in the lower basin and a recognition that we must develop new sources for water if we are to provide for the needs not only of California but the entire arid Southwest.

Although we are considering today a bill which will construct facilities in Arizona so that we can water our deserts and our cities, we are also in the long run providing for an importation of water from areas of surplus.

As a Californian, of course, this is what particularly interests me—that California will have a guarantee of at least 4.4 million acre-feet indefinitely, and also that water will be brought from areas of surplus to areas of deficit in the arid Southwest.

Thank you.

Mr. ASPINALL. I recognize the gentleman from California, Mr. Reinecke, author of H.R. 4675.

STATEMENT OF HON. ED REINECKE, REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. REINECKE. I also ask unanimous consent that my statement be incorporated into the record. I would like to supplement it with some remarks.

Mr. ASPINALL. Without objection so ordered.

(Congressman Reinecke's statement follows:)

STATEMENT OF HON. ED REINECKE

By 1985, the 15 counties in the southern half of California will have a population of about 20 million people—considerably more than the total present population of all of California.

Los Angeles County will jump from its present population of 6.9 to 9.3 million in 1985. Within Los Angeles County, the area known as the Antelope Valley, a high desert plain, today has about 90,000 residents. The Los Angeles County Regional Planning Commission estimates that the Antelope Valley alone will have a population of 160,000 within 5 years; a population of over a half million by 1980; twice that population by 1990; and it is projected that the Antelope Valley portion of Los Angeles County will have 1,280,000 residents by the year 2000—only 35 years from now.

In addition to the Antelope Valley, I have the honor of representing much of the San Fernando Valley. While not as statistically spectacular as the growth projections for the Antelope Valley, the San Fernando Valley area is expected to grow by 33 percent, an increase of at least 500,000 people, in the next 20 years. By 1985, there should be 1.7 million people there.

The 20 million southern Californians which we anticipate in 1985 are 8 million more than we have now, an increase of about 66 percent. Orange County will increase by about 142 percent; San Bernardino County by 118 percent; Riverside County by 145 percent; and Imperial County by 54 percent.

In the 12 years between 1950 and 1962, employment in manufacturing in southern California doubled, and there is good reason to believe that manufacturing will continue to expand at a rapid rate in southern California.

Like people, manufacturing uses water. The two combine to consume enormous quantities of water; somehow this water must be found. It does not now exist in plentitude in southern California—it will simply have to be imported.

Our industry, our agriculture, our recreational needs, and our homes continue to expand at unprecedented rates. The basic services necessary to support them—such as water, power, and highways—must meet the challenge imposed by this growth.

So far in southern California we have been able to keep pace with our population. Our water position will remain firm for another 25 years—but only for

that length of time. In the last decade of this century we will once again need additional water. Two great aqueducts now bring water to southern California—the Los Angeles aqueduct and the Colorado River aqueduct. Within 6 years, water will begin to arrive from a third importation source, the California aqueduct.

Moreover, we are now investigating new sources of water, such as importation from rivers in the Northwest or conversion from local nonpotable waters through desalination. We in southern Califronia are a great distance from the northwestern rivers and any project contemplating the use of such water would be costly. Desalination, too, is presently prohibtively costly.

Soon, we will turn our attention to another importation method which has thrilling possibilities: an undersea aqueduct bringing to southern California the water of northern rivers by catching that water as it empties into the Pacific Ocean and piping it undersea along the coast to southern California.

These are some of the possibilities for bringing water to one part of the Southwest, and some of those methods will have to be in operation before the end of the next three decades.

The problem which Arizona faces is more immediate—and there does not exist the wide range of solutions which we in California have. As you know, Mr. Chairman, if this project is authorized, not one ounce will be added to California's water supply through water naturally flowing in the Colorado River. There is considerable doubt in my mind whether the river will be able to meet the demands on it unless its own supply is augumented, perhaps through the addition of water transported to it from the Northwest.

Whatever the various possibilities may be, they will not be of immediate help to Arizona, which is now confronted with a dropping water table. Arizona's only other major source is the Colorado River.

But its ability to divert this water is limited by compacts, by treaties, and by nature.

The population growth expected in Arizona has considerable similarity to the projections for California and Nevada. The entire Pacific Southwest must work together, immediately and resolutely, toward the solution of its common problem: how to provide an adequate water supply for its future generations.

A few days ago, I read a speech given on August 5 of this year by the Secretary of the Interior, Stewart L. Udall, who gave his audience some fascinating statistics: he said that the production of $1 worth of steel requires 1,400 gallons of water. He said that to produce a pound of beefsteak requires 4,000 gallons of water. And he said that when we include industrial and agricultural uses, water in the United States is consumed at the rate of 1,380 gallons per day per person.

As applied to the Southwest, this figure may be exaggerated because our agricultural use of land is below the national average, and with an increase in population, may fall even further below the average.

Nonetheless, it is interesting to take the Secretary's figure of 1,380 gallons of water per person per day and arrive at the following projection:

Southern California will need, by 1985, as much as 10 trillion gallons of water each year. If accurate, that figure would indicate a needed water supply of 30,900,000 acre-feet per year.

I should repeat, however, that the Secretary's figure is probably inflated in its application to the Southwest. I would suggest that total water use per capita would be in the order of magnitude of 750 gallons per day.

But even this scaled down figure provides some startling statistics: with a population of 20 million in 1985, southern California will use at least 5.43 trillion gallons of water a year, which is equivalent to 16.8 million acre-feet.

In 1985, that portion of southern California which relies on the Colorado River will have a population of about 16 million. This is theoretically a drain on the river of 2.17 trillion gallons a year—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 supply California with 6.7 million acre-feet.

It is time now for the States of the Lower Colorado River Basin to move on toward the solution of the water problem. We of California are happy to assist in this cooperative effort. The dispute between our States has raged too long—and has accomplished very little.

We hope that passage of this bill will be a start toward the elimination of the water gap.

Title II, which directs the Secretary of the Interior to conduct studies, investigations, and surveys in an effort to develop additional water for the West should be the beginning of a solution and California has a vital interest in this matter. Adequate water will, in fact, determine the future of our State.

Our technological age continues to produce new developments at a pace which is unbelievable. We should not forget that this progress magnifies our capability to undertake projects which until recently were considered "pie in the sky" and the dreams of scientists and engineers. Our engineering capability can keep pace with the scope of our needs and the problems we face in the Colorado River Basin can be met and the projects we need can be constructed to permit our economies to expand.

As an example of the great technical strides we are making in the resources field, initial work is now underway upon the Pacific Northwest-Pacific Southwest intertie which will pioneer the transmission of power by use of high-voltage direct-current equipment. The increased flexibility of such a system permitting the more efficient use of power-generating facilities in the West will be of great value to our entire economy. Until recently, due to certain limitations of alternating current transmission, our ability to take advantage of regional variables in power generation was much more limited. We are moving forward in the development of new materials to enable us to move water in unusual situations, such as undersea or in extreme cold climates.

We must recognize that supplementing the waters of the Colorado River Basin will be a task of unusual magnitude and will present problems of a scale not yet encountered. We do have the advantage of continuing technical progress which can make our projects more workable and enable us to undertake them at less expense. To those who are critical or doubtful of our ability to complete them, we need only show the progress we make every day in improving our technology.

But caution must be exercised. The Congress, and particularly this committee, must give thorough scrutiny to the feasibility and the necessity of each of the components of this project. It may be possible to find better methods to accomplish some of the objectives.

With that caveat, and one more, I shall conclude my remarks: The need for action has been demonstrated; the technological ability exists. In executing our clear responsibility to authorize a project to assist Arizona in the development of its water, let us not blind ourselves to existing legal ramifications. We must be mindful that along with the Colorado River go treaties, compacts, and present perfected rights.

While we must move expeditiously and efficaciously, we cannot afford to infringe on the rights of those presently and legitimately relying on Colorado River water. We cannot go through lengthy legal delays such as we have experienced in the past.

Above all, as we begin this venture and make this investment in our future we must provide for safeguards which will minimize the loss of water by evaporation, seepage, and the like. And we must take positive steps to maximize the usable available water in the Southwest. Water there, as everywhere, is precious. We must not waste it. Instead, we must utilize every particle of it. The central Arizona project is a step in the direction of economical water utilization, which, in the long run, can result in the increased well-being of the entire Nation.

Mr. REINECKE. Like all of us here I am also pleased that at least we have come to a point where the three principal States involved in this dispute agree at least on all major points.

I would like to emphasize the fact that California is very much a water-oriented State, and to indicate that according to present projections just the district which I alone repersent is proposed to grow to 1.25 million by 1985. This is a population comparable to the entire State of Arizona at this time. That is why this matter is so vitally important to California.

A great deal has been done in developing our water resources throughout the State, and I am hopeful that shortly we will be investigating the possibilities of bringing surplus water through an undersea aquaduct along the coast.

Arizona's problems are more immediate, it seems, inasmuch as they have had curtailments. I think it is incumbent upon us on this committee and all representatives of both States to see that all that is reasonable and possible can be done.

I must, however, suggest caution in that we do not in haste generate legislation that will in any way prolong the anguish which has taken place over the last 20 years and that whatever we come up with will be legally acceptable and legally fair to all the parties concerned.

The question of legal delays we have experienced thus far have cost us many millions of acre-feet of water and we want to be certain that each and every component of this project will maximize and optimize the use of our most precious natural asset.

Thank you, Mr. Chairman.

Mr. ASPINALL. The gentleman from California, Mr. Burton, who is the author of 4672.

STATEMENT OF HON. PHILLIP BURTON, REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. BURTON of California. Mr. Chairman, the development of the lower Colorado River Basin is vital to the well-being of my State, California, and our adjacent States in the Southwest, Nevada and Arizona.

The continued growth, development, and prosperity of this entire area revolves around a common need—water.

The lower Colorado River Basin project represents the thoughtful approach of experts in this field of reclamation to the problem of meeting our present and future needs for this vital resource.

As a Californian, I am proud of the program which my State has undertaken under the able leadership of Governor Brown to develop to the fullest its capacity to store and transmit our water supply.

I also understand the need for this legislation and am pleased to be a cosponsor of the measure which we have before us, which meets the common needs of those of us in the West and Southwest, and our greater national need to reclaim and preserve our natural wealth and resources.

Mr. ASPINALL. Without objection the statement of Hon. Ronald Brooks Cameron, of California, will be placed in the record.

(The statement of Hon. Ronald Brooks Cameron follows:)

STATEMENT BY HON. RONALD BROOKS CAMERON, OF CALIFORNIA

Mr. Chairman, since the turn of the century the great Western States of California and Arizona have been engaged in a fruitless and bitter quarrel over the valuable water of the Colorado River. As you know, the definitive 1963 Supreme Court ruling which followed 11 years of litigation apportioned 4.4 million acre-feet to California, 2.8 million to Arizona, and 0.3 million to Nevada, with numerous other provisions covering potential shortage and surplus. Immediately following this decision, Arizona's Senators introduced legislation calling for construction of the central Arizona project, the first of several plans offered since then which have unsuccessfully tried to reconcile the conflicting water interests of the Southwestern States.

The proposal now under consideration by your committee, the Lower Colorado River Basin Project Act, is remarkable in that it is the first ever to have achieved a consensus between the States during a half century of feuding. But remarkable as this consensus is, I do not see it as the greatest achievement represented by the present bill.

The real contribution of this legislation would be to give our Nation its most comprehensive and complex legal framework for dealing with the problem of water scarcity and allocation.

The crucial water needs which are developing at an extremely rapid rate in the Southwestern United States demand a solution now. Yet for years the great engineering works which could solve the needs of these States have been forestalled or canceled because of the confusion and ambiguity of our water laws. A State cannot afford to invest millions of its taxpayers' dollars for water projects in areas where its right to water may be subsequently denied by the courts. Consequently, there has been a lack of innovation, a tenacity in preserving the status quo, when creative departures are necessary for the health and survival of the Western States.

Permit me to comment briefly on some of the legal problems encountered in the solution of water problems, for I think it will help the committee to more easily appreciate the achievement embodied in the present bill.

The laws that determine the distribution and consumption of the Nation's water are among the most difficult and ambiguous of our juridical system. Water law must deal with priorities for competing and irreconcilable uses for water—as in the conflict between irrigation and navigation—and with the classic problem of water shortage among groups and individuals who all want to make consumptive use of the same water.

Complexity is intensified by the fact that the great river and its tributaries are seldom confined to any one State and are often the boundaries between States. There are competing jurisdictional claims between different areas within a State, between various States, and between States and the Nation. The Federal claim to the river is based on the constitutional power of the Federal Government to regulate interstate commerce, to regulate the use of Federal property, and to promote the general welfare.

The State claims its right to use the water, just as it claims the right to land and other natural resources in the State. This accounts for a troublesome and often vague division of power between State and Nation which has not infrequently been a source of friction.

The two mechanisms developed by Anglo-Saxon law in determining interstate and intrastate conflict of water interest are known as the riparian and appropriation doctrine. Under the former, the right to water usage is limited to tracts of land that are contiguous to the stream; under the latter, the general rule is "first in time is first in right." This rule means that regardless of whether a given piece of land is contiguous to a stream, if its owner serves public notice of intention to use a specific amount of water and diligently constructs works for its use, his right to the water cannot be cut off by a competitor who later initiates a water project. While at first glance the appropriation doctrine might seem less equitable than the riparian, it has the great virtue of allowing considerable security to the investor. Shortage is borne by the newcomer who must ascertain if residual water will justify his investment.

The law must provide consideration not only of conflicting jurisdictions and determination of priority, but also must judge the quality of water even after jurisdiction and priority are agreed upon. At the present time, for example, Mexico justly complains that the water it receives, even when of appropriate volume, has an extraordinarily high salt content resulting from certain projects in the States which dump brine into the river to maintain its volume. This activity is bringing disaster to a vast Mexican farming region and it will take many years to again make the land productive.

The body of water law which has evolved is not the product of any overall legal vision. History shows that many claims to jurisdiction over water tend to obscure exactly which level of government has the power to determine rights and on what basis they shall be determined. Consequently, the laws have originated primarily in adversary proceedings in courts, the common law almost always preceding statutory law. Since the Federal Government embarked on its course of constructing great public works, Congress has assumed the burden of resolving major conflicts over water, an undertaking made extremely difficult amid the multitude of existing and anticipated demands and the host of court rulings and common law precedents that must be considered in constructing legislation. The task which falls to Congress today is to establish principles on which the logical and rapid development of water resources must proceed.

The laws we pass must not be mere piecemeal responses to opportunistic and provincial requests. They must have overall commitment to the regional de-

velopment of coherent water plans. They must first consider the situation as it exists—a given body of water, the regulations, priorities, and uses presently associated with it. There must be reasonable assurance that the fabric of the present arrangement will not be destroyed in a revolutionary manner. To thus threaten the great water consumers with the loss of their water sources will necessarily make them opponents of new developments and visionary plans. But, assured of reasonable claims and a clearcut area of jurisdiction, consumers can afford a certain generosity and innovative spirit.

It is in this highly volatile, competitive, confused context that the present proposal can be seen as such a giant step forward. For the first time in more than two generations, California and Arizona have reached an agreement embodied in a thorough, just law which solves many of the legal dilemmas I have noted: The question of jurisdiction, the balance between the riparian and appropriation doctrines, the tension of incompatible water claims.

The proposal is a framework for a regional plan which would serve as a vehicle for common cooperation of all States involved, the greatest planning effort ever undertaken in a single river basin. Its provisions are defined witthin the framework of the 1963 Supreme Court decision which authorizes the 2.8, 4.4, and 0.3 ratio for water distribution in Arizona, California, and Nevada. And it does it in such a way as to allow Arizona to begin construction on her long cherished dream of a central Arizona project, while assuring California of its annual 4.4 million acre-feet of water.

This last provision, contained in section 304 of the bill, is the most crucial point of agreement, for it requires the Secretary of the Interior to limit diversions from the Colorado to the central Arizona project in any year that the river cannot supply the 7.5 million acre-feet apportioned by the Supreme Court. The central Arizona project thus will bear any shortage, its rights being junior to those of already existing projects in California, Nevada, and Arizona. This means that the principle of appropriation priority embodied in the water law of both States is reconciled with the Supreme Court specifications. In concrete terms it means that the great waterways constructed at enormous cost by the taxpayers of California—the Metropolitan Aqueduct and the All American Canal—will not be allowed to run dry in deference to a new project.

California rights, however, are protected onl yto the 4.4 million acre-feet guaranteed by that decree and not the 5.1 million acre-feet which it presently uses and depends upon. These restrictions on both States obviously make it of mutual interest to support and diligently work for new efforts to replenish the supply of water in the Colorado—California because it must replace the 1 million acre-feet it is bound to lose, Arizona to fill to capacity its new waterway. Neither State will be forced to assume the burden of a water shortage alone or to shed its responsibility for the water needs of the region. The crucial interests of both States are being guarded in the skillful definition of this section, providing far more in benefits than either State would have received had it fully prevailed during the long litigation preceeding the Supreme Court's 1963 decision.

Before concluding permit me to single out four distinct characteristics of the proposal which I find particularly worthy of remark.

First, the plan is decidedly progressive in a time and place where bold planning means survival. The Secretary of the Interior would be authorized to investigate all available sources and methods of providing water to meet the projected needs of the river basin area and to submit comprehensive plans to Congress concerning his findings. This would include examination of alternative methods of water procurement such as desalination and reclamage of waste water. I hope we are not too tardy in at last moving in this direction for, beyond doubt, the one characteristic of water resource development is that it takes many, many years to produce significant results. The central Arizona project will take more than 30 years to become fully operative and California's Feather River project will require a quarter-century between conception and fruition. The anticipated population growth in these Western States makes immediate action imperative.

Second, the proposal has the attraction of being regional in character. The needs of the entire Colorado River Basin, upper and lower, are anticipated and provided for under the bill. A Pacific Southwest Regional Water Commission would represent each of the seven States of the basin, every State from which water is imported to the Colorado, and each major Federal agency and department concerned.

Third, the proposal is especially prudent in its protective restriction for "States of origin," that is, those States whose waters will provide replenishment for the Colorado. It insures that water available for use in those States will be adequate for their ultimate requirements. The bill further provides for our obligation under the United States-Mexico water treaty of 1949, an obligation which regrettably has long been slighted by this country. It would relieve both the upper and lower Colorado basins of the burden of the Mexican treaty. It would enable all parties to think in terms of replacing overdraft from already badly damaged ground basins, instead of completing their destruction by continuing to remove from them more water than can naturally be replaced.

Finally, I must applaud the sound financial structure for all projects conceived under the terms of the bill. Following construction of the bridge and Marble Canyon dams their revenues would be employed, along with those from the Hoover and Parke-Davis projects after their payout periods, for the benefit of the region. Gathered into the Pacific Southwest development fund, these revenues would be used to repay the advances of the General Treasury, to subsidize existing projects, and to finance the projects required to import the water necessary to make up for Colorado River shortages. The water procured for the river over and above the 7.5 million necessary to its present commitment would be paid for by project beneficiaries. The concept of regional funds, administered within the region, eventually bearing the cost of its water needs is totally consistent with the progressive, creative tone of this excellent bill.

Mr. Chairman, I urge prompt enactment of this legislation. Thank you.

STATEMENT OF KEN W. DYAL, MEMBER OF CONGRESS FROM CALIFORNIA

Mr. Chairman, my long years of service with the Feather River Advisory Board has kept me in direct contact with the water problem. I have followed with considerable interest the course of the controversy among the lower basin States over use of the Colorado River, and it was extremely heartening when in the early months of this year this historic accord was reached. I am more than pleased to be a cosponsor of this agreement having introduced H.R. 4696 on February 9 with 33 of my California colleagues and my 3 colleagues from Arizona.

The Colorado River forms the eastern boundary of my district and is the source of water for many of my constituents, provides them with a livelihood, and is a source of pleasure during their leisure hours. Like much of the rest of the Pacific Southwest, San Bernardino County is an arid land with a meager rainfall; in fact, in portions of the county no rain falls for several years at a time making us continually aware of our dependence upon a few major sources of water.

If the future possible interchanges under the Pacific Southwest water plan, San Bernardino County would be an obvious locale for such an interchange. Certainly, the area around the Cedar Springs Reservoir, now approved by the Feather River project, would be an appropriate location for such interchange of water as the Pacific Southwest water plan is developed.

An aspect of the Colorado which I feel deserves particular emphasis is its tremendous potential for recreation. Southern Californians are rapidly converting the last of their open spaces for city uses leaving little where one can escape the hurry of urban living. I might cite as just one example the tremendous usage of Lake Havasu and the river below Parker Dam in recent years for every form of water based recreation, including water skiing, fishing, boating, and swimming.

The desirability of stabilizing the water supplies of the river through the essential importation program advocated in this bill will be a significant factor in the further development of this entire area to meet its full recreation potential.

Mr. Chairman, I would like to urge your committee to take prompt and favorable action on this legislation.

STATEMENT OF CONGRESSMAN TENO RONCALIO

Mr. Chairman, the passage of the Lower Colorado River Basin Act, H.R. 4671, will have far-reaching effects upon future generations in our Western States. In considering this legislation we must concern ourselves not only with the needs of today but must also keep an eye on future trends and developments.

For an indefinite period of years, the Central Arizona project will be dependent upon water allocated to the upper basin States but not yet used by them. However, the use of this water is constantly expanding in the upper basin, as we approach the day when the total allocation of 7.5 million acre-feet per year will be consumed. If the upper basin begins to utilize its maximum of 7.5 million acre-feet per year, and there is a shortage of water in the lower basin, the health of the Central Arizona project will be dependent upon an uncertain scheme for importing water from outside the Colorado River Basin.

The problem is that there simply is not enough water in the Colorado River for both the Arizona project and future upper basin projects. Thus, it should be made clear that Arizona will have to bear any shortages which may result when the upper basin later claims the full use of its allocation, as determined by the Colorado River compact of 1922.

In addition, the upper basin States should be relieved from any burden resulting from Mexican deliveries. Article III(c) of the Colorado River compact says that the Mexican obligation shall be satisfied first out of the surplus over the 8.5 million acre-feet allocated to the lower basin and 7.5 million to the upper basin. These quantities are to be supplied from the mainstream plus the tributaries. Thus, there is a surplus over the 8.5 million acre-feet in the lower basin because Arizona's tributaries support about 2 million acre-feet of consumptive use.

Finally, the diversion of funds from the Upper Colorado River Basin fund to the Colorado River Dam fund as payment for the Hoover Dam deficiencies should be terminated immediately.

In our attempts to secure ample water supplies for present and future projects, I believe we should recognize that conservation of our existing water resources is a more positive approach to the problems of water shortage and water allocation than tying to siphon water off a source thousands of miles away. Importing water will result in more waste through evaporation.

MOVE THE PEOPLE TO THE WATER

Instead of allocating our water resources in the wasteful manner of sending the water to the people, it would be more economical and efficient to bring the people to the water. The problems brought about by population concentration in certain areas of the country largely result from rural problems which have been neglected in the past. Much of this is due to the plundering of rural resources without paying adequate prices.

Incomes in rural areas are about half those of the urban dwellers. Consequently, many of the people leaving the country are not equipped for urban life. It is time to recognize the fact that millions of these people could be provided jobs and homes in rural areas with less economic and social strain than in the crowded cities. It is cheaper to deal with rural problems in the countryside rather than moving them to the cities, where natural resources are in short supply.

In accordance with this approach, increased emphasis should be placed upon pollution control, water salvage, and desalinization.

My State is not adopting a negative attitude toward future lower basin projects but I do urge that we maintain a broad perspective in defining our problems and use all existing means to solve them.

Wyoming does not seek to take a "dog in the manger" attitude toward the Central Arizona project, or any other downstream development in the Lower Colorado River Basin. Wyoming does, however, mean to defend here and now against any encroachment upon the waters of the Green River to which it is rightfully entitled.

Therefore, before approval could be given to this project, this bill should be amended to provide for a margin of reservation for appropriated waters for future industrial and agricultural development within Wyoming, and an assurance that shortages which will develop in central Arizona after 1990 will not be chargeable against upstream appropriations of Green River water.

Wyoming is 1 of the 2 States of the entire 50 in the Nation which has not grown in population in the last 20 years. Wyoming's economy is not enjoying a healthy or constant growth in any way comparable to that of other States of this Union—and, in fact, Wyoming has seen fit upon its own resources and initiative to attempt to hold its own in the economic race of States without such help as the Appalachian legislation has recently given to many of the States of the East. Any threat to the use of our own headwaters in the genera-

tions to come would only only deal a deathblow to our potential for growth and expansion. For these reasons, until this legislation has made clear-cut and irrevocable reservations for this future use of water, it will behoove Wyoming to join its sister States in the Upper Colorado River Basin to object to any further action upon the bill.

STATEMENT OF CONGRESSMAN JAMES C. CORMAN

Mr. Chairman, I wish to join my colleagues in expressing wholehearted support for the lower Colorado River Basin project. This project, which offers a regional approach to the water problems of the Pacific Southwest reflects a unique solidarity of feeling toward our water needs and the means of meeting them. This program, now before you as H.R. 4671—with 36 counterpart bills, including H.R. 4686 which I introduced—is a sound and far-reaching approach to our water problems.

Each part of the bill provides a sensible and orderly program for meeting the water needs of the seven basin States for many years to come. Under the provisions of section 304, the great projects now functioning in my State—the Colorado River aqueduct of the Metropolitan Water District, the All American Canal of the Imperial Irrigation District and the Coachella Valley County Water District, and the facilities of the Palo Verde Irrigation District—will be protected up to the 4.4 million acre-feet allocated to California in the decree in *Arizona* v. *California*.

And the Secretary of the Interior is directed to immediately undertake comprehensive studies of our supply and demand through the early decades of the next century and present Congress with the projects needed to cure the deficiencies by means of water importations from areas of water surplus.

I know your committee will receive ample testimony to show the seriousness of our water needs and the continuing growth which will not permit us to relax our vast water development program. This is nowhere more evident than within my own district, a portion of the dynamic and burgeoning San Fernando Valley, where population figures become obsolete the moment they are sent to the printer. Our demand for water corresponds to this growth.

H.R. 4671 represents a great new era in water development for the West. It challenges us to think and act in terms of our future while removing the sore spot over which we have quarreled for many years. It is an unhappy fact that we have devoted decades to fighting over a dwindling and inadequate river, apparently lacking the imagination to act for our own benefit. Now we have the means available to work together for our mutual good. I therefore urge your favorable consideration of this bill.

Thank you.

STATEMENT BY E. ROSS ADAIR, FOURTH INDIANA DISTRICT

Mr. Chairman, I appreciate the opportunity of appearing before the committee to express my opposition to proposed legislation which would permit the construction of a dam on the lower Colorado River. As a matter of fact, I wish to apprise the committee that a number of my constituents have written to me about this proposal. The consensus has been strongly in opposition to it.

Having visited the Grand Canyon, and beheld its awe-inspiring beauty, I am sure that most Americans will stubbornly resist any efforts which would damage this marvelous, natural phenomenon. It is in truth one of the greatest wonders of the world. Any person who has seen the Grand Canyon would not want to see it destroyed or damaged in any way. Building this dam, in my opinion, could not but detract from its beauty.

I also want to inform the committee that the Indiana division of the Izaak Walton League has gone on record in opposition to this legislative proposal. Furthermore, this organization has also adopted a resolution setting forth its opposition to any projects which would impair the beauty of the Grand Canyon. I have been asked to advise the committee of the league's specific action in this matter.

While we all recognize that there are many reasons for taking steps to improve the economic potential of our great country, at the same time we must not let this emphasis overshadow the necessity for maintaining the natural wonders of the United States. We owe it to future generations to keep the Grand Canyon in its present state—undamaged by the hand of man.

CONGRESS OF THE UNITED STATES,
HOUSE OF REPRESENTATIVES,
Washington, D.C., September 13, 1965.

Hon. WALTER ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs, Longworth Building, Washington, D.C.

DEAR MR. ROGERS: I respectfully request that this letter, which contains a statement of my views concerning the proposed lower Colorado River storage project, be entered into the records of the subcommittee hearings which were recently concluded.

Let me begin by saying that I support the position taken by the Honorable Calvin L. Rampton, Governor of the State of Utah, in the statement which was presented to this subcommittee in his behalf by Mr. Jay Bingham of the Utah Water and Power Board.

I am sympathetic to the needs of the State of Arizona, and I certainly recognize the great contribution that the central Arizona project would make to the economy of that State.

I wish to number myself with those who take a constructive approach. If adequate safeguards are placed in the legislation to protect the upper basin compact allotments of Colorado River water, and to assure opportunities for further development of the upper basin, and provide conditional authorization of importation of water from sources from outside the Colorado Basin, I would urge favorable consideration of the lower Colorado River Basin project. In the past few days I have also received resolutions concerning this project from the Utah Water and Power Board and the Central Utah Water Conservancy District, both of which have vital interest in any legislation which affects the use of water of the Colorado River. I ask that you include in the record these attached resolutions.

Very sincerely yours,

DAVID S. KING,
Member of Congress.

RESOLUTION

Whereas the future economic growth and development of the State of Utah is largely dependent upon the availability of water; and

Whereas the compact apportionment of water made to the State of Utah from Colorado River system represents the major source of water for the future; and

Whereas there is pending before the Congress legislation which would authorize the construction of major facilities to utilize Colorado River system water; and

Whereas competent engineering studies show that during any period such as that which occurred during the period from 1921 to 1964 the water supply of the Colorado River will not be adequate to supply the 7½ million acre-feet per year apportioned to the upper basin division and the 75 million acre-feet in any 10-year period apportioned to the lower basin division by the Colorado River compact; and

Whereas construction and operation of the proposed central Arizona project without an accompanying importation of water into the Colorado River Basin will result in shortages of water to supply other existing and proposed water uses in the Colorado River Basin; and

Whereas in order to avoid the effect of such potential shortages and allow needed water development in the Colorado River Basin to move forward, it is desirable for the seven Colorado River Basin States to work together in a joint approach to releaving the potential shortages; and

Whereas the Board feels a sense of urgency in the preparation of a plan to import water into the basin and permit further water development in the Lower Colorado River Basin to move forward: Now, therefore, be it

Resolved by the Utah Water and Power Board at a special meeting held in Salt Lake City, Utah, this 17th day of August 1965, That the board concurs in the position taken by the Governor of the State of Utah in his letter of August 16, 1965, to the Honorable Wayne N. Aspinall, chairman, House Committee on Interior and Insular Affairs, to the effect that provisions should be made for the importation of substantial quantities of water from sources outside the Colorado River Basin as a part of the authorization of any projects in the Lower Colorado River Basin; be it further

Resolved, That the board concurs in the position adopted in regard to further water development in the Lower Colorado River Basin in the resolution approved by the Upper Colorado River Commission at its regular meeting in Salt Lake City on August 16, 1965; be it further

Resolved, That the board authorizes the staff to negotiate with representatives of the other Colorado River Basin States to amend presently drafted legislation in accordance with the position adopted above so as to protect the interest of the State of Utah and of the other Upper Basin States.

CERTIFICATE

I certify that the foregoing is a true and correct copy of a resolution adopted by a unanimous vote of the members of the Utah Water and Power Board in a special meeting in Salt Lake City, Utah, on the 17th day of August 1965.

JAY R. BINGHAM, *Executive Director.*

RESOLUTION

Whereas there is pending before the U.S. Congress bills to authorize a Lower Colorado River Basin project, the water for which must come from the upper basin supply presently unused but now flowing into the lower basin; and

Whereas the pending legislation does not contain adequate safeguards to protect the future water development of the Upper Colorado River Basin, including the State of Utah; Now, therefore, be it

Resolved, That the Board of Directors of the Central Utah Water Conservancy District in a meeting duly assembled on August 13, 1965, does hereby urge that H.R. 4671 and related bills pending in Congress be amended to provide adequate protection to the future water development program of the Upper Colorado River Basin by including but not necessarily limited to the following principles:

(*a*) An importation of not less than 2.5 million acre-feet of water from sources outside the Colorado River Basin with the first 1.5 bililon acre-feet to be used to fill the Mexican treaty obligation;

(*b*) A means of supplying the future uses of water in the upper basin by making the water returnable to the upper basin in the amounts and at the times the upper basin needs it;

(*c*) A return of the power revenues to the Upper Colorado River Basin fund for amounts that have been charged against that fund for deficiency energy, impairment capacity, and impairment energy resulting from the filling of upper basin reservoirs.

CERTIFICATE

I, Lynn S. Ludlow, secretary of the Board of Directors of the Central Utah Water Conservancy District, do hereby certify that the foregoing is a full, true, and correct copy of a resolution duly adopted by the Board of Directors of the Central Utah Water Conservancy District at the regular meeting held on the 13th day of August 1965. Said meeting having been duly called and being attended by a legally constituted quorum of officers and directors of said district.

Dated at Provo, Utah, this — day of ——, 1965.

LYNN S. LUDLOW, *Secretary.*

Mr. ASPINALL. The next scheduled witness was to be the Honorable Carl Hayden, Mr. Arizona, senior Member of Congress, having served in the House from the time the State of Arizona became a State until he went to the other body, and has served in Congress longer than any other man in the history of our Government.

I understand that he is not able to be present this morning. However, his statement will be placed in the record as if read unless there is objection.

Hearing no objection it is so ordered.

(The statement of Senator Carl Hayden follows:)

STATEMENT OF HON. CARL HAYDEN, U.S. SENATOR FROM THE STATE OF ARIZONA

Senator HAYDEN. Mr. Chairman and members of the committee, I appreciate this opportunity to present to this committee my views regarding proposed legislation to authorize the Lower Colorado River Basin project.

Ever since I first came to Congress in 1912 I have been working to secure authorization for Arizona to use her rightful share of the waters of the Colorado River. Many of the members of this Committee on Interior and Insular Affairs, including its distinguished chairman, the chairman of this subcommittee, and the ranking minority member of the committee, are familiar with the history of my efforts to secure authorization of the Central Arizona project. On November 9 of last year, this subcommittee held field hearings in Phoenix and I appeared before you to urge speedy and favorable action upon the legislation then before you to authorize the Central Arizona project. I reiterate my request.

It has now been more than 2 years since the U.S. Supreme Court answered once and for all the question of Arizona's right to take and use water from the Colorado River for the Central Arizona project. Ever since the conclusion of that legal action, which was initiated in response to a resolution adopted by your committee, there has been before your committee legislation to authorize construction of a Central Arizona project. This project has been found feasible by the Bureau of Reclamation, the Department of the Interior, and the Bureau of the Budget. It is a project which is fully compatible with any regional approach to water resource development and one which, by reason of the emergency needs of my State, should proceed without delay. I hope that the necessary legislation will be passed by the House of Representatives during the present session of the Congress.

The statement which I made to your committee in November of last year is as appropriate today as it was then. During the many long years I have attempted to get this project underway I have supported public works and reclamation developments, sometimes less meritorious, but always justified, in the districts of most members of this committee. I respectfully ask for your support in getting this highly beneficial and urgently needed project authorized and constructed.

We ought not to allow and I trust that we will not allow legislation for the authorization of the Central Arizona project to be weighed down with too many far-reaching proposals. This is not to say that I will not give consideration to proposals that are reasonably designed, using the Central Arizona project authorization as a vehicle, to meet the long-range needs of the region and of the basin. While reserving my right to consider them in detail along with any conditions that may be proposed or limitations on diversions for the Central Arizona project, I intend to give such proposals sympathetic consideration, provided only that they are equitable, compatible with existing law, sensible and practical, and that they have a good chance of finding acceptance in the executive and legislative branches of the Government.

I stated my policy in a memorandum which I wrote to Senator Kuchel on February 1, 1965. At that time, I stated that, although certain amendments which I could not accept had been proposed to my

bill, S. 75, if a bill authorizing the Central Arizona project were passed by the House of Representatives I would ask for prompt passage by the Senate, notwithstanding the fact that I was not wholly in accord with the language of the proposed amendments. I indicated then and I repeat that I would take such action because I was and am convinced that authorization of the Central Arizona project and additional developments in the region is of such vital importance that every effort should be made to expedite passage of legislation to authorize a Lower Colorado River Basin project in order that we may proceed with construction.

It must be remembered that such construction is needed to partially alleviate our critical water shortages. It would not permit any expansion of our irrigated acreages. Prompt construction of the Central Arizona project is essential to prevent a decline in our existing economy. The Congress cannot allow central Arizona to go back to the desert.

Mr. ASPINALL. The next witness will be Senator Paul Fannin of Arizona.

Senator, this is your second appearance before this committee. We are happy to have you.

STATEMENT OF HON. PAUL FANNIN, U.S. SENATOR FROM THE STATE OF ARIZONA

Senator FANNIN. Thank you. It is a privilege to be here with you this morning. At the outset I want to express in behalf of all Arizonians our deep appreciation for this opportunity to come before you with a project upon which so much of our hopes and plans are founded.

I do not desire to be repetitious. Distinguished Members of our Congress are here who have appeared this morning, Congressman Udall, Congressman Rhodes, Congressman Senner, and they have very capably presented our position in this matter.

My remarks will be brief in order to conserve as much time as possible for the many other witnesses scheduled to appear, especially those on technical subjects.

I know you will have many questions. I am confident they can provide the answers.

As you know, my State has sought ways to utilize its share of Colorado River water for more than 20 years. We long ago recognized the need to bring the supplemental water into the State to sustain the unprecedented growth which history thrust upon the Southwest.

Through no fault of our own or that of the Congress we had to contend with an unusual set of circumstances which restricted our progress.

We had to undergo nearly 12 years of costly litigation, for example, to clear Arizona's entitlement to its share of the river.

Meanwhile our project as initially formulated has passed through successive stages of revision to meet changing conditions.

I might also point out that despite these long years of setback and frustration we in Arizona have remained constant in our support of other sound reclamation projects in the Colorado River Basin and throughout the Western States.

We could not logically expect our neighbors to stand still while we hammered out a sound solution to our own problems.

Out of this experience has come a degree of unity and cooperation among all of the basin States which did not previously exist. We now have an understanding of mutual interest and widespread acceptance of the fact that our project must be considered within the framework of maximum development for the entire basin.

From firsthand experience I know what has gone into this exhaustive effort to reconcile old grievances in view of the larger problem confronting all of us.

We certainly have the chairman, the Honorable Congressman Aspinall, to thank for his guidance and counseling, for his visits to our State, for the time and effort he has put forth to assist us in this regard. We add thanks, also, for the other members of the committee who have been so helpful in this regard.

As a former Governor it is my privilege to play a personal part in helping to forge a spirit of unity among the basin States. All of us joined together in this cause are fully aware of the enlarged mission which changing conditions have dictated. We are conscious of the interdependence of those States whose economic destiny is linked to ultimate development of the Colorado River.

We are also encouraged by the growing recognition in other areas of the Nation that dependable supplies of fresh water cannot be taken for granted because this should help dispel any lingering doubts about the soundness of the reclamation concept.

Surely the experience of the last quarter century has taught us to plan and build today for the need of tomorrow.

Our need for the Central Arizona project, our needs for the Central Arizona unit, is another link in the chain of Colorado River development and it will be thoroughly documented. I feel Members of Congress have helped very much in that regard.

Later testimony will show that our project meets your established feasibility standards. Likewise the benefits to accrue from this project will be substantiated in detail during the hearings.

Let me mention just one fact to illustrate the gravity of our situation in Arizona. We knew that our need for water was urgent when the first central Arizona project legislation was introduced in the late 1940's. Our case was sound even then. It has grown into critical proportions now.

In that period which coincided with our greatest span of population and economic growth the average ground water level has dropped between 75 and 100 feet in the central area included in our plan.

The distinguished chairman of the Interior and Insular Affairs Committee, Mr. Aspinall, along with all the other members, deserve the gratitude of the entire Southwest for the record you have achieved and honest and fair consideration of reclamation legislation.

It is a tribute to your ability and integrity that your approval of a major reclamation bill in recent years has so often been accepted by the Congress.

In conclusion, Mr. Chairman, we are now ready, willing, and able to meet the requirements for authorization of the Lower Colorado River Basin project. With an awareness of the past and with great enthusiasm for the future we look forward to these hearings as one of

the last major steps before the water of the Colorado can begin flowing into the dry areas of Arizona.

It is a pleasure to be here with you today, Mr. Chairman.

Mr. ASPINALL. I thank the gentleman very much.

The gentleman from Florida?

Mr. HALEY. No questions.

Mr. ASPINALL. Questions, gentlemen?

(No response.)

Mr. ASPINALL. The Chair has two questions. You heard your colleagues from the House, Senator, state that they are of the opinion that the water of the Colorado River can be used according to the entitlements of the States in any part of the State. Are you in agreement with that statement?

Senator FANNIN. Yes, I am, Mr. Chairman.

Mr. ASPINALL. On page 2 of your statement you state that the State of Arizona knew the needs of the area when the first central Arizona project bill was introduced in the Congress in 1947, if I remember correctly.

The fact of the case is that Arizona knew this in 1922 and 1923, did she not?

Senator FANNIN. That is correct, sir.

Mr. ASPINALL. Yet it was 18 years before Arizona saw fit to approve the Colorado River compact.

Senator FANNIN. I understand that, sir.

Mr. ASPINALL. I do not wish to bring up any past history which will upset a great project, but I think it should be shown that delay has not been on the part of the Congress of the United States. The delay has been a matter of interstate differences.

Senator FANNIN. Mr. Chairman, I stated I did not feel it had been the fault of the Congress of the United States. I think we are very indebted to you for assistance in regard to bringing our groups together.

Mr. ASPINALL. Senator, I asked the House members from Arizona a question about the availability of water. Did you hear those questions?

Senator FANNIN. I did, sir.

Mr. ASPINALL. Are you in a position to answer those questions at this time?

Senator FANNIN. Mr. Chairman, I would defer that to the members of our group who will be testifying at a later time inasmuch as they have detailed information in this regard.

Mr. ASPINALL. You mean the technical people who will appear before us?

Senator FANNIN. That is correct.

Mr. ASPINALL. Thank you very much, Senator.

Senator FANNIN. Thank you, sir.

Mr. ASPINALL. You have presented a fine statement and we appreciate your willingness to cooperate with the committee in trying to get the first part of our hearings underway.

The next witness will be the Honorable Thomas H. Kuchel, senior Member of the Senate from California, one of the most beloved Members of the Congress and a very effective Member of the Congress. It is good to have you.

STATEMENT OF HON. THOMAS H. KUCHEL, U.S. SENATOR FROM THE STATE OF CALIFORNIA

Senator KUCHEL. Thank you, sir.

I am honored to appear before your committee on this occasion to urge approval of the Lower Colorado River project legislation sponsored by the Arizona delegation in the House of Representatives, by 34 Members of the California House delegation, and by my colleague, Senator Murphy, and me in the Senate. I think I may truthfully say that our two dear friends in the Senate from Arizona, Mr. Hayden and Mr. Fannin, though not cosponsors, look with great favor on the fundamental aims of our proposal. Governor Goddard of Arizona and Governor Brown of California also concur with our legislation.

What has been introduced into the Congress on this subject represents the culmination of long, constructive, and joint efforts by citizens of good will in both our States, our several State and local water agencies, immeasurably aided by Secretary of the Interior Stewart Udall, and his staff, all of us working together, instead of at cross-purposes, to remove a common and growing danger to the common future of our two States.

The future growth and life of the semiarid Pacific Southwest face a bleak prospect of water shortage. The entire Colorado River Basin, indeed, all the country, confront, in varying degrees, a similarly widening water crisis. The present critical plight of our Northeastern States dramatically demonstrates the imperative necessity of careful, long-range planning to meet rising water needs in all the decades ahead. Otherwise, large areas of this country someday are likely to dry up and blow away.

Commencing today, your committee, Mr. Chairman, faces a truly historic responsibility of finding the best and most feasible means of authorizing the construction of the urgently needed central Arizona project, of averting a vast, potential water shortage in the Lower Colorado River Basin and, in so doing, of assuring additional highly necessary water development in the Upper Colorado River Basin as well. In achieving these goals, Congress will have removed the one enormous hurdle now standing in the past of every State through which the Colorado River flows.

I wish to present briefly some of the background of the legislation being considered today.

In 1928 Congress enacted the Boulder Canyon Project Act. This statute, which originated in this House committee, authorized construction of Hoover Dam and the All-American Canal. It gave consent to the Colorado River compact, in which, 6 years earlier, the seven States had agreed upon a division of water between the upper basin, drainage parts of Colorado, New Mexico, Utah, and Wyoming (and a small area in Arizona) and the lower basin, drainage parts of Arizona, California, and Nevada, plus small areas in Utah and New Mexico. The compact made no division of water among the States within each division. Six States legislatures had ratified it, but Arizona's had refused, for reasons which I will not take time to discuss.

The upper basin States were insistent that if Hoover Dam and the All-American Canal were built, thereby enabling the lower basin States to greatly expand their use of water, these structures be controlled by that compact. The reason was significant. Then, as now,

the law of priority of appropriation prevailed in all seven States, and the upper basin States feared, quite rightly, that if great investments were made in the lower basin to put water to use, the lower basin States would invoke this rule of prior appropriation and its sister doctrine, the law's protection of existing uses—comprising, together, what the Supreme Court has called its rule of equitable apportionment—to protect those lower basin uses. The river's flow, conserved by Hoover Dam, would then be preempted by the lower basin.

Congress adopted compromise legislation. The President, under its terms, might proclaim the act effective if only six States ratified, provided, in that event, that California's Legislature should have enacted a statute limiting our State's share of the waters of the Colorado River system. This was because California then had great projects in existence as well as others planned and ready for construction. It was in my State that the greatest expansion was about to take place. Our legislature proceeded to enact this limitation. Its language, which Congress had prescribed, restricted California to the use of 4.4 million acre-feet annually of the 7.5 million acre-feet which the Colorado River compact had apportioned.

The President proclaimed the project act effective in 1929. Another condition of the statute then came into operation. This provided that no funds could be appropriated or spent on construction of the dam until the Secretary of the Interior had first made contracts for the sale of power and storage of water at Hoover Dam adequate to assure, in advance, repayment of the Government's investment there. Similarly, work on the All-American Canal was prohibited until the Secretary should have in hand repayment contracts with its potential users. Furthermore, no one could have the use of the stored waters unless he had first contracted with the Secretary for this service.

These conditions were met, and the two great structures were built. Hoover Dam was completed in 1938, the All-American Canal in 1941. The Metropolitan Water District of Southern California contracted for 1,212,000 acre-feet of water and underwrote 36 percent of the cost of Hoover Dam in order to get the power to pump that water. It financed the construction of Parker Dam and a great aqueduct from Parker Dam to the coastal plain of California. It began service in 1941.

The All-American Canal and Imperial Dam were underwritten by Imperial Irrigation District and Coachella Valley County Water District and commenced service in 1941. Over a half million acres of farmland in California are dependent on those structures.

California has a third Colorado River project—the Palo Verde Irrigation District encompassing 120,000 acres surrounding the town of Blythe.

These three projects, and the people, industries, homes and farms dependent upon them, constitute California's stake in the Colorado River—over 10 million people, expected to grow to 20 million before this century ends, over 500,000 acres of farms, some $20 billion in assessed valuation—more than half that of the entire State. The direct investment in project works exceeds a half million dollars—bond proceeds and tax money.

California water contracts with the United States total 5,362,000 acre-feet—that is, 4.4 million acre-feet of the 7.5 million acre-feet

apportioned in perpetuity by the compact to the lower basin and 962,000 acre-feet of excess or surplus. The works have been constructed to use all of this water. In fact, about 5.1 million were consumed last year. California's Colorado River water rights are thus owned by districts and water users who have built the projects to use that water and who are the holders of water contracts with the Secretary. These rights are not owned by the State.

I shall not recount the events of the 20-odd years between the completion of these works in 1941 and the Supreme Court decree in 1964. Suffice it to say that in 1945, the Senate ratified the Mexican Water Treaty and thereby guaranteed forever to Mexico the delivery of 1.5 million acre-feet annually on an optimistic, perhaps I should say overly optimistic, water supply forecast which, regrettably, failed to materialize.

On June 3, 1963, the Supreme Court rendered its long-awaited decision in *Arizona* v. *California*, 373 U.S. 546, the suit which Arizona had brought to clear title to sufficient water for the Central Arizona project. The Court's decree undertook to divide among Arizona, California, and Nevada 7.5 million acre-feet of the annual consumptive use of the waters of the main stream—4.4 million to California, 2.8 million to Arizona, 300,000 to Nevada and awarded one-half the surplus to California, one-half to Arizona and Nevada. But the Court refused to rule on the question of how shortages should be borne in the event there was insufficient water in the main stream of the Colorado River to satisfy 7.5 million acre-feet of consumptive use per annum, a situation which will prevail on the Lower Colorado within a few decades. The Court left the allocation of such shortages to the Secretary of the Interior, but said specifically that Congress might legislate what it considered to be an equitable shortage formula, thus taking the matter out of the Secretary's hands.

Thereafter, the Arizona delegation introduced bills to authorize the Central Arizona project.

When Senate hearings were held on the Central Arizona project bill by the Senate Interior and Insular Affairs Committee in April 1964, I introduced an amendment, drafted by the attorney general of California, which would protect all existing projects in Arizona, Nevada, and California against the new uses which would result from construction of the Central Arizona project. Even though California is now using 5.1 million acre-feet per year, we sought protection against the Central Arizona project only to the reduced extent of 4.4 million acre-feet per annum. California's position was based on historic principles of western water law which protect existing projects from destruction by new uses.

During the April 1964 hearings there was a consensus that Arizona's water problems should be tackled within the framework of a regional plan designed for the benefit of the entire water-short Southwest, along the general lines of Secretary Udall's proposed Pacific Southwest water plan.

The facts of life led to two inseparable conclusions: Water must be imported into the lower basin, and existing projects must be protected until that water arrives in sufficient quantity to supply the newcomer as well as the pioneer. Consequently, on April 22, 1964, I introduced S. 2760, 88th Congress, which contained the framework

for a regional plan within which I hoped the Colorado River States and neighboring States might work, as good neighbors, to solve the problems of the Pacific Southwest, which are truly national, indeed, international, in scope. My bill incorporated authorization for a number of new projects in the Lower Colorado River Basin, protection of existing main-stream projects and provisions for a study by the Secretary of all possible sources of water for importation to the Colorado River Basin.

That bill was not acted upon by the Senate committee, but S. 1658, the Central Arizona project bill, was reported out, modified to incorporate several features of Secretary Udall's regional plan, plus some other changes. This bill offered protection to existing projects in California only for a period of 25 years, on the ground that importation works to alleviate any shortages would certainly be built within that time. That limited protection was unacceptable and unrealistic. My position was that the hazard was 25 years away, that protection during that period was essentially meaningless, and that existing uses ought equitably to be given priority over new uses.

Early in the 89th Congress I introduced S. 294, embodying most of the basic principles of S. 2760 of the previous Congress. In an effort to find a basis on which Arizona and California could agree, California Attorney General Thomas Lynch, Mr. Northcutt Ely, and others of us, proposed a new protection section reading as follows:

> * * * whenever the President shall proclaim that works have been completed and are in operation, capable in his judgment of continuously delivering water in aggregate annual quantities of not less than 2,500,000 acre-feet 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 permanently 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.

The reason why release of the protection of the existing projects against shortage in the 7.5 million acre-feet apportioned by the Supreme Court decree is conditioned upon the importation of the minimum quantity of 2.5 million acre-feet is plain. This is the portion of the inflow to the lower basin at Lee Ferry which cannot be used in the lower basin; 1,500,000 acre-feet must flow through to Mexico. Another million, net of the inflow of the lower basin tributaries, is lost in transit. That is to say, whenever the upper States deplete the flow at Lee Ferry to the minimum which the compact requires, which is 75 million acre-feet per decade, the lower basin States will be about 2.5 million acre-feet short, unless they are able to invoke another clause of the compact to require the upper basin States to increase their deliveries to meet half of the Mexican burden. This clause is in dispute between the two basins. But, I emphasize, that if 2.5 million acre-feet annually are imported, this potential source of friction will be eliminated because imports will offset the whole Mexican burden.

I do not suggest that importation should be limited to 2.5 million acre-feet. To the contrary, all the bills before you state this as a minimum and direct the Secretary to determine and report to Congress the anticipated deficiencies in both upper and lower basins and the quantities which should be imported to avoid these deficiencies.

The quantity so determined will probably be substantially greater than 2.5 million. Indeed, 2.5 million acre-feet of imports would merely firm up the 7.5 million that the Supreme Court apportioned, and of this California would receive only 4.4 million, against the present uses of 5.1 million, and constructed capacities of 5.362 million. And the Secretary of the Interior has already reported that central Arizona needs far more than the 1.2 million acre-feet that would be firmed up by this minimum importation. Moreover, the upper basin States' deficiencies must also be met.

Importation of additional water is unquestionably vital to all of the Colorado River States. It is essential if California is to replace the 700,000 acre-feet reduction in use which will come about as soon as the central Arizona project is in operation, and if our constructed works are to be utilized to full capacity. It will also trigger the release of the priority protection afforded existing projects against the central Arizona project. Finally, it will permit upper basin reservoirs to be filled without harmful effects on existing projects in the lower basin.

Importation will benefit everyone on the Colorado: It will improve the quality of water for all lower basin users, as well as Mexico. It will relieve both upper and lower basins of the Mexican treaty burden and enable the upper basin to store water that it must now deliver to Mexico. Finally, it will provide Arizona and California enough water to better meet present and future needs.

My bill, S. 294, contained a conditional authorization similar to that employed in the Reclamation Project Act of 1939. It would presently authorize importation works subject to a later finding of feasibility by the Secretary of the Interior, approval by the President, and submission of such finding to the Congress.

The principles contained in S. 294 received a favorable reception from many in Arizona and at the Department of the Interior. Under the auspices of Secretary Udall, diligent negotiations between representatives of Arizona and California produced the compromise proposal now before this committee. It embodies most of the principles contained in S. 294. It specifically adopts the protective provisions for existing projects. However, it does not contain the conditional authorization for importation works which I have just described, a modification I accepted with reluctance, because of the urgent importance of implementing an importation program for the benefit of the entire region at the earliest possible date.

The essentials of the bill before you can be briefly stated. Mr. Northcutt Ely, attorney for the California agencies, and representatives of Arizona and the Department of the Interior will provide a detailed analysis. Suffice it for me to highlight the following:

1. *Investigation of importation projects.*—Title II authorizes investigations to find sources and to plan projects for importation of at least 2.5 million acre-feet into the main stream in the lower basin. No sources are named nor is any construction authorized. The Secretary is to make his report within 3 years.

2. *Authorization of central Arizona project.*—Title II authorizes construction of the central Arizona project, as well as Bridge Canyon and Marble Canyon Dams and powerplants to help finance repayment of the cost of that project. Bridge and Marble Canyon Dams would

also feed revenues into a basin account to help finance future importation works. The Budget Bureau has recommended deferral of authorization of Bridge Canyon Dam as being unnecessary to make the central Arizona project feasible. Testimony by experts before your committee should provide the basis for a correct decision by your committee and by the Congress.

3. *Basin account.*—Title IV creates a basin account or development fund into which will be paid revenues from Bridge Canyon and Marble Canyon Dams and, also, from Hoover, Davis, and Parker Dams after those projects have paid out. Net revenues will be applied to repayment of the cost of the whole project, including any importation works subsequently authorized.

4. *Protection of areas of origin.*—Title II and III of the bill spell out important provisions for protection of areas and States of origin of the water which may be imported into the Colorado River Basin. I recognize that our friends in areas of surplus water are sensitive to the possibility of tapping that surplus where it may exist for the Colorado River Basin and I believe we should make all necessary arrangements to prevent any adverse effects on such areas.

This is a national problem. We are all, in addition to representatives of our own people, representatives of the national interest and of the American people, and if surplus unnecessary to future growth in one area may be utilized to stave off stagnation in another, to that extent I think the equities and justice demand that type of use.

5. *Protection of existing projects.*—Section 304 of the bill insulates existing projects in Arizona, Nevada, and California (up to 4.4 million acre-feet per annum) from impairment by central Arizona project operations until importation works are completed to deliver 2.5 million acre-feet per annum into the main stream of the lower Colorado River on a permanent basis. Imported water is to be made available at Colorado River prices, up to a total of 4.4 million acre-feet in California, 2.8 million acre-feet in Arizona and 300,000 acre-feet in Nevada.

6. *Law of the river.*—Title V requires the Secretary to conform to the law of the river in the fashion of the Colorado River Storage Project Act and subsequent Colorado River project authorizations. A consent to suit provision would enable affected States to seek relief in the Supreme Court for the Secretary's failure to so comply. It is my intention that no rights of the upper basin States under the Colorado River compact shall be impaired in any fashion. And I think the bill says so.

7. *Conservation works.*—The bill also authorize certain conservation works in the lower basin to salvage substantial quantities of water now lost under present operating conditions.

The Budget Bureau has endorsed the bill in principle. However, it has recommended several amendments which will be discussed by subsequent witnesses.

In any event, it is imperative that studies looking toward an importation plan be started as soon as possible for the benefit of the entire basin.

I have read a memorandum on the Colorado River water supply which has been approved by the lower basin States. I quote from the conclusions reached:

We are unanimous in the opinion that the supply of the river will be insufficient to meet future demands, estimated to reach about 18 million acre-feet per

annum by year 2000, or to meet apportionments of use of water made by the Colorado River compact to the upper and lower basins and the Mexican Treaty burden. It is simply a question as to how long it will take the demands to surpass the water available. Both basins are ultimately dependent upon substantial importations which should be made available by the last decade of the present century.

I wholeheartedly agree.

I respectfully ask that the committee take favorable action on the proposals before you.

Mr. ASPINALL. Thank you very much, Senator.

The gentleman from Florida.

Mr. HALEY. Mr. Chairman, I have no questions of the distinguished Senator. I was surprised, on page 6 of your statement, in talking about the Supreme Court, where you say they said "specifically that Congress might legislate what it considered to be an equitable shortage formula." I am glad there is some part of the United States on which the so-called Supreme Court will agree that we can legislate on these matters.

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

Mr. HOSMER. No questions, Mr. Chairman. I want to congratulate our colleague from California on his fine statement.

Senator KUCHEL. Thank you.

Mr. ASPINALL. The gentleman from Oklahoma.

Mr. EDMONDSON. I have always had a great admiration for the Senator, and it has increased a little more this morning. It is a fine statement.

Senator KUCHEL. Thank you.

Mr. ASPINALL. The gentleman from Kansas.

Mr. SKUBITZ. I have no questions. I do want to commend the Senator on his excellent statement. Coming from Kansas, I am going to have to do a little homework on this matter and I shall reread the Senator's statement.

Senator KUCHEL. Thank you.

Mr. ASPINALL. The gentleman from Nevada.

Mr. BARING. No questions.

Mr. ASPINALL. The gentleman from Oregon.

Mr. WYATT. I have no questions of the Senator.

Mr. ASPINALL. The gentleman from California.

Mr. JOHNSON. Thank you, Mr. Chairman. I want to take this opportunity to welcome our senior Senator here, a man with whom I have worked very closely over the years. He is very knowledgeable about the affairs of the Colorado River. I think he has made a very excellent statement here this morning. Over the past several years we have worked very closely to try to bring about a better understanding between all of the people in the lower basin. I will say he has championed that cause and has accomplished the purpose.

I am glad to see you here this morning, Senator Kuchel, to present this very fine statement.

Senator KUCHEL. Thank you.

Mr. ASPINALL. The gentleman from Idaho.

Mr. HANSEN. Mr. Chairman, I join my colleagues in commending the Senator for the great contribution of his statement.

Senator KUCHEL. Thank you very much.

Mr. ASPINALL. The gentleman from Arizona.

Mr. UDALL. Mr. Chairman, I first want to say that Tom Kuchel is a builder, he is a constructive, sound, progressive man, and a lot of the peace and harmony we now have in the lower basin is due to the constructive attitude he has taken. I am proud to have him before us, and I am proud to be working with him on this great project of such overriding importance.

Senator KUCHEL. Thank you.

Mr. HALEY. Will the gentleman yield?

Mr. UDALL. Yes.

Mr. HALEY. The gentleman should go back out there, because I understand as a result of some recent activities, there is a lot of building to be done in certain areas of California around Los Angeles.

Mr. ASPINALL. The gentleman from California.

Mr. REINECKE. Thank you, Mr. Chairman. I am also honored to welcome the distinguished Senator from California, the greatest and thirstiest State of the country.

I do have one question. Do you feel comfortable about commencing construction of the project prior to firm importation plans?

Senator KUCHEL. I do think there is enough history of congressional action in conditional authorizations to justify this committee's consideration in this bill of such conditional authorizations as a result of testimony which I am sure they will hear.

My personal hope would be that such conditional authorizations would be a part of this bill. On the other hand, I am glad to join you and all our colleagues, as Americans living across the river from Arizona, in saying Arizona has a critical and crucial problem, and I want to see the central Arizona project built even though there were not to be included conditional authorizations. On the contrary, however, I would prefer to have the conditional authorizations in this bill.

Mr. REINECKE. Thank you very much.

Mr. ASPINALL. If my colleague will yield, do I understand that it is your opinion at this time that this project is physically feasible as far as the availability of water is concerned, giving due respect to the entitlements of the upper basin as they are permitted to develop their water—that this project is feasible without importation?

Senator KUCHEL. Mr. Chairman, I think it is generally conceded—if there is to be no importation either in this bill or subsequently, it is generally conceded by water experts that roughly a quarter of a century from now there would be a shortage which would reflect itself in a central Arizona project utilized far less than full capacity, something which has happened already to one of our projects in California when our aqueduct runs half full. So, Mr. Chairman, I would say that I would hope that consideration might be given in this present legislation to authorizations for importation.

Mr. ASPINALL. But this committee and the House of Representatives does not look with favor upon conditional authorization. This is the difficulty. We know that your body does, but it has been a long time since we had a conditional authorization for a reclamation project before the House.

My question, following through with Congressman Reinecke's question—whether you consider this to be a feasible project without importation? Of course, I think perhaps those who are testifying for the

Governors and others will answer this question, but this is the same question I propounded to the House Members from Arizona and also to Governor and Senator Fannin. This is the most important question, in my opinion, that we have before this committee as far as the passage of this legislation. We want to be sure that the water is there and that it is water to which the lower basis is entitled, and that agreement in the lower basin makes it possible to have a feasible project.

Senator KUCHEL. Mr. Chairman, your first comment is correct. This committee, the House of Representatives, and the Congress as a whole have not in recent years considered conditional authorizations, although it is equally true that in our history Congress has, on innumerable occasions, determined to authorize on a conditional basis.

Mr. ASPINALL. This is true, but in our former history we also permitted secretarial authorization; we don't permit that any more.

The gentleman from California, Mr. Reinecke, and the Senator from California have put their finger upon the criticality of what is proposed in this legislation. As I understand—of course, I read your statement—you postpone the criticality of water until 2000, and yet there are those engineers, as you know because you admitted it in your last statement, that under the worst conditions, as far as the availability of water is concerned, who think the criticality might appear in 1984.

Senator KUCHEL. This is true. And the draft proposal which quite a number of us have together introduced does, of course, clothe the Secretary with the responsibility of making his studies and within 3 years reporting back to you and your committee and to the Congress generally, on the theory, of course, that positive authorizations would then be forthcoming synchronized into whatever action may be taken, and hopefully would be taken, by you and your committee on the kind of a draft bill now before us.

Mr. ASPINALL. But the Senator does not want to postpone starting construction until the late sixties, he would like to start construction as early as possible so the project can go into operation by 1975, when practically all parties in the upper basin and the lower basin admit there will be surplus water because the upper basin cannot use the waters to which they are entitled. Isn't that correct?

Senator KUCHEL. It is. But, in addition, I look forward during my time in the Congress to a development of the water resources of your State and the other States in the upper basin, Mr. Chairman, as the conditions require that development. And as a matter of fact, my overall thinking—and I am sure it is shared by all of us here—is that this is the kind of basic plan that is involved in the legislation your committee is now considering, an importation of water which will be of benefit to all States in the Colorado River system.

Mr. ASPINALL. I think we are all agreed upon that, providing we can get it. But the question is, Will the water be there and will it be there in conformity with the provisions of this bill, as far as the study of importation, or will the study be relegated to a national commission as is proposed by the administration, which gets away from the immediate responsibility for a study of this area? This is what is involved, and we have to be careful we do not do something that the people of the United States, who must put up this money in the first instance, can point to later on—not in your time, not in my time, but

in the time of our colleagues, as so often is the case—saying, "Well, they exercised poor judgment."

Senator KUCHEL. The chairman is completely right, and my own personal preference, as the chairman knows, because we have discussed this point, is for the establishment of such a commission working with the Secretary to determine what surplus areas are available to the Colorado River Basin, since this does deal with that area exclusively. But the chairman is also right—the Budget Bureau has recommended a nationwide study.

Mr. ASPINALL. Does the gentleman from California have further questions?

Mr. REINECKE. No further questions.

Mr. ASPINALL. Thank you very much.

The gentleman from Idaho, Mr. White.

Mr. WHITE of Idaho. I would just like to compliment you, Senator, on an excellent statement, well prepared, and indicating a long association and study and knowledge of the subject.

I used to think I could sit in Idaho and look at the problems of the Upper and Lower Colorado more or less disinterested and disconnected from it. However, it seems like I am moving into the area of the Upper Colorado and I am going to have a new group of people to aline myself with.

There is one thing I would like to say here, prompted by the initial opening statement of the Member from Arizona. In his statement he included, almost apologetically, that this project would not produce surplus food and would not produce certain things that are subject to criticism in the Congress and by the public at the present time. I have a basic feeling in this area with respect to reclamation and to the use of water. I have seen the American people and our Government accused of a missile gap, or a nuclear gap, and now recently a water gap in the arid Northeast. I think it is incumbent upon this Congress and all Congresses from now on, and in the past as well, to do the proper thing with respect to the proper use of water, reclamation, soil conservation, all of those things, so that we can continue to have surpluses. Everyone seems to think a surplus is the thing we don't need, but this is the thing that makes our country great—the fact we have had adequate food-producing areas with adequate water for the use of these areas. I don't want to ever have anyone come back and say this Congress or succeeding Congresses produced a reclamation gap, a conservation gap, or a water gap. Thank you.

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

Mr. BURTON of California. First, Senator, I would like to thank you and commend your statement.

I would like to ask your personal view of the Budget Bureau's recommended deferral of the Bridge Canyon Dam. This is on page 11—about two-thirds of the way down the page—of your prepared statement. You make reference to the fact that the Budget Bureau has recommended deferral of authorization of the Bridge Canyon Dam. I would like your view of that action of the Budget Bureau and what, if any, recommendation you would suggest to this committee, and the reasons for your position.

Senator KUCHEL. First of all, the original Colorado Basin plan, as envisioned by Secretary of Interior Udall did, as you know, include the

construction of both Bridge and Marble to operate as a "cash register" to accommodate the feasibility of this whole vast undertaking, and the bills before this committee include an authorization for the construction of Bridge and Marble. The Budget Bureau, as you say quite correctly, has recommended that the construction of Bridge be deferred. Not canceled, but deferred.

Mr. ASPINALL. I think this question perhaps should be left, aside from a general statement from the Senator, to the witnesses for the Department.

Senator KUCHEL. I will sum up my own version this way, then, with your permission, Mr. Chairman: There is obviously considerable opposition to the construction of both Bridge and Marble Canyon, and the construction of both those reservoirs has to do with the economic feasibility of this undertaking. Obviously, whatever this Congress does must be economically feasible. My judgment is that you and I, as legislators in our two committees, are going to have to get before our committee the various parties to the conflict over recommending the construction of Bridge and Marble and then together make our decision as to whether it should be included.

For example, I would want to know most specifically whether the Budget Bureau can justify the economic feasibility of the draft legislation in the absence of Bridge. I would want to go very carefully, by cross-examination, into the position which some of our people in your and my State and in other States take an opposition to it and see whether or not, by testimony and, as I say, by cross-examination, we can arrive at an enlightened opinion as to whether to include it.

Mr. BURTON of California. I take it from your answer that you are still weighing the evidence on this. Is that it?

Senator KUCHEL. Yes. In view of the action of the Budget Bureau, I think it will be incumbent upon all of us to take testimony on it. As I say, I included it, and I think our colleagues in both the Senate and the House included authorization for Bridge and Marble because we felt that the Department of the Interior, in recommending their construction, did it in the fashion that would make this an economically feasible project, and at the same time take such arrangements which the bill describes to maintain the pristine beauty of the area we are talking about. But this is a conflict. The only way I know how to resolve it is to listen to both sides and then make our final decision.

Mr. BURTON of California. Thank you.

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

Mr. TUNNEY. Before getting elected to Congress, Senator, and as one of your constituents, I have known your name to be long associated with progressive water legislation as well as with the protection of California's water rights, and I now understand why from the statement you have given.

Senator KUCHEL. Thank you.

Mr. ASPINALL. The gentleman from Washington.

Mr. FOLEY. Mr. Chairman, respect and admiration for the senior Senator from California is universal in Congress and throughout the country. This is certainly the case in the Pacific Northwest, which yields to no region in admiration for the Senator from California. I

would not want this to be interpreted as an endorsement of all of the recommendations the Senator is making today, but I do think the statement has been most informative and helpful to the committee. It is a pleasure to see you here, Senator.

Senator KUCHEL. Thank you very much.

Mr. ASPINALL. The gentleman from Texas.

Mr. WHITE of Texas. Mr. Chairman, I have been impressed with the statement and I have no questions.

Senator KUCHEL. Thank you.

Mr. ASPINALL. The gentleman from Wyoming.

Mr. RONCALIO. Mr. Chairman, I would like to associate myself with the others on the committee in praise of the Senator from California. I have no questions.

Mr. ASPINALL. Thank you very much for your statement and a very fine presentation.

(Senator Murphy's statement, inserted per later request of Mr. Reinecke, follows:)

STATEMENT OF U.S. SENATOR GEORGE MURPHY OF CALIFORNIA

Mr. Chairman, I wish to take this opportunity to add my support to that of my distinguished colleague from California, Senator Kuchel, whose able and comprehensive testimony you have heard, for the Lower Colorado River Basin project legislation now before you.

The fact that I joined Senator Kuchel in cosponsoring the companion legislation in the Senate (S. 1019) evidences my support of the provisions embodied in the 37 identical House bills you now have under consideration. The months since the introduction of this legislation have served only to increase my belief in its urgency, and I felt that a restatement of my endorsement might underscore the fact that every one of California's 19 million citizens—one-tenth of the population of the United States—is vitally concerned, and rightfully so, about the adequacy of our future water supplies.

Little over a century ago a comparative handful of visionary pioneers, attracted by the promise of gold, transformed California into a bustling, booming land of opportunity. Other equally farsighted men have followed them to develop our Golden State into a prosperous agricultural and industrial empire. These men anticipated the dramatic western migration and prepared for it by building the great water projects which now provide us with our water. Lawns are green and swimming pools filled only because of the farsightedness of these pioneers.

Now the increasing demand for water is rapidly overtaking our supply. Once brimming sources of water have been completely tapped. And so, where the men of the 1850's searched for gold, the men of the 1960's are searching for water. Today water has replaced gold as the magic word which stirs the hopes of man in the West.

Our success in finding and developing new sources of water for the future will determine whether or not California and the Pacific Southwest can remain free of the blight of dry rivers and empty reservoirs and so continue to lead in the economic expansion and prosperity of our Nation. This, then, is the time for Congress, reflecting its own concern, to assist in providing solutions for these future needs, as well as for whatever immediate shortages might exist.

One very promising solution, the transfer of surplus water from sources outside the Colorado River Basin, would be made possible by these pending bills. It is my understanding and belief that these importation projects should be planned and constructed so as to make the imported water available in the Colorado River not later than 1980.

In closing, may I thank and congratulate the members of this subcommittee for the exhaustive and painstaking work which I know has been necessitated by your thorough consideration of this program. I sincerely hope that you will approve the projects and be able to see as the reward for your work the continuing progress, with abundant water, of the Southwestern United States. Thank you.

Mr. ASPINALL. Unless there is an objection, the statement of Senator Alan Bible from Nevada will be made a part of the record at this point.

(Senator Bible's statement follows:)

STATEMENT OF SENATOR ALAN BIBLE

Mr. Chairman, it is my pleasure as senior Senator from Nevada to join with those urging this committee to act expeditiously and favorably on H.R. 4671, the legislation to authorize the central Arizona project.

This is a project that has been long sought and long deserved by the State of Arizona. It is a project that will bring to reality a dream that has survived years and years of legal battles, delays, and seemingly endless obstacles.

The major obstacle was removed in 1963 when Arizona was finally able to secure her legal rights to the main stream waters of the Colorado. The project before this committee simply makes it possible to apply those rights effectively.

As I see it, Arizona asks no more than Congress has given to those other Colorado River Basin States. These other States, my own included, have secured, or are in the process of securing, the projects they need to realize the benefits of this great western river. Congress owes Arizona no less.

You have before you the favorable reports of the Bureau of the Budget and the Department of the Interior. You have before you the joint memorandum of three Governors of the lower Colorado River Basin States—California, Nevada, and Arizona. And you have before you the uncontradicted fact that the central Arizona project—truly a rescue project—is vital to the preservation of the economy and culture of Arizona.

With all this, I submit, this committee and the Congress should feel impelled to move forward quickly and favorably with this legislation.

Further, we must not overlook the very vital fact that this legislation envisages the solution not only of Arizona's immediate and desperate needs but the resolution of long-range water problems throughout the entire Colorado River Basin. In addition to dam construction it authorizes serious studies into the problem of increasing the priceless water yield of the Colorado. This is a matter of deep and continuing concern to all States benefiting from this river.

Finally, I wish to underscore the enlightened approach Arizona has taken to this legislation and the long conscientious work of her revered senior Senator with respect to it.

First, despite the delays that have prevented Arizona from exercising her own rights to Colorado River waters, the State has always cooperated wholeheartedly with and aided all other basin States in their efforts to realize their own rights. Through conciliation and negotiation Arizona has taken unprecedented care to respect and protect the rights of every other basin State. The result is that Arizona has come forward with a bill that more nearly engenders the unanimous suport of all basin States than any other previously proposed. That is one of the major reasons behind the unanimous support of California and Nevada for this bill.

The same may be said of the work of Senator Hayden. Throughout the long controversy over development, use, and allocation of Colorado River waters he has remained dedicated to the welfare of the basin States and the West as well as to the welfare of Arizona. He has repeatedly shown himself to be bigger than the many problems that he has encountered. He has repeatedly displayed a statesmanship and a public spirit that are more than able to surpass the obstacles and the complexities he has met.

For Arizona, for the Colorado River Basin, for the States of that basin, for the West and for the progress of our Nation, I urgently recommend rapid and full approval of this bill.

Mr. ASPINALL. The Chair has the following announcement to make. The House will receive a veto message from the President and then will adjourn because of the death of our late colleague, Clarence Brown, of Ohio. We will meet, then, here this afternoon at 2 o'clock to continue the hearing on this legislation. The committee stands adjourned.

(Whereupon, at 11:45 a.m., the subcommittee recessed, to reconvene at 2 p.m., the same day.)

AFTER RECESS

Mr. ASPINALL. The Subcommittee on Irrigation and Reclamation will resume its hearings.

This afternoon we have as our witnesses the Honorable Stewart L. Udall, Secretary of the Interior, accompanied by the Honorable Floyd E. Dominy, Commissioner of the Bureau of Reclamation, accompanied by his staff.

Before the Secretary starts his presentation, I wish to remind the representatives of the executive department that we are considering H.R. 4671, the bill with all of its provisions, and if the Secretary and the Commisisoner or any others wish to testify as to provisions of the bill which presently do not have the favor of the Department, then of course we want that in the record. So, as the Secretary starts his presentation and as the Commissioner makes his presentation, we want an analysis of the complete bill.

Mr. Secretary, we are glad to have you back in this room. We hope we can write a well-rounded, constructive record of evidence for this legislation.

STATEMENT OF HON. STEWART L. UDALL, SECRETARY OF THE INTERIOR

Secretary UDALL. Thank you very much, Mr. Chairman.

I should like to say at the outset that there is nothing pending in my office as important as this is. Mr. Dominy and I thought it might be better in terms of giving the committee a complete picture if we sat here together and presented both of our statements, and then took questions from the committee on the basis of the total presentation. It was our thought we could be most helpful to the committee in this way, and this is the reason we are here together and prepared to present and make a joint presentation.

I have a prepared statement which I should like to file. I will read almost all of it, Mr. Chairman.

Mr. ASPINALL. If the Secretary is going to read almost all of it, since undoubtedly it is put together for the purpose of a continuous story, I suggest you go ahead and read all of it.

Secretary UDALL. I want to make two comments before I begin my statement, however. I know comments have been made about the gentlemen before whom I am going to speak today, but I want to add my own to the very gracious comments of the chairman this morning. I think it most fitting and suitable that sitting with the committee at this moment is John R. Murdock of Arizona, who not many years ago served as chairman of this committee. There are few members of the committee left, only the chairman and two or three others perhaps, who served with him when he sat where the chairman now sits. He was during his years in the Congress, as I think everyone who knew him would agree, a very constructive figure in this committee and in the Congress, one who was always trying to accomplish what was best for the whole country. I think it is a very wonderful gesture that the chairman has asked him to sit up with the committee today.

Mr. ASPINALL. If the Secretary will yield, I could not let go unnoticed the fact that he was standing, and I think if anybody has a right to sit at this rostrum, it is a former chairman of this committee,

which some of us think is the most important committee that there is to the West. He is not only sitting up here because he was an effective member, but he is sitting up here because he was one of the most beloved Congressmen during his stay and in the years since then.

Secretary UDALL. The other general comment I wanted to make, Mr. Chairman, with regard to this committee and the chairman of this committee, is that I think, at least going back the 11 years that I have watched this committee and the Congress in action, as far as this committee is concerned this has been the most productive session, the most constructive session that I can recall. As all of us know, on Friday of last week the Auburn-Folsom project was passed by the Senate and is now at the White House. This committee is the first committee which in a single session has passed two projects of such major scope. To demonstrate that its interest in the country is nationwide, it appears that also before the first session is through there very likely will be enacted into law two very handsome new national park areas for the eastern part of the United States. That underscores what I consider to be one of the finest developments in this committee's work under your chairmanship, that this committee is serving the entire Nation and it is passing legislation that is needed in the whole conservation and resource development field for our entire country.

I am glad to appear today, Mr. Chairman, to present the position of the administration on H.R. 4671 and its 36 companion bills.

At the outset, I should like to discuss the major policy considerations, as we see them, which underlie the Colorado River problems and any solutions. Commissioner Dominy will present the details of the basin plan and other aspects of the project to round out our total presentation here today.

Mr. Chairman, there is one overriding fact of life which dominates the entire Colorado River Basin today—the fact that the streamflow quantities which formed the framework of the Colorado River compact in 1922 and the Mexican Treaty agreement in 1944, are not present in the river today. The specter of shortage hovers over the entire region in 1965, and must of necessity provide the setting for all deliberations concerning its future. This basin and its water service area contain most of the fastest growing major cities in the whole United States—Los Angeles, San Diego, Las Vegas, Denver, Phoenix, Salt Lake City, to name only a few—and they include some of the most desirable land areas and vital resources in the Nation for future growth as well. However, there is not enough water to underwrite the region's potential growth. And we must plan on ahead 25 or 50 years. That is the great secret of resource development planning. This is the problem that brings us here today and compels the wisest possible action by this committee.

The bills before the committee bear the title, "To authorize the construction, operation, and maintenance of the Lower Colorado River Basin project, and for other purposes." These bills are not, however, I would underscore, concerned only with the problems of the Lower Colorado River Basin. They reflect the growing realization and understanding that a successful resolution of the water problems of the lower basin requires consideration of the needs of the entire region.

Therefore, there must be equal involvement in the development of

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a comprehensive program to provide adequate water supplies for the Upper Colorado River Basin States as well as for the lower basin.

With these underlying principles and objectives, Mr. Chairman, the administration is in basic agreement.

Our appearance here today has evolved from a planning process which began, Mr. Chairman, as a result of a letter you wrote to me on November 27, 1962, nearly 3 years ago. That letter, written at a time when the lower basin States and the United States awaited the outcome *of Arizona* v. *California*, requested "an outline for a coordinated, comprehensive pattern under which, in your Department's understanding and view, the Southwest's water and power needs might be satisfactorily provided for."

Beginning then in late 1962—well in advance of the Supreme Court's decision—the Department of the Interior developed the broad outlines of a comprehensive plan which it called the Pacific Southwest water plan. A report on this plan was transmitted to the affected States and Federal agencies for review and comment on August 26, 1963. The plan was modified and was transmitted to the President on February 14, 1964. This report, dated January 1964, was furnished to the Senate Interior and Insular Affairs Committee.

When the Department addressed itself to the proposition of a program for the Southwest, a 10-year hiatus in lower basin planning came to an end. This hiatus was due, of course, to the fact that the pendency of *Arizona* v. *California* had obliterated the basic principles upon which planning could proceed. But while planning stood still, the needs of the area continued to grow as its population expanded and its economy developed. The decision of the Supreme Court, which came in June of 1963, found the Pacific Southwest to be both the driest and fastest growing region of the country. The ground-water resources of the central Arizona area had continued to drop until now the annual effective rate of overdraft exceeds 2 million acre-feet a year. The burgeoning cities and agriculture of the southern California coastal plain had increased their uses of Colorado River water to the point where California was diverting more than 700,000 acre-feet in excess of its basic 4.4 million acre-feet annual consumptive use.

Meanwhile, the upper basin States avoided the pitfall of litigation. By interstate compact they apportioned among themselves the water allocated to the upper basin by the Colorado River compact of 1922. The upper basin compact made possible congressional authorization of the comprehensive development of the Upper Colorado River Basin.

Nonetheless, the upper basin States share with their lower basin neighbors the same basic hard problem—the shortage of Colorado River water which, for them as well as for the lower basin, means that the 1922 compact allocations cannot be utilized without augmenting the Colorado's natural flows.

As demonstrated by the success of the Upper Colorado River Storage Project Act, regional planning geared to a basin account is the best solution to future water needs of the region.

I am saying quite frankly as I have said to this committee before, that we are taking a leaf out of the book of the upper basin experience. The three lower basin States are in agreement on these basic elements.

It is my considered opinion that when the water history of the Colorado River States is written, of all of the States of the basin, the

year 1965 will be regarded as a historic turning point; 1965 is the year the Arizona-California water fight ended and Arizona-California cooperation began; 1965 is the year the 11 Governors of the West began common planning on water problems on a westwide basis. This is a development of enormous significance; 1965 is the year the solemn fact of shortage was recognized by all Western States and all parties as the controlling element in all future water planning.

I should like to ad lib at this point, Mr. Chairman, that I am convinced that as long as this type of broad westwide planning is carried out with the right type of cooperative approach, there is nothing that cannot be accomplished in terms of providing for future needs.

With the willingness to cooperate that is demonstrated by these developments, there is no doubt that a solution will be found. We need not and will not bog down in the mire of divisive controversy.

In that light, our planning is based on these objectives:

(1) The undertaking of detailed and comprehensive studies of how and where to get additional water.

(2) The establishment of a Lower Colorado River Basin development fund to assist in meeting the cost of water development.

(3) The authorization of needed lower basin works now. These include the central Arizona unit, Marble Canyon Dam, water salvage programs, and recreation and fish and wildlife facilities.

There are certain basic problems which the Congress should appropriately consider and resolve.

The Mexican Treaty burden is a national responsibility. This must also be considered. Consideration should be given to isolating this requirement from other demands for Colorado River water.

There needs to be consideration of protection for the interests and opportunities of other areas that would be affected by import of water from other river systems to the Colorado River system.

The sections of the bills that address themselves to future planning are of paramount importance.

Title II and the related title VI of this legislation, as submitted by its sponsors, direct that broad-scale investigations shall be conducted to identify the best possible method of supplementing the water supply available to both the upper and lower basins.

The administration has proposed that these studies be conducted under the leadership of a national water commission. Nonetheless, the basic principles of these studies must be discussed and established.

I should like to say—I will comment more on that later, Mr. Chairman—as a result of the leadership in particular of this committee, there is a new entity in existence that was not in existence in April when the Bureau of the Budget letter went forward to the Congress, and that is the new Water Resources Council. It has been in existence for only a month, but we have had quite a bit of business at our counter, most of it in the eastern part of the United States, interestingly enough, and it may be that this provides a new focus and new fulcrum for action.

The bill specifically provides that 2.5 million acre-feet of water annually from outside the basin's natural drainage area shall be made available in the river before priorities to existing lower basin users will be lifted. If at some future time water is imported from some

other river basin, great care must be taken fully to protect the rights of exporting areas.

Any studies must explore in depth the comparative advantages of importing water from regions with surplus supplies that will otherwise waste into the ocean, and of large-scale desalting plants. Appropriate attention must be given, of course, to better use of existing water supplies, water salvage, and weather modification.

All of these potentials would receive careful consideration under the provisions of titles II and VI.

The Lower Colorado River Basin development fund would be established by title IV. It is modeled after the fund established by the Colorado River Storage Project Act. As I stated earlier, establishment of such a basin fund has been a principal objective of our planning. With it, the lower basin's project, like those in the upper basin, will conform to the carefully developed and prescribed principles of repayment under which the Federal Government participates in water resources development in the Western States.

All project appropriations and revenues would be credited to the fund. The principal revenues would come from the Marble Canyon powerplant and from surplus power revenues at Hoover, Parker, and Davis powerplants after completion of their present payout responsibilities.

As we all know, Hoover Dam is halfway toward repayment, and is on schedule.

The surplus revenues in the fund will be available to help meet the cost of new water supplies for the region under rules prescribed by the Congress as it authorizes future additions to the overall project.

Establishing a bank account now to finance facilities that will inevitably be required in the future is financial planning at its best. This Congress, if it establishes the bank account proposed by the authors of the bills, will have acted in the best traditions of American prudence and foresight.

Title V of the legislation makes it clear that in the construction and operation of the Lower Colorado River Basin project there will be no displacement of the basic law of the river. Under these principles, the use of water by lower basin projects, including the central Arizona project, cannot jeopardize the upper basin's right to the use of the water of the Colorado River system apportioned to it by the Colorado River compact. I can assure the committee categorically that the Department of the Interior is committed to full compliance with these essential requirements.

The legislation you are considering is broad in scope. It addresses itself to problems that are critical now and looks to the future to prevent even more serious problems from occurring. It directly involves the economic welfare of seven important States and in a real sense affects the future welfare of the entire country.

Nonetheless, I have made my presentation today brief. I have done so deliberately because I recognize that the best use of our time will be found in an exchange of ideas and information guided by questions that occur to members of the committee.

Earlier I noted the splendid spirit of cooperation that has emerged in this basin and in the West. I think this new pattern of cooperation

is most hopeful. Nothing that has occurred in the last 4½ years has held out such hope and promise for the water future of the West.

Commissioner Dominy has a more detailed statement and presentation that will round out the presentation of the administration regarding this project. I will turn the floor over to him at this time, if I may, Mr. Chairman.

STATEMENT OF FLOYD E. DOMINY, COMMISSIONER, BUREAU OF RECLAMATION; ACCOMPANIED BY EDWARD WEINBERG, DEPUTY SOLICITOR; AND DANIEL V. McCARTHY, CHIEF, DIVISION OF PROJECT DEVELOPMENT

Mr. DOMINY. Mr. Chairman, 30 years ago the Colorado was a wild, untamed river. Only 40 percent of its average flow was being put to consumptive use. The remainder was wasted unused into the Gulf of California.

Today, the Colorado is almost completely controlled by works of man. Taking into account the filling of main storage reservoirs, the entire flow of the Colorado River is being utilized. About 80 percent of its average flow is being used consumptively.

Ten years from now, assuming that in the interim the yield of the river will equal its long-term average, and this is a reasonable assumption based on long years of water supply records on the Colorado River, the main storage reservoirs will be essentially full. We expect that at that time over 95 percent of the yield of the river will be required for consumptive use purposes. Only portions of extreme flood-flows that occur when all reservoirs are full will escape unused to the Gulf of California. Even then, there will be areas of serious water shortage and excessive mining of ground water within the Colorado River Basin.

After 1975, as population and economy expand, both the upper and lower basin water demands will far outstrip available water supplies. The future of not only a great 7-State area hangs in the balance, but the vigor and strength of the entire Nation will be affected as well. If water to sustain the potential economic growth of this area is made available, then the region and the Nation both will benefit. If water is denied, then both will suffer.

This is why I consider the measures before you the most important legislation on which I have had the privilege of presenting testimony during my tenure as Commissioner of Reclamation. This is why the Department of the Interior and the Bureau of Reclamation wholeheartedly endorse and urge, with certain amendments, early enactment of the legislation before you today.

DEVELOPMENT OF THE PACIFIC SOUTHWEST WATER PLAN

Secretary Udall discussed the steps leading to development by the Department of the Interior of the Pacific Southwest water plan.

This plan had two overriding objectives. The first was to provide a basis and to furnish guidelines for developing a comprehensive plan in detail to meet all existing and future water needs. The second was to provide the basis for seeking immediate authorization of works to meet the most urgent needs.

Although the original Pacific Southwest water plan has been revised and the scope of the features proposed for immediate authorization scaled down, these two overriding objectives have remained intact. They are contained in the legislation before you today. In one important concept the plan has been expanded, and that is to give full emphasis to providing for the future water needs of the upper basin as well as the lower basin.

The display map shows the Pacific Southwest water plan as presented in the January 1964 report. The features shown in light gray have been deleted from the plan, at least for the time being. The features shown in light red have, in the interim, either been authorized separately or are now being considered by separate legislation. The remaining features in bold red comprise the physical features now recommended by the administration as the initial core of the Lower Colorado River Basin project.

THE LOWER COLORADO RIVER BASIN PROJECT

The proposed legislation under consideration would authorize the Lower Colorado River Basin project. It contains many provisions that set policy and procedure to be followed in developing an ultimate solution to the existing and emerging water supply problems of the Colorado River Basin.

Titles II and VI, as Secretary Udall has described, direct that broad-scale investigations be made of alternative water sources and methods of supplying water to meet current and anticipated water requirements in both the upper and lower basins.

Title IV would establish a Lower Colorado River Basin Development Fund similar to that established by the Colorado River Storage Project Act. It would be the bank account needed to implement the financial aspects of the plan. All project appropriations and revenues would be credited to the fund. Surplus revenues from Hoover powerplant after 1990, and surplus revenues from Parker and Davis powerplants after 2004, which is the completion of payout of these existing features, would also be credited to the fund. Revenues credited to the fund would be available without further appropriation for project operation, maintenance, and replacement costs and emergency expenditures but would not be available for construction of works. Revenues in the fund in excess of the amount required for operation, maintenance, and replacement costs and emergency expenditures would be paid annually into the general fund of the Treasury to return all reimbursable project costs, with interest where appropriate, including financial assistance in the repayment of irrigation costs in excess of the water users' ability to repay. Surplus revenues also would be available to assist in the return of costs of measures to develop new water supplies for the Lower Colorado River Basin. The value and extent of such assistance would be defined in future proposals to authorize such measures.

Title IV also provides that, to the extent that revenues are available in the fund after meeting project operation, maintenance, replacement, and construction costs for units therein authorized, they be used to defray added costs of water to users which would otherwise not have been incurred by such users if there were sufficient water available in

the Colorado River to satisfy an annual consumptive use of 2.8 million acre-feet in Arizona, 4.4 million acre-feet in California, and 0.3 million acre-feet in Nevada. The administration indicates that such a commitment should be taken only after the most careful consideration and that, should the Congress decide that the situation is unique because of the burden of the Mexican Water Treaty, the price guarantee should be limited to not more than 1.5 million acre-feet annually—the amount required to meet the Mexican Water Treaty obligation.

Section 304(a) of the bills provides that in any year in which there is insufficient Colorado River water available to satisfy the annual consumptive use of 7.5 million acre-feet in Arizona, California, and Nevada, diversions from the main stream for the purposes of the central Arizona unit shall be so limited as to assure the consumptive use of 4.4 million acre-feet in California. A similar priority is extended to water users in Arizona and Nevada served under existing contracts with the United States. These priorities would cease whenever the President proclaims that works have been completed and are in operation capable, in his judgment, of delivering annually not less than 2.5 million 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. These provisions have evolved from the efforts of Arizona and California to accommodate their differences. It is important to recognize, however, that agreement on these provisions was reached only in the expectation that an affirmative program to lay to rest the water shortage problems of the Colorado Basin would be forthcoming and thus insure that the statutory priorities would never need to be invoked.

Attached to my statement for the record as attachment No. 1 is a brief discussion of section 304(a) as it affects pressent Arizona contractors with the United States for Colorado River water.

Section 402 provides, among other things, that the costs of construction, operation, and maintenance of works to offset the depletion of Colorado River flows available for use in the United States, including river and reservoir losses, occasioned by compliance with the Mexican Water Treaty, be nonreimbursable. This provision recognizes that the commitment of the Mexican Water Treaty is a national and not a sectional obligation. The administration recognizes that the Mexican treaty imposes an important demand on the Colorado River. In its view, the costs associated with replenishment of deficiencies of up to 1.5 million acre-feet annually occasioned by compliance with the treaty could be offset either by use of development fund revenues if the Congress considers the situation unique, or, as an alternative, by making such costs nonreimbursable.

I believe that these guiding policies and procedures as discussed and as the Congress may implement them, are essential to realization of the first primary objective of the Lower Colorado River Basin project—the laying of a foundation upon which to build a lasting detailed comprehensive solution to the existing and future water supply problems of the Colorado River Basin.

In order to initiate the Lower Colorado River Basin project, title III would authorize certain specific units as follows.

The main stream reservoir unit would be comprised of the Bridge Canyon and Marble Canyon projects. The administration recom-

mends that authorization of Bridge Canyon be deferred pending a re-evaluation of the scenic and power values involved. In this event a moratorium upon the issuance of a license to any non-Federal entity for the construction of a dam at the site should be imposed by the legislation.

The Marble Canyon project would be composed of Marble Canyon Dam and Reservoir, powerplant, transmission facilities, and related recreation and fish and wildlife development. The Marble Canyon site is 12.5 miles above the upstream boundary of the Grand Canyon National Park. The dam would create a reservoir that would back water 54.8 miles upstream to the toe of Glen Canyon Dam. Paria Dam and Reservoir on the Paria River would provide 98,000 acre-feet of capacity for sediment control to protect the Marble Canyon Reservoir capacity and Glen Canyon tailwater channel from sediment encroachment.

The Paria River is one of the worst silt contributors on the lower Colorado River system, and Marble Canyon Reservoir would need to be protected from this silt deposition. So the Paria Dam is included as part of the plan.

Marble Canyon Dam would be a thin-arch concrete design rising 310 feet above streambed to create a reservoir with 363,000 acre-feet of capacity and a normal water surface at elevation 3,140. The installed capacity of the powerplant would be 600,000 kilowatts and would generate an estimated 2.1 billion kilowatt-hours annually.

The central Arizona unit is proposed for construction to divert annually 1,200,000 acre-feet of Colorado River water via high-lift pumping plants and an open, concrete-lined aqueduct into the rapidly expanding metropolitan areas of Phoenix and Tucson. In addition, water would be delivered to several agricultural areas which now depend on the severely overdrafted ground-water basins in Maricopa and Pinal Counties.

Four multipurpose dams and reservoirs (Buttes, Charleston, Hooker, and Orme) on the Gila River system are included for conservation, flood control, and additional river regulation. Through coordinated operation, by which the four proposed reservoirs would provide upstream regulation, the benefits of Colorado River water can be extended to areas other than the central Arizona area by exchange agreements.

Because the central Arizona unit has been delayed so long by the moratorium on water supply projects in the Lower Colorado River Basin, it deserves special consideration. Twice, legislation to authorize this project was passed by the Senate. However, efforts to secure approval in the House of Representatives failed. It was the inability to secure authorization of this project which led to the extended legal involvement that has now been ended by the Supreme Court decree in the case *Arizona* v. *California*.

During the intervening period of almost 20 years, Arizona has experienced a phenomenal growth. The water supply for this growth has been supplied by overdrafting ground water reserves, which fortunately existed in the area. These reserves have been continuously depleted over the past several decades, and each additional year they are further depleted adds to the hazards threatening the economy of the area.

The immediate construction of the central Arizona unit facilities is essential as a stopgap measure to preserve the virile economy that now exists in central Arizona until such time as a full water supply can be provided for the entire Colorado River Basin. I wish to emphasize here the often overlooked fact that the central Arizona unit would not provide for the irrigation of additional lands. Water supplies conveyed through project facilities would be utilized to satisfy growing municipal and industrial demands and then to supplement local supplies for presently developed irrigated lands. In effect, its purpose is simply to reduce the rate of depletion, and to extend the life of the underground reservoirs upon which the economy of the area, and indeed of life itself, depends. Irrigated lands will continue to go out of production and local irrigation supplies will continue to be taken over and transferred to municipal and industrial uses, even if the central Arizona unit is built, until addition water supplies other than those available naturally to the Colorado River Basin are made available.

The central Arizona unit is not only a most important feature of the regional plan, it is also most urgently needed now.

The water salvage programs that would be authorized by title III consist of eradication and control of phreatophytes and ground water recovery.

The eradication and control program would eradicate and control dense growths of phreatophytes now infesting about 42,000 acres of Federal and nonarable Indian land on the flood plain of the Colorado River which annually consume many thousands of acre-feet of water. This program would effect the salvage of an estimated 100,000 acre-feet of water annually.

The ground water recovery program would provide an additional 220,000 acre-feet of water for further beneficial use in the lower basin. These waters would be obtained by pumping from the Yuma ground water reservoir waters now escaping from the U.S. portion of the Colorado River Basin or building up excess ground water storage.

These programs, together with present works being constructed for channelization and regulation of Colorado River flows below Hoover Dam, would salvage an estimated 680,000 acre-feet of water annually. Provisions will be made to maintain a reasonable degree of undisturbed habitat for fish and wildlife in connection with these programs.

A major objective of the Lower Colorado River Basin project is to create new opportunities for recreation and fish and wildlife. Such opportunities, particularly those based on fishing, hunting, and water sports, are in tremendous demand. New reservoirs will create large water areas for boating, fishing, swimming, and water skiing, and additionally will provide new access to some of the most spectacular scenery in the Nation.

The Dixie project in Utah was originally included for authorization as part of the Lower Colorado River Basin project. It was authorized separately, however, by the act of September 2, 1964. Section 309 of the pending bills would integrate the Dixie project into the Lower Colorado River Basin project in order that it might participate in the development fund, as appropriate.

Section 306 would authorize the southern Nevada water supply project as a unit of the plan. Hearings on legislation to authorize this

project separately have been held by this committee and by its counterpart committee of the Senate. The administration has strongly endorsed this project.

The above-described projects recommended for authorization constitute the initial core of the Lower Colorado River Basin project. They would meet some of the most pressing needs of the present. They would constitute a firm, encouraging start toward making the entire Colorado River Basin sufficient in water supply for the future.

COLORADO RIVER WATER SUPPLY

The Colorado has been and is a maverick river. Its annual water yield has fluctuated through a wide range, as illustrated on the display map. At Lee Ferry the maximum estimated virgin flow for 1 year, the best year of record, was 24,038,000 acre-feet, which occurred in 1917. The minimum virgin flow was 5,641,000 acre-feet in 1934, the worst drought year of record. From 1906 through 1965, the period of analysis that the Bureau of Reclamation adopted for its studies of the Lower Colorado River Basin project since that is the period of years for which accurate measurement is of record, the estimated virgin flow at Lee Ferry has averaged 15,060,000 acre-feet annually.

Mr. ASPINALL. Mr. Dominy, you have twice used the term "virgin flow." I know some members of the committee do not understand what you mean by virgin flow of the river. Will you explain that? I had the question asked me this morning, and I suggested that it would be answered.

Mr. DOMINY. This is the total yield of the river as it would have been prior to use by man. It is computed by taking into account the historic flows as measured, transmountain diversions and all other diversions and consumptive uses associated with development by man. In other words, that is the total yield of water available under presettlement conditions for use on the Colorado River at Lee Ferry.

Mr. HOSMER. But not necessarily the volume of water that flows past Lee Ferry?

Mr. DOMINY. Exactly. That is not the amount of water that reaches Lee Ferry now, because some of it is transmountain diverted and some is diverted within basin and only the return flow comes back to the river. This constitutes a careful computation of the natural yield of the river as reflected at Lee Ferry for compact purposes.

There is close agreement among water experts as to the historical water facts of the Colorado River—what the flows have been, where they have been used, and in what amounts. Such agreement, however does not extend to projections of future conditions. To project future conditions requires the making of assumptions, which in turn requires the exercise of judgment. Where judgment is involved, there is always room for honest differences in opinion. In respect to the future water supply of the Colorado, this is a classic case in point.

The principal assumptions wherein opinions differ include (1) the period of historical record that is most likely to be representative of future Colorado River flows, (2) the rate at which upper basin development will deplete Colorado Basin waters within the compact apportionment, (3) the effectiveness of proposed water salvage measures, and (4) the most appropriate methods of reservoir operation to be fol-

lowed. A further closely related and complicating factor is the difference in interpretation of the Colorado River compact as it concerns the extent of the obligation of the upper basin in respect to the Mexican treaty water deliveries.

Differing assumptions will, of course, result in differing projections of future water supply available from the Colorado River and of its divisions between the upper and the lower basins. Hundreds of water supply projection studies have been made by the Bureau and by the various State agencies involved. Hundreds more could be made.

Although all such studies vary in results, depending upon the assumptions adopted, they all have one thing in common. They demonstrate forcefully that sooner or later, and mostly sooner, the natural flows of the Colorado River will not be sufficient to meet water demands, either in the lower basin or the upper basin, if these great regions of the Nation are to maintain their established economies and realize their growth potential. Bureau of Reclamation studies project that this critical point in time will occur about 1990, 25 years from now. If we take into account full instead of partial relief of the critical overdrafting of ground waters in the central Arizona area, that date will occur earlier. Whether that date occurs in 1985, 1990, 1995 or the year 2000 is, to me, irrelevant compared with the fact that it will inevitably occur.

POWER DEVELOPMENT

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.

If the Lower Colorado River Basin project is to follow traditional reclamation policies of financial solvency, as proposed, a source of financial assistance will be necessary. This will be particularly true as future works are proposed to supplement the natural water supply of the Colorado River. Through the sale of power and the buildup of surplus revenues in the development fund, a source of financial assistance can be assured.

Aside from this contribution, Marble Canyon power will be of major importance to the power users of the area.

Studies by utilities show that hydroelectric resources generally are more economical for meeting peaking requirements. Hydroelectric units can be shut down each day after the peakload has passed and be restarted to meet the next day's peak as required. High-temperature, high-pressure steam units, such as those contemplated in the Lower Colorado River Basin, are more suited for continuous or base-load operation since numerous stops and starts greatly increase operation and maintenance costs. If these steam units are to be used for peaking, they are unloaded during off-peak hours but kept hot and spinning. Additional fuel is thus consumed during light-load periods when no power is generated.

The commercial power generated at Marble will meet a part of the requirement for peaking power in the area and by proper contractual arrangements also provide power and energy at a usable load factor to smaller preference customers. The estimated return of $10 per

kilowatt of capacity and 3 mills per kilowatt-hour of energy is substantially less than current values for the type of peaking power that will characterize Marble Canyon production. As new technologies emerge, the cost of producing peaking power undoubtedly will decrease. However, we believe that the returns for commercial power which we have projected as an average over the payout period are conservative as a basis for demonstrating project repayment.

CHARACTER AND SCOPE OF FUTURE PLANNING

Secretary Udall mentioned the major considerations involved in future studies of potential surface-water imports and of desalting. I would like to review briefly other potentials for augmenting future Colorado River water supplies.

This past year our program of applied research in weather modification was greatly expanded. We are hopeful that funds will be appropriated to continue and to further expand this activity. Its major aim is to determine, through experimentation under closely controlled conditions, the effectiveness of weather modification techniques in producing actual on-the-ground moisture.

The Colorado River Basin is an ideal large-scale laboratory. High mountains create orographic wind currents which are susceptible to being milked of their moisture. Complete control of runoff by major storage reservoirs means that artificial induction of precipitation will be effective whenever it can be accomplished, not just during years of drought when opportunities to induce precipitation are minimal. Increased precipitation during years of average or above-average runoff can be caught and held in storage reservoirs until needed in years of scarcity. For these reasons a major portion of our weather modification program is being centered in the Colorado River Basin.

Results of our efforts to date lead us to be optimistic, although it is far too soon to predict results with certainty. A small percentage of increase in Colorado River runoff due to weather modification, however, would be a significant contribution to improving the water supply situation.

Water obtained through salvage programs is the cheapest source of new water for the Pacific Southwest. Therefore, to the maximum extent possible at this time, the plan includes water salvage programs. We recognize, however, that much more can be accomplished in time in this general field. The program of the Department of Agriculture to increase runoff from watersheds, including especial attention to snowpack runoff, is an example.

The treatment and reuse of waste water can be a significant future source of new water. To date the Federal Government has not been involved in this activity, but local agencies have been active and are expanding their programs. We believe this to be a particularly suitable area in which local interests can contribute to solving their own water problems. The lining of canals, such as the All-American Canal system, is another source of significant water savings. Before this should be undertaken as a Federal activity, however, we believe new agreements within California as to the use of the salvaged water and renegotiation of existing contracts under the Boulder Canyon Project Act must be prerequisites.

More efficient water use practices also can do much to stretch existing supplies to cover demands. We must insist at all times on the most careful husbandry in the use of water. For example, one provision of the bills now before you will make it a condition precedent to the availability of water under the central Arizona unit that users have lined water distribution and conveyance systems.

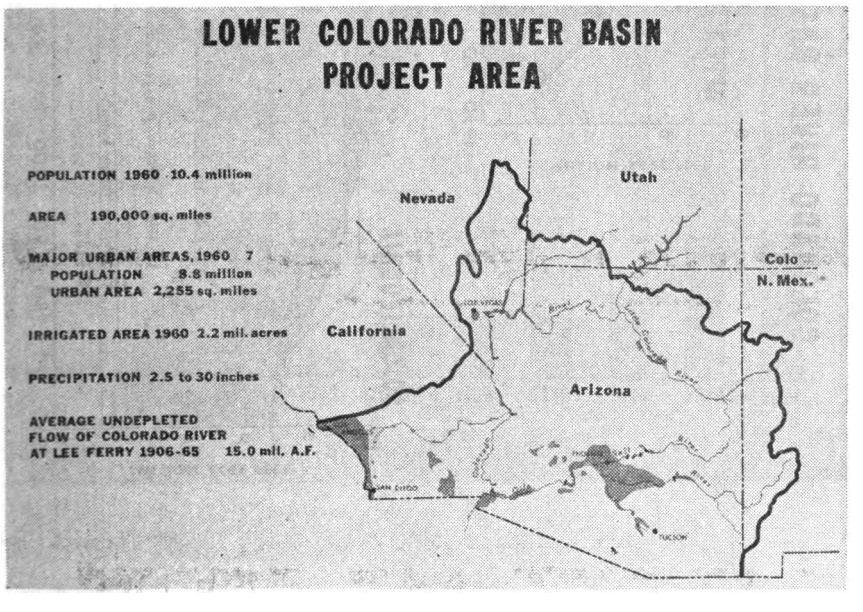
We highly endorse that as a new step in water salvage.

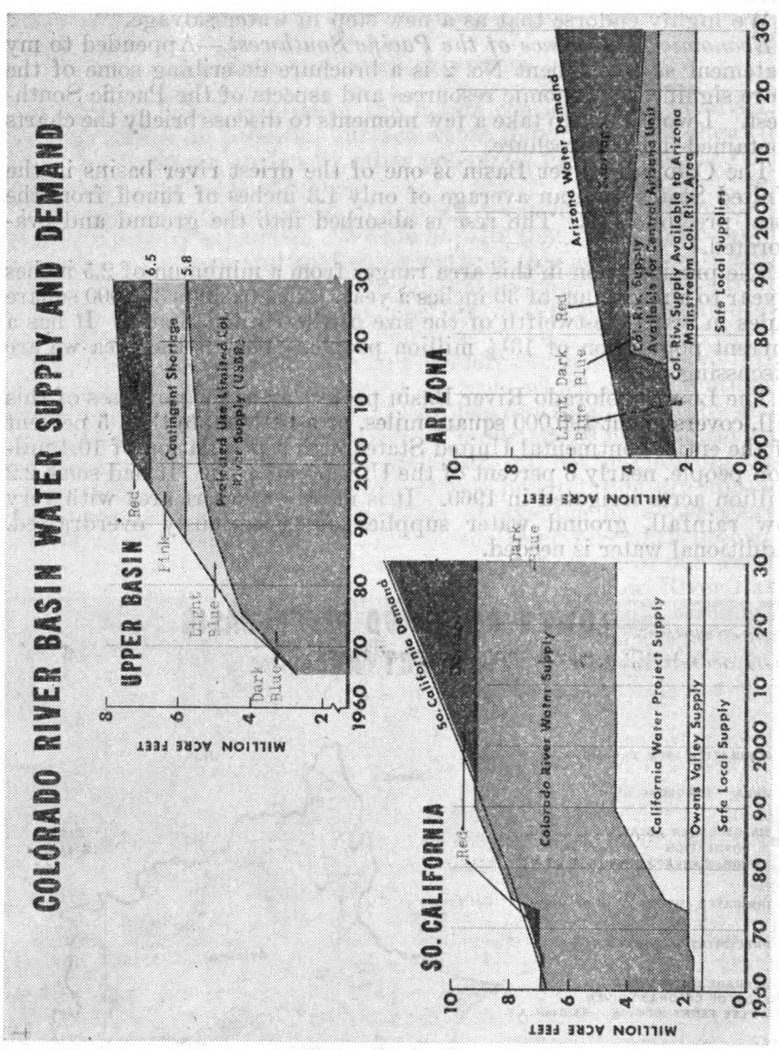
Economic Importance of the Pacific Southwest.—Appended to my statement as attachment No. 2 is a brochure describing some of the more significant economic resources and aspects of the Pacific Southwest. I would like to take a few moments to discuss briefly the charts contained in that brochure.

The Colorado River Basin is one of the driest river basins in the United States with an average of only 1.3 inches of runoff from the total precipitation. The rest is absorbed into the ground and evaporated.

The precipitation in this area ranges from a minimum of 2.5 inches a year to a maximum of 30 inches a year. The basin is 300,000 square miles in area, one-twelfth of the size of the United States. It has a current population of 13½ million people. That is the area we are discussing.

The Lower Colorado River Basin project area, for purposes of this bill, covers about 190,000 square miles, or a little more than 5 percent of the entire continental United States with a population of 10.4 million people, nearly 6 percent of the U.S. population. It had some 2.2 million acres irrigated in 1960. It is mostly a desert area with very low rainfall, ground water supplies being seriously overdrafted. Additional water is needed.




COLORADO RIVER BASIN WATER SUPPLY AND DEMAND
UPPER BASIN
MILLION ACRE FEET
Red
Link
Light Blue
Dark Blue
6.5
5.8
Contingent Shortage
Prefigured Use Limited Col. River Supply (USBR)
1960 70 80 90 2000 10 20 30
SO. CALIFORNIA
So. California Demand
Colorado River Water Supply
California Water Project Supply
Owens Valley Supply
Safe Local Supply
ARIZONA
Arizona Water Demand
Col. Riv. Supply Available for Central Arizona Unit
Col. Riv. Supply Available to Arizona Mainstream Col. Riv. Area
Safe Local Supplies

The Colorado River Basin water supply and demand chart is a very interesting summation of what we are talking about here on water supply. The chart shows projected water supply-water demand relationships separately for the upper basin for southern California, and for Arizona.

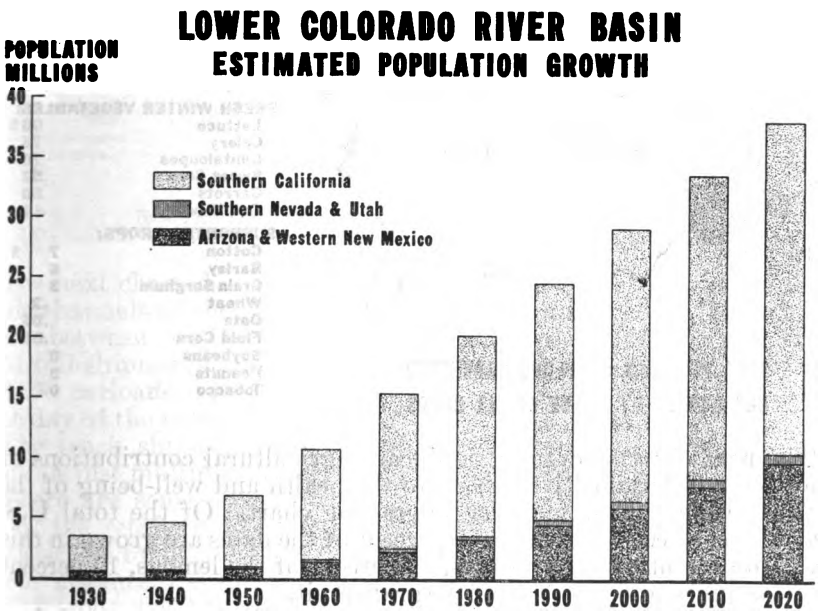
The significant color on the chart is red, for this color depicts existing and expected water shortages.

As I said in my statement, we can all have our own views as to when shortages will start to occur, but we all agree that shortages will occur.

Both the upper basin and southern California are expected to have shortages by 1990 or shortly thereafter.

Significant water shortages exist in Arizona and the central Arizona unit will partially relieve present shortages. Without augmentation after 1990, Colorado River water available for the central Arizona project will steadily decrease. That is shown on that map.

As practically the full yield of the Colorado River will be consumptively used after 1975, this chart demonstrates vividly that augmentation of the natural flows of the river is the only practical solution to water shortages both for the upper and lower basins.



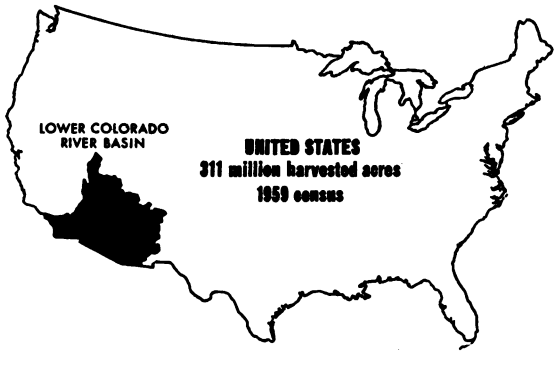
The next chart shows the Lower Colorado River Basin estimated population growth. These projections are taken from Census Bureau and various State estimates and they are the best and most accurate projections we can find.

The unparalleled population growth is the major reason for the rapidly increasing water demand. More than 10 million people live in this area. Population over the decade for 10 years, 1950–60, grew at the rate of 5 percent per year as compared to U.S. average of only 2 percent.

Between 1930 and 1960 the population tripled, and between 1960 and 1980 the population will approximately double again. By the year 2020 we can expect nearly 40 million people in this lower basin area.

Population growth in recent years has been largely confined to the major urban centers.

SIGNIFICANT AGRICULTURAL CONTRIBUTIONS
LOWER COLORADO RIVER BASIN



ONLY .7% OF U.S. CROPLAND HARVESTED
BUT 4.4% OF U.S. VALUE OF ALL CROPS

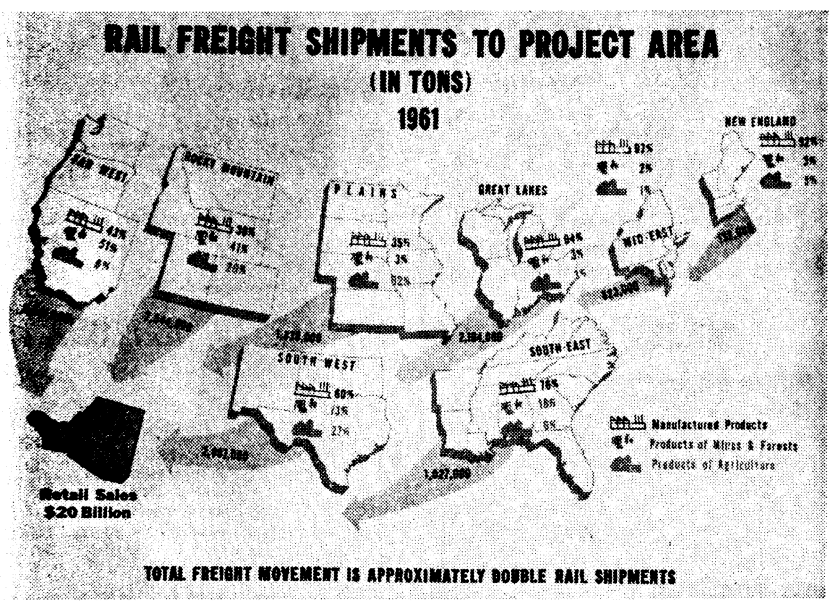
PORTION OF U.S. PRODUCTION	
FRUITS:	
Dates	100%
Avocados	76
Lemons	82
Oranges	19
Grapefruit	8
FRESH WINTER VEGETABLES:	
Lettuce	95%
Celery	75
Cantaloupes	70
Sweet Corn	52
Carrots	50
Cauliflower	44
SUPPORTED CROPS:	
Cotton	7 %
Barley	5
Grain Sorghum	3
Wheat	.2
Oats	.05
Field Corn	.01
Soybeans	0
Peanuts	0
Tobacco	0

The next chart shows the significant agricultural contributions of the Lower Colorado River Basin to the health and well-being of the entire Nation. This is a very interesting chart. Of the total U.S. production of certain fruits, 100 percent of the dates are grown in this area, 76 percent of the avocados, 82 percent of the lemons, 19 percent of the oranges, and 8 percent of the grapefruit.

Of the fresh winter vegetables on all the grocery store shelves throughout the United States, 95 percent of the lettuce comes from this area, 75 percent of the celery, 70 percent of the cantaloups, 52 percent sweet corn, 50 percent carrots, and 44 percent cauliflower.

Of the supported crops, cotton is the most significant. The area produces about 7 percent of the U.S. cotton, but it does it on only 3 percent of the harvested cotton acreage.

The next thing of interest is that the support problem is not as large as these figures would suggest. A recent Department of Agriculture publication states that historically the amount of cotton acquired by the Commodity Credit Corporation from this Pacific Southwest area is relatively small, the majority of this cotton moving freely in market channels. In 1963 Arizona left 8 percent, California only 1½ percent of their cotton crop in Commodity Credit stocks as compared with the national U.S. average of 39 percent.



The next chart shows the importance of this Southwest area to the trade channels of the Nation. A lively reciprocal trade relationship exists between the Colorado River Basin and the United States. In 1961 rail shipments into this area including southern California, were 413,000 carloads. This is equivalent to 12 freight trains of 94 cars each day of the year.

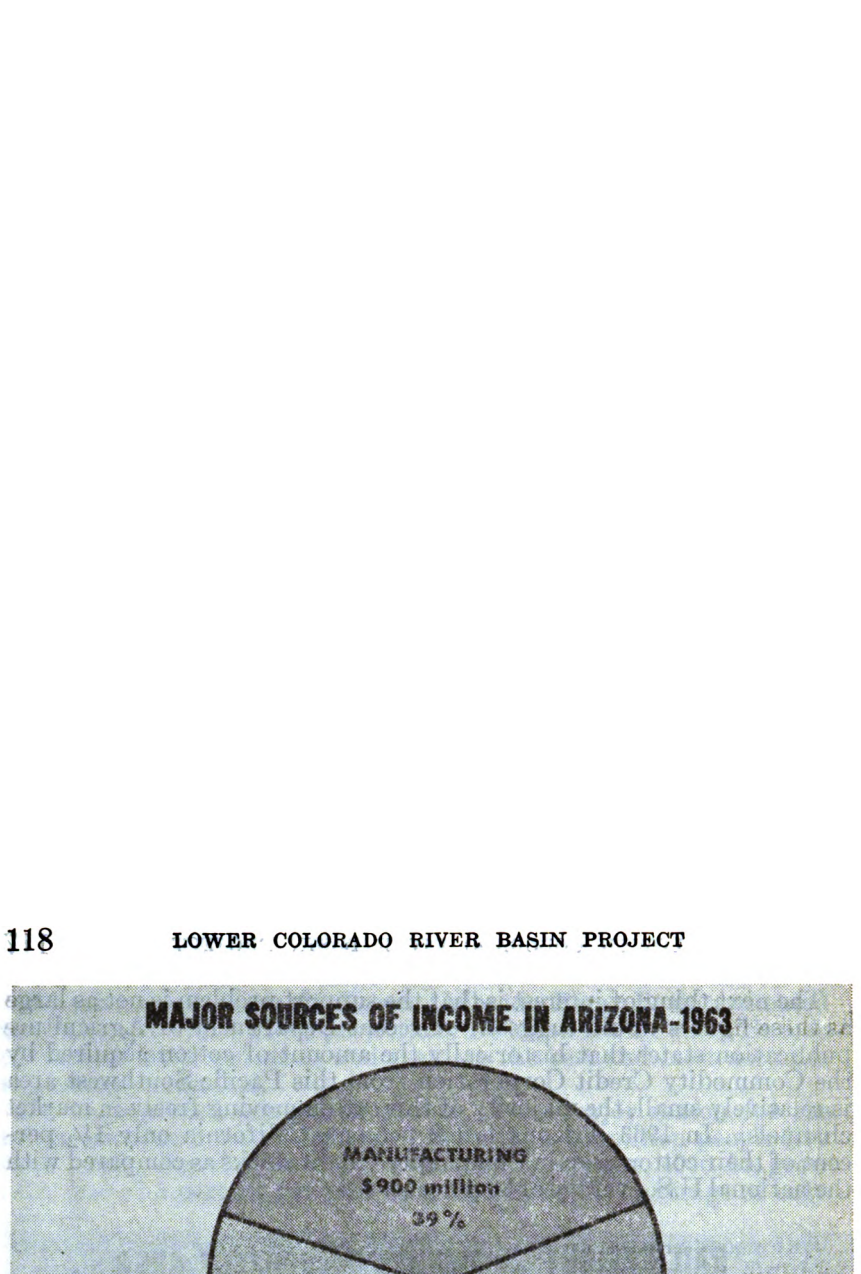
The truck shipments are at least equal to the rail shipments, so you can just multiply that figure by two to get an accurate reflection.

There are some other interesting things on this chart. It shows all of the retail trade moving in by tons because that was the only statistics we found available.

For instance, the shipments from Pennsylvania-New York totaled 823,180 tons, but 97 percent of that was manufactured goods. Only 1 percent was agricultural products.

The value of that 823,000 tons is probably much greater than the 1,330,000 tons which came in from the north Plains States where 62 percent of it was agricultural products, for example, because of the manufacture and extra labor and processing that went into the material which was shipped.

This chart would indicate the welfare of the Nation hinges on preserving the economy of this great Southwest area.



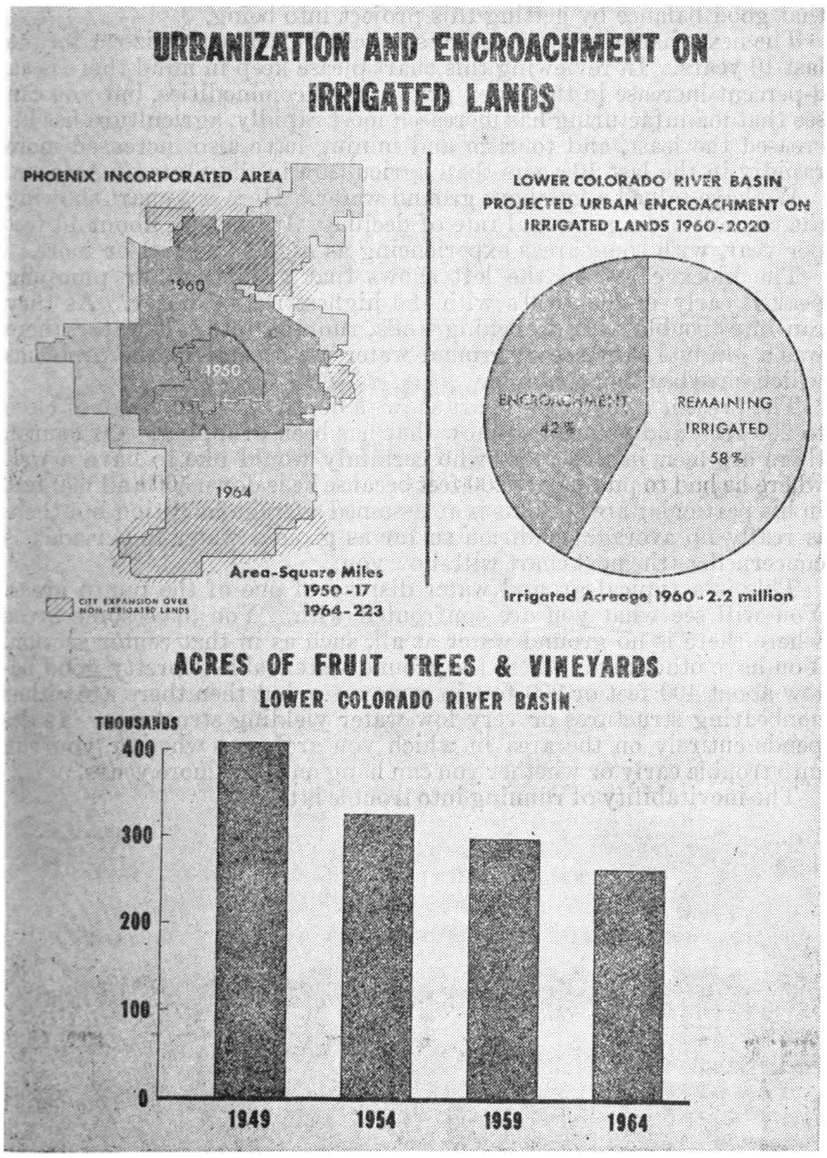
The next chart shows the urbanization movement on to irrigated lands in the Pacific Southwest. An inevitable result of the progressive urban expansion which is occurring throughout the Nation, and particularly in the Southwest, is the loss of prime agricultural land. In the West this is especially so because nearly all of the cities have sprung from towns in the irrigated farming areas.

For example, the incorporated area of Phoenix, Ariz., has increased from 17.1 square miles to 222.7 square miles in the last 14 years.

All except that crosshatched area was expansion on to irrigated lands. That land was taken out of production and the water supply diverted to municipal and industrial purposes.

The next pie chart on the right shows that urbanization and other nonagricultural encroachment by 2020 will take another 900,000 acres of irrigated farmland. This will reduce by 42 percent the presently irrigated area in southern California and Arizona.

The next chart will show what happens when this occurs. Shown here is the trend in acreage of fruit trees and vineyards in the Lower



Colorado River Basin. There were 400,000 acres in 1949. The average was down to about 280,000 acres in 1964. This reflects good citrus and vineyard lands taken out of production and put into urban development.

The next is an interesting chart because it shows a pretty well-balanced economy for the State of Arizona. It shows that 39 percent of the State's income is from manufacturing. Of course, there is some manufacturing related to agriculture included in that. Twenty-one percent is shown from mining, 16 percent from tourism, and 24 percent from the basic agricultural industry. We would like to help preserve that good balance by getting this project into being.

The next chart shows the major sources of income in Arizona for the last 10 years. In reviewing this chart please keep in mind there is an 8-percent increase in the index prices of all commodities, but you can see that manufacturing has increased most rapidly, agriculture has increased the least, and tourism and mining have also increased more rapidly in the last 10 years than agriculture in the State of Arizona.

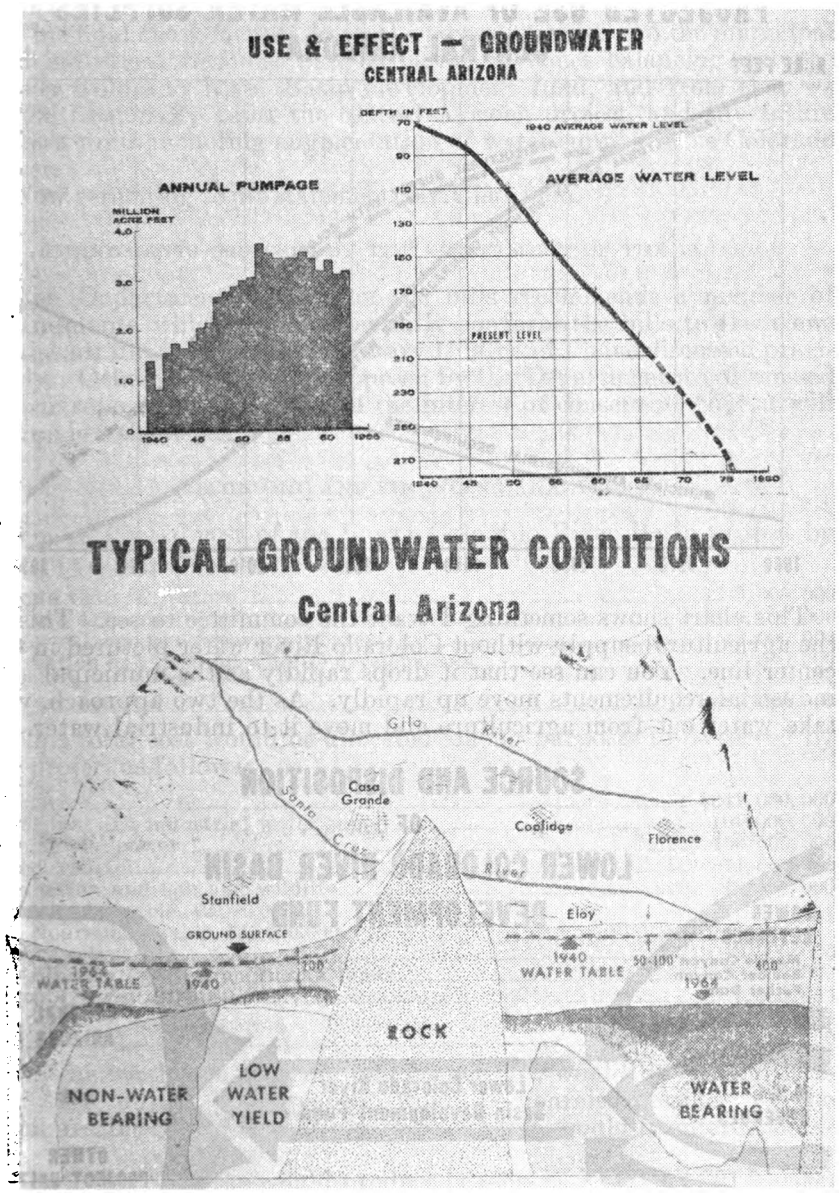
We have talked a lot about ground water. Here is a chart showing the current average annual rate of decline. It has been about 10 feet per year, with some areas experiencing as high as 20 feet or more.

The block chart on the left shows that ground water pumping peaked early in the 1950's with the highest use of water. As they ran into trouble with deepening wells, running into salt water, there was a gradual decrease of ground water use because of the problems which have been encountered.

The present level on the chart shows a depth on the average of close to 200 feet, and you can see how that has been dropping. Of course, there are men in this room who certainly would like to have a well where he had to pump only 200 feet because he is down 500 and 600 feet in his particular area. This is an assumed average condition but there is really no average condition so far as ground water in Arizona is concerned, as the next chart will show you.

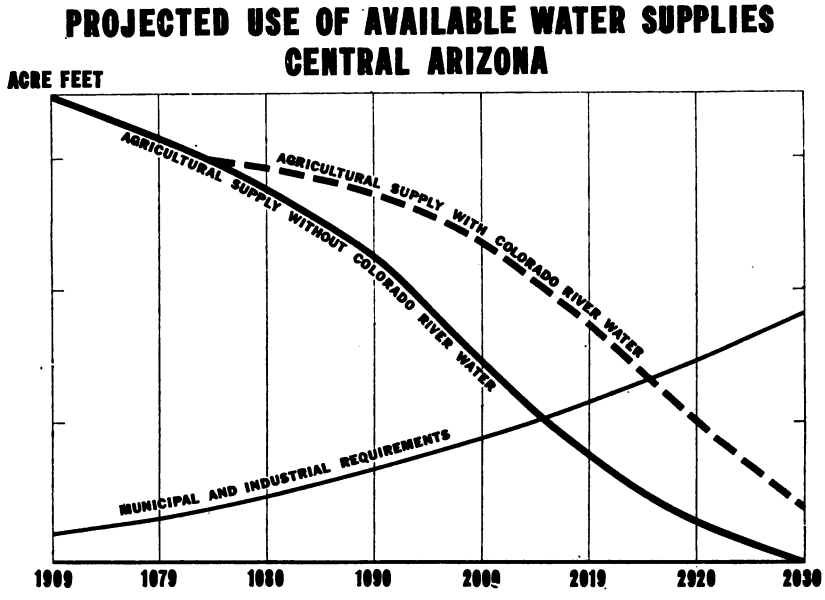
This is a typical ground water display of one of the pump areas. You will see what you are confronted with. You have some areas where there is no ground water at all, such as in that center section. You have other areas where the ground water table is pretty good below about 400 feet or 200 feet in some cases, but then there are either nonbearing structures or very low-water yielding structures. It depends entirely on the area in which you are as to whether you run into trouble early or whether you can hang on a few more years.

The inevitability of running into trouble is there.

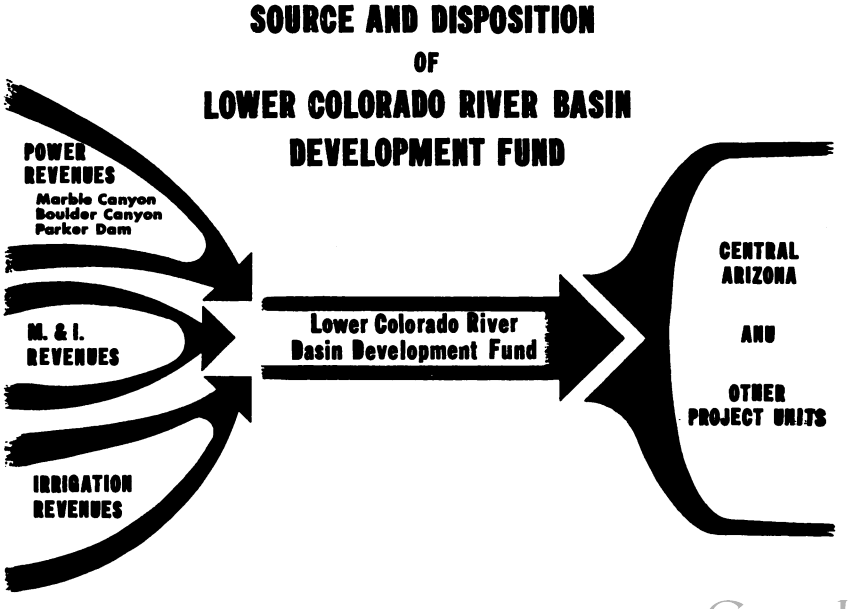

USE & EFFECT — GROUNDWATER
CENTRAL ARIZONA
ANNUAL PUMPAGE
MILLION ACRE FEET
AVERAGE WATER LEVEL
DEPTH IN FEET
1940 AVERAGE WATER LEVEL
PRESENT LEVEL
TYPICAL GROUNDWATER CONDITIONS
Central Arizona
Gila River
Casa Grande
Coolidge
Florence
Stanfield
Eloy
GROUND SURFACE
1964 WATER TABLE
1940 WATER TABLE
ROCK
NON-WATER BEARING
LOW WATER YIELD
WATER BEARING

This is the final chart, showing how the proposed project will utilize revenues from the hydroelectric facilities.

I skipped one, I believe.



This chart shows something I want the committee to see. This is the agricultural supply without Colorado River water pictured in the center line. You can see that it drops rapidly as the municipal and industrial requirements move up rapidly. As the two approach, you take water out from agriculture and move it to industrial water.



All we will do with this project is to delay that inevitability as is shown by the light blue line. We will reduce the decline of the ground water and we will delay slightly the shift from irrigation water to municipal water. We need to pick up that difference with the augmentation of the Colorado River.

This final chart merely shows the power revenues and the municipal and industrial revenues and irrigation revenues balancing into the Lower Colorado River Basin development fund, and from that we would financially assist the central Arizona project, and any future project units including augmentation of water supply to the Colorado River.

Now returning to my statement, Mr. Chairman.

AMENDMENTS PROPOSED BY THE DEPARTMENT OF THE INTERIOR

The Department's report on the bills recommends a number of amendments which would essentially conform the bills to the views of the administration that Secretary Udall and I have discussed previously. Other amendments proposed by the Department are discussed in our reports on the bills. In the interest of conserving time, I will not review them here.

ECONOMIC AND FINANCING ANALYSES

The estimated cost of the Lower Colorado River Basin project by features that would be authorized by the bills is as follows:

Marble Canyon feature	$239,000,000
Central Arizona unit	526,000,000
Water salvage and recovery programs	42,000,000
Recreation and fish and wildlife developments	5,000,000
Total	812,000,000

This total cost would be allocated among purposes to be served by the project as follows:

Irrigation	$341,000,000
Municipal and industrial water supply	191,000,000
Commercial power	156,000,000
Flood control	11,000,000
Recreation and fish and wildlife	49,000,000
Reimbursable, $2,000,000.	
Nonreimbursable, $47,000,000.	
Water salvage	42,000,000
Distribution systems on Indian lands	20,000,000
Prepaid investigation costs	2,000,000
Total	812,000,000

Of the total cost $692 million, 85 percent, would be reimbursable and $120 million, or 15 percent, would be nonreimbursable. Of the reimbursable costs $351 million, or 51 percent, would be interest bearing.

These initial works would produce benefits estimated at $91,800,000 annually compared with estimated annual costs of $41,800,000. The overall benefit-cost ratio based on a 100-year period of analysis is 2.2 to 1. The ratio based on a 50-year period of analysis is 2 to 1.

Mr. ASPINALL. Figuring all benefits, direct and indirect.

Mr. DOMINY. Yes.

I would like to comment here particularly on the economic justification of the central Arizona unit. Our water supply analysis indicates that the central Arizona unit would have a full divertible water supply of 1,200,000 acre-feet per year for the first 15 years of its operation, or until the year 1990. Thereafter, without Colorado Basin imports, the water supply for the unit would progressively decrease as the upper basin depletions increase. At the end of the payout period in the year 2025, we estimate that the average water supply available for diversion at the Colorado River for the central Arizona unit would be about 580,000 acre-feet. Throughout the payout period municipal and industrial water requirements would be met first with the remainder of the water supply going to irrigation. Under these conditions of analysis the benefit-cost ratio of the central Arizona unit, based on a 100-year period of analysis, is 2.5 to 1. On the basis of a 50-year period of analysis the ratio is 2.2 to 1. Even under such water supply conditions all reimbursable costs would be repaid within a period of 50 years with assistance from the development fund.

Irrigation water would be sold at an average rate of $10 per acre-foot while municipal and industrial water would be priced at an average of $50 per acre-foot. Commercial peaking power from Marble Canyon at 35-percent plant factor has been estimated to return, as an average over the payout period, $10 per kilowatt and 3 mills per kilowatt-hour of energy. After payout of Hoover and Parker-Davis costs, energy produced at these facilities would be sold at an average of 4 mills and 4.7 mills per kilowatt-hour, respectively.

In addition to returning all reimbursable costs within 50 years, including $184 million of financial assistance to the repayment of irrigation costs of the central Arizona unit, the above rates, given the limited water supply conditions to which I have referred, would result in the accrual of surplus revenues of $481 million in the development fund by the year 2025. Through the year 2047, the end of the payout period of the initial phase of the Pacific Southwest water plan, the accrual of surplus revenues in the fund would aggregate $1,266 million. Appended to my statement as attachment No. 3 is a more detailed presentation of the economic and financial aspects of the lower Colorado River Basin project.

From the standpoint of accepted tests of economic and financial feasibility, the Lower Colorado River Basin project represents an exceptionally sound investment. Further, it lays an impressive financial foundation for works to make whole the water supply of the Colorado River Basin for the future.

SUMMARY

The Colorado River Basin is moving rapidly toward a water shortage crisis. The national significance of a sectional water crisis in a heavily populated area is vividly demonstrated by the current drought situation in the Northeast. The President has taken quick and decisive action in marshaling the administrative and technical resources of the Federal Government, under the direction of Secretary Udall, in seeking both short-range and permanent solutions to water problems of this area.

The Colorado River Basin is fortunate in that it has ample, but not overample, forewarning that a crisis is pending. I am confident that, if the Congress enacts this legislation before you and if the various interests involved unite in a common determination, a solution will be found that will provide additional water supplies for the entire basin. The crisis will be averted.

It is far less costly to prevent a disaster than to recoup from one. Action should be preventive now—not remedial later. H.R. 4671 and its counterparts prescribe the constructive course of action.

ATTACHMENT No. 1

SECTION 304(a) AS IT AFFECTS PRESENT ARIZONA CONTRACTORS WITH THE UNITED STATES FOR COLORADO RIVER WATER

The present Arizona contractors are all located within Yuma County in the southwest portion of the State. They include the Yuma County Water Users Association, which administers the valley division of the Yuma project; the North Gila Irrigation District, the Yuma Mesa Irrigation and Drainage District, the Yuma Irrigation District and the Wellton-Mohawk Irrigation and Drainage District, each of which comprises a part of the Gila project; and the Unit B Irrigation and Drainage District, which is under the Yuma auxiliary project.

Each of these contracting entities is a "user" as that term is defined in section 503(b) of the bills. "User" is there defined as any person or legal entity entitled under the decree of the Supreme Court in *Arizona* v. *California* to use main-stream water when available under the decree. In addition to these irrigators, there is also a contract for delivery of water to the city of Yuma for domestic purposes as well as a small number of Warren Act and special use contracts. These contractors are also located in Yuma County, and like the irrigation organizations, they are "users" under the definition contained in the bills.

Section 304(a), as we read it, is intended to give Arizona and Nevada Colorado River main-stream contract users and holders of "present perfected rights" the same priority as to consumptive use of main-stream water as would be afforded to the consumptive use of 4,400,000 acre-feet of main-stream water per annum in California. In order words, these Arizona and Nevada users stand on a par with, and share the same priority as, the California contractors who have a contract entitlement from the United States of the consumptive use of 4,400,000 acre-feet per annum of Colorado River main-stream water. Within each State, however, relative priorities, among themselves, of the users afforded this priority over the central Arizona project would not be affected nor would the basic priority afforded holders of present perfected rights, as against each other and subsequent users, be modified. It follows, of course, that in the administration of the central Arizona project in nonshortage years, the entitlements of Arizona's present contract users and holders of present perfected rights would not be curtailed in favor of the central Arizona unit.

By reason of section 304(a), therefore, in the event less than 7,500,000 acre-feet of main-stream water is available in any given year for consumptive use in Arizona, California, and Nevada, the existing Arizona contractors and present perfected rightholders, like the existing Nevada contractors and the contractors and holders of present perfected rights in California to the extent of 4,400,000 acre-feet per annum, would receive their entitlements of main-stream water with the shortages being borne by the central Arizona unit. Accordingly, it is the central Arizona unit, not the present users in Arizona, Nevada, and California (to the extent of 4,400,000 acre-feet of consumptive use per annum) which would absorb shortages of main-stream water.

ATTACHMENT No. 3

LOWER COLORADO RIVER BASIN PROJECT ECONOMIC AND FINANCIAL ANALYSIS

Attached to the Department of the Interior's May 17, 1965, report to the chairman of the House Interior and Insular Affairs Committee on H.R. 4671 and companion bills was a copy of the Department's January 1964 report on the Pacific Southwest water plan. This January 1964 report contained a

detailed presentation of the economic justification and financial feasibility of the Pacific Southwest water plan as then proposed. The Lower Colorado River Basin project, although it contains many of the basic concepts of the Pacific Southwest water plan, is a modified and scaled-down version of that plan.

It is the purpose of this statement to compare the scope and the economic and financial aspects of the two proposals, to indicate the factors that have changed since January 1964 which affect economic and financial analyses, and to present the results of economic and financial feasibility studies recently completed for the Lower Colorado River Basin project modified, as recommended by the Bureau of the Budget and the Department of the Interior.

Initial features recommended for authorization

	Pacific Southwest water plan	Lower Colorado River Basin project
Bridge Canyon project	$511,000,000	----------
Marble Canyon project	239,000,000	$239,000,000
Water salvage and recovery	42,000,000	42,000,000
Central Arizona project	527,000,000	526,000,000
California aqueduct enlargement	240,000,000	----------
Southern Nevada water supply project	72,000,000	----------
Moapa Valley pumping project	12,000,000	----------
Dixie project	45,000,000	----------
Indian irrigation projects	10,000,000	----------
Recreation and fish and wildlife	6,000,000	5,000,000
Total Federal cost	1,704,000,000	812,000,000

CHANGES SINCE JANUARY 1964 WHICH AFFECT ECONOMIC AND FINANCIAL ANALYSES

1. The Bridge Canyon project and the north coastal California import scheme, including Federal participation in the enlargement of the California aqueduct, have been deleted pending further study.

2. The estimated cost of the central Arizona unit has been reduced about $1 million due to more recent studies of alternative route and power schemes. Reductions have been $11 million in canal power drops, a powerplant in Orme Dam, and associated transmission lines. An increase of $10 million was caused by the inclusion of an additional pumping plant to bypass increased urban development.

3. The southern Nevada water supply project is the subject of separate legislation.

4. The Moapa Valley pumping project has been deleted pending further investigations.

5. The Dixie project was authorized by act of September 2, 1964; however, it is proposed to be financially integrated into the Lower Colorado River Basin project.

6. The Indian irrigation projects are already authorized under other legislation.

7. The recreation and fish and wildlife programs have been decreased by about $1 million to accommodate the Supreme Court decree concerning allocation of main stream water below Hoover Dam.

8. Pumping energy for the central Arizona unit is now scheduled to come primarily from Marble Canyon, with additional purchase during offpeak power generation periods.

9. The water supply of the central Arizona project is reduced significantly due to using a projected increase rate of depletion by the upper basin States and due to provisions of pending legislation that would accord to California a priority to 4.4 million acre-feet per year of main stream water. Without water imports, these factors would reduce the average annual Colorado River diversions from 1,200,000 acre-feet per year over the payout period under the Pacific Southwest water plan to 900,000 acre-feet per year under the Lower Colorado River Basin project.

10. The average rate for irrigation water remains at $10 per acre-foot; however, due to a higher interest rate, changed water supply and slight changes in the cost allocation, the average municipal and industrial water rate has increased from $45 to $50 per acre-foot.

11. The interest rate for financial payout of interest-bearing components is now 3.222 percent in accordance with current determinations versus 3 percent in the Pacific Southwest water plan. For benefit-cost analysis, the interest rate has increased from 3 to 3⅛ percent.

12. The cost-sharing provisions of the Recreation and Fish and Wildlife Act have been included where appropriate, and area redevelopment has been removed from the cost allocation in accordance with current policy.

13. The costs of the water salvage and recovery programs have been treated tentatively as nonreimbursable to be consistent with treatment of the already authorized channelization programs and the Senator Wash Dam. Further consideration will be given to this item dependent upon future determination of the disposition of salvaged water.

ECONOMIC ANALYSIS

Cost allocation of construction costs

	Pacific Southwest water plan	Lower Colorado River Basin project
Irrigation	$665,000,000	$341,000,000
Municipal and industrial water supply	284,000,000	191,000,000
Commercial power	616,000,000	156,000,000
Flood control	9,000,000	11,000,000
Water salvage		42,000,000
Recreation and fish and wildlife	84,000,000	49,000,000
Reimbursable		(2,000,000)
Nonreimbursable	(84,000,000)	(47,000,000)
Area redevelopment	14,000,000	
Indian projects and distribution systems	30,000,000	20,000,000
Investigation costs paid from other sources	2,000,000	2,000,000
Total	1,704,000,000	812,000,000
Benefit-to-cost ratios:		
100-year period	2.3:1.0	2.2:1.0
50-year period	2.0:1.0	2.0:1.0

FINANCIAL ANALYSIS

Both plans paid out their allocated cost within 50 years of the completion of construction of each feature.

	Pacific Southwest water plan	Lower Colorado River Basin project
Payout year	2030	2025
Financial assistance to irrigation	$441,000,000	$184,000,000
Development fund surplus in 2025		$481,000,000
Development fund surplus in 2030	$981,000,000	$661,000,000
Development fund surplus in 2047	$1,955,000,000	$1,266,000,000

Facing this page is a payout schedule showing the details of the financial analysis of the Lower Colorado River Basin project in a form comparable to table 25 of the Pacific Southwest water plans report.

Mr. DOMINY. As always, Mr. Chairman, it is a pleasure to be here and to testify before your committee.

Mr. ASPINALL. Thank you very much.

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

Mr. O'BRIEN. I have no questions, Mr. Chairman, but I would like to make a brief observation.

You paint a very dark picture here. I could not help thinking, while you were showing the various charts, that, in many instances, we

could have superimposed a map of New York State over that of Arizona and come up with the same conclusion—the dropping water levels, the dwindling cultivated farmlands, and so forth.

I was impressed by your statement toward the end, that at least here we are trying to avoid a crisis, to prevent it, because we are in the middle of one.

I hope that while we can give thoughtful consideration to the problems of the West that we will take an occasional look toward the Northeast in the future.

That is all, Mr. Chairman.

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

Mr. HOSMER. I would like to reserve my time, Mr. Chairman.

Mr. ASPINALL. The gentleman from Oklahoma, Mr. Edmondson?

Mr. EDMONDSON. Thank you, Mr. Chairman.

I would like to congratulate the Secretary of the Interior and the Commissioner of Reclamation upon their very comprehensive statements. I think, as a matter of fact, Mr. Chairman, I am not one of those who advocates there should be any change in the personnel in the Department of State, but I think if we should need a replacement for the Secretary on down the line that the Secretary of the Interior probably qualifies for the job by what has been accomplished here in getting these States together.

When I first began my service on this committee if someone had forecasted that someday we would have representatives of Arizona, California, and Colorado all appearing to propose the same general plan to solve their water problems I would have thought it was indeed a dream.

I don't know whether Mr. Dominy or the Secretary, either one, is prepared to comment at this time upon the other river systems which are likely to be looked to for supply of the water for import.

I note reference was made to that subject on pages 5 and 6 of the Secretary's statement, and also reference was made to it in Mr. Dominy's statement.

Is it a premature question at this time to ask what other river systems are going to be looked to as a source of water for import?

Secretary UDALL. I do not think it is premature, Congressman. I suspect if you didn't ask the question someone else would. We might as well be quite candid about it.

I think that there are three possible major sources of supply in addition to conservation of salvage water which is the cheapest source and the one we really ought to tackle, aggressively, first. However, these three sources are the possibility of desalting in terms of municipal and industrial water as one possibility; northern California as a second source; and I think that the third most likely source, and we might as well be very frank about it, is the mouth of the Columbia River below Bonneville Dam. After the water use of the Columbia River—which is a great hydroelectric river of this country, and which has 12 to 13 times more water than the Colorado River—has been completed and the water is ready to waste into the ocean I think this can be considered, also, a third likely source to study.

Mr. EDMONDSON. The first was desalting?

Secretary UDALL. Yes, after salvage.

Mr. EDMONDSON. That would not necessarily consist of other river systems, then?

Secretary UDALL. No. This would be a nonriver source. There would be two sources, probably—the coast next to Los Angeles, the Pacific coast, and in Mexico at the place where the Colorado River empties into the Gulf of Lower California.

Mr. EDMONDSON. Those would be the three major sources to which your study would be directed in order to locate water for import?

Secretary UDALL. We think what the committee would want us to do is to look at all alternatives, develop all the possible costs, so it can make a judgment on the basis of the alternatives.

Mr. ASPINALL. Why not the fourth possible source for at least a temporary operation—northern California where water now is going out to the ocean—with the understanding that, when needed by southern California, it can be diverted to the use of southern California and taken away from the Colorado River Basin at that time.

Secretary UDALL. The chairman has described what I meant by northern California as the second source, yes. I would agree with that entirely.

Mr. ASPINALL. I thought the second source had to do with reclaiming water.

Secretary UDALL. No, that was really a first step. I was really talking about four, with reclaiming and conservation as a first step. I am sorry that I confused it.

Mr. ASPINALL. Thank you.

Mr. EDMONDSON. At the time that an election is made to where you would go for the import of water, would the legislation now before us require further legislative action to accomplish that import decision?

Secretary UDALL. There have been some suggestions that the legislation before you be revised so that it would have a form of conditional authorization with the President making a determination.

What the administration has recommended, however, is a study, a broad-gage study, without a congressional authorization and without a conditional authorization.

Mr. EDMONDSON. I was trying to get at whether this legislation contains within it all the authorization necessary to make an election of where you will go to get this water to import and to accomplish the importing, whatever construction is necessary and whatever transit is necessary, all contained within this package without our knowing at this time in which direction you will go for the import water. Is that correct?

Secretary UDALL. In relation to the legislation before you, the bills before you, I think you will find do not provide a form of conditional authorization. I think it is very obvious that, at this early stage the alternatives have to be developed and that Congress, in all likelihood under this legislation, would have to do some reviewing of the matter as well as on the executive side, because until you were certain what the alternatives were and what the costs were you could not make final decisions.

Mr. EDMONDSON. How soon does your timetable call for a decision as to where the best source of imported water would be?

Secretary UDALL. This is a matter which could be within the discretion of the committee really. Some have talked about 3 years, 5

years, 10 years. I think it depends upon the committee's feeling basically with regard to urgency of the matter.

Mr. O'BRIEN. I would like to join in greeting our old colleague, Mr. Murdock. He swung the gavel up here when I first joined the committee.

He, perhaps, does not remember me but I met him just before he left office. I welcome him.

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

Mr. JOHNSON. I want to start off with thanking the gentleman who is here too in the person of Mr. Murdock. He was here the first time I arrived in Congress representing the area of northern California. I want to thank him for all the courtesies and projects in operation now which are doing such a fine job.

Mr. Secretary and Mr. Commissioner, I want to thank you for your very fine statements.

Mr. Secretary, I want to say that when I visited your State last year, and we had the opportunity to make the trip to Lake Powell, I fully realized that some of the fears of the people who are in opposition to this project were not well founded. I think that I saw there some of the most beautiful sights I ever saw. I know that the Marble Dam site will not interfere at all with the fears of those who are opposing this project and from whom we are now receiving mail in connection with further flooding of the canyon.

Mr. ASPINALL. I think it should be understood that the waters from Marble Canyon will more than likely back up into the part of the Grand Canyon National Monument.

Mr. DOMINY. Marble Canyon is on the Colorado River above the Grand Canyon National Park. The dam would be about 12½ miles above the northern boundary of Grand Canyon National Park, and then would back water some 54.8 miles to the toe of Glen Canyon Dam.

Bridge Canyon Dam, the one which the Budget Bureau has recommended be deferred, is the one which would back water through the monument and 13 miles along the Colorado River where the river is the northern boundary of the park, and the water would be about 90 feet above the river level at the corner of the park and zero feet additional at Kanab Creek 13 miles upstream.

Mr. JOHNSON. That was my understanding.

In your statement you point out that there is enough water in the river to pay out this project. I see by the arithmetic here that you come up with a very fine set of figures even without Bridge Canyon.

Mr. DOMINY. That is correct.

Mr. JOHNSON. The arithmetic given us here today as far as repayment potential was concerned, the cost of the project had to do merely with Marble Canyon Dam.

Mr. DOMINY. That is correct. We have analyzed the units which would be authorized absent Bridge Canyon.

Mr. JOHNSON. While we were in Arizona we had the opportunity to review the route of the aqueduct and also the service area. I do believe that at the time we held hearings there it was pointed out that there was a need, and when we had the opportunity to review the areas of service we could see for ourselves that this was going to take care of the vital need there, merely trying to save what you already have, as well as taking on expansion of the need for domestic and industrial waters.

Now we come down to the items here about which you speak as far as outside importations of water are concerned.

In your statement you recognize the fact that you can reclaim a considerable amount of water in the Colorado River Basin at the present time, taking it away from the phreatophytes and other means of diverting water from the river, with lined canals and works of that nature which would recover, I believe you said, something like 650,000 acre-feet of water.

Then as we move out into the other areas we have the desalinization program being carried on and other developments in northern California.

I want to say we are now going to be diverting into southern California approximately 2 million acre-feet of water in the near future, and the north coastal area has water not being put to beneficial use at the present time.

It is not my understanding that this legislation calls for any of that water to be taken from the 4.4 million acre-feet of water. This legislation would guarantee California 4.4 million acre-feet of water from the Colorado as its proper share.

The legislation does not entail, if we were to bring in a source of saline water for an additional source of water to northern California, that this would have anything to do with the reduction of the amount of water from the Colorado into 4.4 million acre-feet. Is that correct?

Secretary UDALL. The gentleman is correct in that assumption.

Mr. JOHNSON. As we look to the Pacific Northwest and other areas of the United States for water to bring into the Colorado River watershed this would build up the additional 2½ million acre-feet which you figure is absolutely necessary, and those studies are provided in the legislation.

Secretary UDALL. That is correct.

Mr. JOHNSON. And at a later date that will be brought back to this committee for consideration?

Secretary UDALL. This is what is anticipated by the legislation.

Mr. JOHNSON. I want to thank you two gentlemen for bringing in here a very factual report from the Secretary and a very comprehensive report from the Commissioner of the Bureau of Reclamation.

Certainly in his statement here the Commissioner points out that under all conditions there will be sufficient water in the river to pay out this project, including the Marble Dam and the conduit which would serve the area.

Mr. DOMINY. That is correct. It would not solve the problem on the river, and neither will the aqueduct be full all the time. It will be full less than half the time during the payout period if we do not get additional water into the river system, but the project area still would get enough benefit out of it under the combined plan as presented to make it economically feasible, economically justified, and have the repayment ability, including assistance from the development fund, to meet the obligations of repayment.

Mr. ASPINALL. I think this is a good time to ask this question because I think the record should have it.

What happens to the central Arizona project after 2025? You testified the cost-benefit ratio is determined by the benefits figured over a 100-year plan.

The history of this area is such that we know that great irrigation systems were present in this area during the former civilizations.

What is there about the situation today which leads you to believe that the Government or the government in the area concerned will accept the responsibility of getting the additional water before the waters are entirely used up and there is no water to carry on the economy of what is one of the finest agricultural and industrial areas in the United States?

Secretary UDALL. Mr. Chairman, I want the Commissioner to comment on this a moment. I think this is indeed a very crucial question.

With regard to the first part of the question relative to the 30-year payout period of the Arizona project, the project has such a favorable cost-benefit ratio that, even assuming nothing is done with regard to an import to augment the overall supplies in the basin, the plan that we present here would still provide for payout even if the water were depleted.

Mr. ASPINALL. Mr. Secretary, I am not talking about the financial responsibility or feasibility of this project. We will get into that later on when we begin to study your revised figures you have placed before the committee. What I want to know is what will happen to this area if it becomes a water-short area, what will happen to this project?

Secretary UDALL. If we proceed on the assumption that nothing is done to alleviate the shortage, which has been discussed and which we consider to be the main fact of life in the region——

Mr. ASPINALL. And the further assumption that the upper basin is allowed to develop its potential under the terms of the Colorado River compact—considering those two things together.

Secretary UDALL. This is the other basic assumption. Then, assuming nothing further is done, I think the overall assumption one has to make—and I thought the most significant chart that was presented here by the Commissioner was the one that showed the entire area with the projected water shortages in red, and as far as this region is concerned it is already short, and the supplies provided for in the bills do not make up the shortage that exists—the whole future growth of the region, therefore, is imperiled and would wither. I think there is the broad conclusion one must draw.

Mr. DOMINY. The first thing that would begin to slow down, of course, would be agriculture, as shown on those charts. Our projections show, Mr. Chairman, that even after payout in the year 2030 there would still be 580,000 acre-feet per year on the average for the central Arizona project to divert. But by that time it is my judgment most of that would be needed for municipal and industrial purposes, and therefore one of the finest agricultural areas of the United States, with a 12-month growing season for the most part, that can adapt itself to whatever we need in our agricultural demands as a nation, would begin to dry up and would no longer be contributing.

Mr. ASPINALL. Of course, you figured it on the most favorable water conditions that you can figure for the central Arizona project. Now what if you take the most unfavorable water conditions?

Mr. DOMINY. If we use the projections, but with a minimum release to Lee Ferry of 7.5 million acre-feet annually, in other words, there would be no contribution from the upper basin to the Mexican Treaty, and using the projections of more accelerated development of upper

basin uses, by 1990 there would be only an average of about 400,000 acre-feet of water available to the central Arizona project, and this would reflect at about that level is the annual average throughout the overall payout period. So it would just mean that the agricultural uses in Arizona would begin to dry up that much faster.

Mr. ASPINALL. Then it is your position, with your new evaluation, that this 400,000 acre-feet of water, used for domestic purposes and sold at the price of $50 an acre-foot, as contemplated in your presentation, would make the project financially feasible?

Mr. DOMINY. That is correct, with the Marble Canyon Dam and the development fund revenues you would still have a feasible program, using the water for either agriculture or municipal and industrial purposes.

Mr. ASPINALL. You see, that is not what is bothering me. What is bothering me is, are we going to dry up a beautiful agricultural area as it was dried up once before.

Mr. DOMINY. I don't think so, because I think our society is a little more sophisticated. We have already controlled and conserved the floodflows on the river, and even that isn't sufficient for our demands. Therefore I think we will solve the problem either through desalinization or import. I don't think we will ever dry up this very valuable agricultural land with a 12-month growing season.

Secretary UDALL. I would like to add my own views to that, Mr. Chairman. I have been through quite an education during the last 3 years in this whole field. I think that the one thing that really has begun to emerge in the entire region is thinking in terms of future growth and in terms of preserving the present values that are there—and I am not just talking about the desert country, I am talking about the entire region. As far as the growth of this country is concerned, you have some of the most desirable areas for growth, and everyone agrees there will be growth. Therefore, I think that one can have, on the basis of what has been done up to this point, faith in the fact that, if enough people work together, if we have faith in our ability and our technology to take care of the needs, we can see to it that there is not only orderly growth but that we don't allow parts of our country to wither on the vine.

Mr. ASPINALL. I thank the gentleman from California.

Mr. JOHNSON. I am through.

Mr. ASPINALL. The gentleman from Oregon.

Mr. WYATT. Mr. Secretary and Mr. Commissioner, I would like to comment upon the obvious amount of very fine quality work which has gone into your reports and your presentation today. I would particularly like to add my compliments to those you have already received about the job that has been done in getting the diverse elements, geographicwise and otherwise, into agreement here. I think I don't have to tell you, Mr. Secretary, you still have a big job in this regard to do in the Northwest as far as augmentation goes from that source.

I may be a trifle repetitious in two or three questions that I put, but I want to make certain the record is crystal clear and that I am crystal clear on this. Would we be talking about this project here today without the prospects of augmentation of the Lower Colorado River system?

Secretary UDALL. I think the answer to that is yes.

Mr. ASPINALL. Will the gentleman yield?

Mr. WYATT. Yes.

Mr. ASPINALL. Only at the expense and with the use of the Upper Colorado Basin entitlement under the Colorado River compact.

Secretary UDALL. During the period in which——

Mr. ASPINALL. I don't care whether it is during that period or whether it lasts forever. That is the only way it can be done, because there is a shortage in the lower basin at the present time, if we consider only water to which the lower basin is entitled.

Secretary UDALL. I am proceeding on the major assumption of the 7.5 million acre-feet delivery and the contemplation of the assumption with regard to buildup in the upper basin depletion.

Mr. ASPINALL. I just want the gentleman from Oregon and new members of this committee to understand what is really involved here and why we are trying to make the record as meticulously as we can.

Mr. DOMINY. I don't want to leave it just there, Mr. Chairman, if I may. I agree that perhaps the project would not be being debated before Congress without certain assumptions and agreements. Nevertheless, we have just testified, sir, that it is a feasible project even without the imports, although the fact that we would be faced with drying up a good agricultural empire is not very——

Mr. ASPINALL. Mr. Commissioner, it depends upon the upper basin reservoirs filling and spilling water that cannot be used in the upper basin in order to assure the feasibility of this project.

Mr. DOMINY. This is very correct. But even after you have put all of your water to work—and we know that you cannot for at least a period of time—that has been taken into account in the justification of the project. That is true. But at no time have we figured we would be using water that is entitled to be used in the upper basin after the time the upper basin is capable of using it.

Mr. ASPINALL. That is right.

Mr. DOMINY. And there is no projection here anywhere based on that kind of thinking.

Mr. ASPINALL. That is the reason you presently have the close association and cooperation with the upper basin representatives.

Mr. DOMINY. That is right.

Mr. ASPINALL. But the fact is without that water which the upper basin is not using this project could not be here before Congress.

Mr. DOMINY. I agree.

Mr. WYATT. Now, my next question is this: Does Congress, by authorizing the Lower Colorado River project, make inevitable the agumenting of the water supplies in the Colorado River Basin from other water systems?

Secretary UDALL. Congressman, the obvious answer to that question, of course, is that this is a decision for the Congress itself. There are two or three different things that are being talked about. One is a conditional authorization. I think the chairman of the committee has very appropriately raised the flag that we would tend to raise about that.

There is the other step that may be taken, that of authorizing the type of comprehensive detailed studies that might be conducted and carried out by the Water Resources Council, or a National Water Commission, or by the Department. The ultimate decision on this, after

all of the alternatives are analyzed, and the committee has an opportunity to evaluate them would be that of the committee.

Mr. WYATT. Has the Bureau or has the Department any opinion as to the inevitability of augmenting the Colorado water system from other water sources?

Secretary UDALL. I think we have made the one major point: that when one looks 30, 40, 50 years ahead the entire region, the upper basin as well as the lower basin, will run into shortages and be in difficulty. Therefore, we think it is a major assumption that the prudent thing to do for the Nation, in terms of resource planning, is to look to augmentation, yes.

Mr. WYATT. Mr. Secretary, when we are talking about augmentation of the system, this means adding water somewhere in the system that will be used down the entire system, but added in a special part of the system. Possibly I may be wrong in this concept, but assuming that I am not, will you tell me what your views are concerning where in the system the water would be augmented, where the considerations are being given for augmenting water into the system?

Secretary UDALL. There are three import possibilities: desalting, northern California, and the mouth of the Columbia River. We think these are the most logical.

Mr. WYATT. Maybe you didn't quite understand my question. I understand these would be the sources of water for the area down there, but what I am talking about is where would this water be added to the system, at what point geographically?

Secretary UDALL. It would vary in each case. In desalting it might be from the Gulf of Lower California or on the west coast. In the case of northern California, this would likely be an input of water into the system below Hoover Dam or southern California. In the case of the Columbia River, this would probably be into Lake Mead through Oregon and Nevada.

May I say, if this were the alternative decided upon, undoubtedly there would be major new agricultural possibilities in eastern Oregon. In other words, Oregon would participate in a very major way in such a project.

Mr. WYATT. The reason I am asking that question is that, when you talk about augmenting the water supplies of the system and as one of the possibilities desalting, it seems to me that of necessity your desalinization plant would have to be right on the ocean right at the salt water sources, and it does not seem to me, as I visualize it, this would augment water into the system. It would help relieve what the system had to ultimately deliver.

Secretary UDALL. In terms of large quantities of water this is off in the distance. We are not saying this is something that can be done tomorrow. Let me be quite specific. Probably the most logical thing to do—because you are quite correct, you are not going to move water very long distances from the seacoast and do it economically—would be to divert desalted water from the Gulf of Lower California where the Colorado River runs into the ocean into, let's say, Imperial Dam. Even looking at technology 20 or 25 years from now, I don't think you could see doing it economically and moving it much further than that. I think we ought to be very frank about it.

Mr. WYATT. Is that about the only place you could put desalted water into the system?

Secretary UDALL. Even there you would not be producing water for agricultural purposes. You would put the water in there, but on an exchange basis Los Angeles or San Diego or the Phoenix people would pay for the water as municipal and industrial water.

Mr. HOSMER. Will the gentleman yield?

Mr. WYATT. Yes.

Mr. HOSMER. The amount of water of the metropolitan water district in the coastal plain eventually, when you get down to 4.4, is quite small, is it not, and therefore any exchange or desalting plant on the coast would be of small help. You almost have to get it in the gulf where you could get some water up to Imperial.

Secretary UDALL. I am being quite frank. It would seem to me this is the most logical source. I would like to say, also, we are not sure whether this is the most promising source. Indeed, it seems to us that the most likely thing, just on the basis of our ordinary commonsense in engineering, if you are going to augment, that the larger the size, the better—the cheaper the water in other words. Unless you are going to build a very large desalinization plant, this factor would tend to make desalting an alternative that probably has some limitations.

Mr. HOSMER. Mr. Secretary, it has very definite limitations as to augmenting industrial and domestic water of the Colorado system.

Secretary UDALL. Yes.

Mr. HOSMER. The industrial and domestic water on the coastal plains does not amount to much. I think it is around 500,000 acre-feet.

Secretary UDALL. I do not want to mislead the committee. We are not talking about desalting water for agricultural purposes, we are talking about municipal and industrial purposes.

Mr. HOSMER. And you are also, under this legislation, required to think in terms of not less than 2.5 million acre-feet, are you not?

Secretary UDALL. Under the terms of the legislation, yes. In fact, I would be quite frank to say, if you are going to get a broad plan of augmentation that will have benefits for everyone in the basin, I think you have to think in terms of at least 2.5 million acre-feet minimum.

Mr. HOSMER. Thank you.

Mr. WYATT. Mr. Secretary, with regard to other water sources for augmenting the Colorado River system, you mentional northern California and you mentioned what you called the mouth of the Columbia River, being below the location of Bonneville Dam. This is quite a long area, as you are undoubtedly aware. There are three congressional districts that border on the Columbia River below the Bonneville Dam, and my own district has the bulk of that area, and the people in this area, of course, are very interested in any planned point of diversion, the amount of diversion, and in various other aspects that are extremely important to the people in the Northwest.

I would like to ask you, in this connection, if the Bureau or if the Department has conducted any extensive studies on diverting the water from the Columbia River below the Bonneville Dam to the Southwest.

Secretary UDALL. Obviously, Congressman, we have not; we do not have any studies of any detail, otherwise we could present more facts to you. But I think, just from the standpoint of a very quick, rough reconnaissance, basically what engineers and reclamation experts

could gather from a study just of the bare bones of the thing, it is obvious that—there are many things that are very desirable about diverting from the Columbia below Bonneville. No. 1—as distinguished from northern California, for example, because, although there are two or three fine smaller rivers in the northern California, they don't have the quantity which you have in the Columbia—you could take 2.5 million acre-feet, for example, which is about 1.5 percent of the total water of the Columbia. The Columbia is the great river of the West, it is the great river of the country in a way. Therefore, could you take that quantity, you could take 1, 2, 3 percent of the water out of the Columbia River estuary without doing harm to the other values that are present. This is the type of thing you could study, and you could also study what benefits to the Northwest would be gained. I think the people in the Northwest might be surprised what you would come up with in terms of actual concrete benefits.

There are many alternatives that one could think of. Certainly, if you were going to move a large quantity of water out of the Columbia estuary, it would make a great deal of sense to drop a lot of that water off and to have a major project in eastern Oregon, for example. So we do not know, except in the very general way in which I am describing it, what we would come up with, but we know the answer is, on the surface of it, very attractive.

Mr. WYATT. Mr. Secretary, you are probably aware of this, and to make certain it becomes a part of the record in these proceedings, the Oregon Legislature has appropriated funds, in fact approximately $230,000, to conduct a study of the water requirements of the State of Oregon and all of the problems in connection therewith during the next 100-year period. This study will be completed by 1970 as presently anticipated. Any study that you conduct pursuant to this proposed legislation probably would not be completed, unless there is a very urgent mandate to you by the Congress, prior to that date. Is that a fair assumption?

Secretary UDALL. I would assume, of course, if a study of this kind were launched we would work very closely with the States, as we always do. They would have an opportunity to review anything the way they always do, and that there would be the fullest kind of cooperation. I think the people of Oregon, for example, would have an opportunity to ask themselves what the alternatives were as against, on the one hand, leaving things the way they are, and what benefits are there in taking a very small portion of the water and using it in eastern Oregon. So you would have an opportunity to analyze the advantages and benefits of both alternatives.

Mr. WYATT. Your present cost-benefit ratio and your present financing is based upon the present water supply without augmentation. Is that correct?

Secretary UDALL. This, of course, is the plan we are presenting——

Mr. WYATT. That is my understanding.

Secretary UDALL (continuing). With the qualification the chairman made.

Mr. WYATT. Yes, with the qualification Mr. Aspinall mentioned.

If there were augmentation by reason of diversion from the Columbia River at any point, then the cost for that water as delivered in the

Southwest would have to be borne, of necessity, by the water users, and it would not necessarily be tied into this plan. Is that correct?

Secretary UDALL. It would be borne by the water users and the people of the region. This is the reason we are establishing a basin account. If the upper basin participated, they, through their basin account, might participate in it also. These are the things we don't have the answers to.

One would assume, also, that, if part of the water were used to enhance industry and agriculture in parts of Oregon, that people there would follow the tradition in reclamation and pay for their appropriate share.

I want to make one other point very clear to the Congressman from Oregon, and that is I don't think we would contemplate, I don't think we do contemplate at this time, if it turned out that the Columbia River were the best source in terms of our analysis, that any plan would make sense unless you looked at the State of Oregon and determined what the wisest use of some of the water was there. We are not just talking about a straight augmentation of the Colorado River as an objective. I think that this would be a very important part of such a study.

Mr. WYATT. Mr. Secretary, I would certainly agree with you there. I would like to ask either you or Mr. Dominy, or perhaps your counsel, whether or not you believe the provisions of title IV in the bill, having to do with the development fund, basin account, so to speak, would be presently available once this bill passed in its present form to finance building transportation facilities for water from the Northwest to the Colorado River area.

Secretary UDALL. Congressman, I would have to explain, as quickly as I can, how the fund would work. If Congress authorizes such a fund, then it would set up the ground rules. As provided in the bills before you there would come into the fund payments for water and for power and all of the various revenues that arise out of the project. As you could tell from Commissioner Dominy's testimony, there would be, under the plan we propose, a surplus built up.

There is one big asset that the people of the lower basin have that the upper basin does not have. We have the big Hoover Dam that is about half paid out. It is in its 26th or 27th year. It's approximately on schedule in terms of payout, and this, 25 years from now, becomes a tremendous asset for the entire basin, and it can be the financial dynamo to help pay for the import program, for example.

Mr. ASPINALL. If the gentleman will yield, I think we had better keep this straight. Under this proposal we have before us at the present time, without Bridge Canyon and its power revenues—this is a very important part of what is in this project—we must use the revenues from Hoover which will be less from now on. They will be less from Hoover than they have been heretofore because of filling the upper basin reservoirs until 1975 or whenever that date is.

Secretary UDALL. 1987.

Mr. ASPINALL. That is when Hoover pays for itself. But we are counting on those revenues, whatever they may be. Hoover pays for itself even though there may be less power from Hoover Dam because of less water. They have been releasing from Hoover, if I remember correctly, about 8,500,000 acre-feet of water annually. It may be less

in the future. But these funds from the existing power system, after full repayment of existing obligations, are pledged by this legislation that is now proposed, without Bridge Canyon, to the repayment of the cost of construction and operation of central Arizona project or the Lower Colorado River project.

Mr. DOMINY. Our studies that I have given you were based on the fact that there will be less water put through Hoover as the upper basin develops, and our projections have all taken that into account. We would build up a surplus if no expenditures were made for an expensive import program. But if there was to be an expensive import program, there would then need to be Bridge Canyon Dam and other revenue-producing elements in order to show economic payout of the imports.

Mr. ASPINALL. I will pursue this on my own time.

Mr. WYATT. I just have a couple more questions. I am sorry to take so long, Mr. Secretary and Mr. Chairman, but this is important for my area, as I am sure you know.

Mr. ASPINALL. That is all right.

Mr. WYATT. I think the question I wanted to put to you is this: In connection with the specific bill before us, and we will take Congressman Udall's bill specifically, under this bill I would like to know whether or not, if this bill becomes law, the development fund money set up could be used to construct and to build transportation facilities for water from the Northwest to the Southwest without additional authorization by the Congress.

Secretary UDALL. The answer is no; there would have to be additional authorization, of course.

Mr. WYATT. And, of course, appropriations in addition to that?

Secretary UDALL. That is right.

Mr. WYATT. One other question. In connection with the use of the water for irrigation in the Southwest, could this water be used for irrigating price-supported crops? Is that exemption in this bill?

Mr. DOMINY. There wouldn't be any validity for that exemption in this bill because we are not going to irrigate new acres. Water service is going to be limited to acres already under irrigation. If they already have a base for the cotton, or another supported crop, that would already have been established, and the limitation, where Congress has put it in, has always applied to new lands being brought in. So it wouldn't be applicable in this case.

Mr. WYATT. Mr. Commissioner, one of the arguments I have heard used and, in fact, I have used it myself, is that, if you can turn land from producing crops that are supported into crops that are not supported you are not using tax money more or less in competition with financed crops.

Mr. DOMINY. As I pointed out in the one chart we showed you, and it is in the brochure attached to my statement, a very small percentage of the acreage is devoted to cotton in terms of present use.

Mr. WYATT. I noticed the figures.

Mr. DOMINY. This project, of course, will sustain an existing agriculture economy and keep it from declining as rapidly as it would without the project. But even with this project it is on the downhill as far as agricultural use is concerned.

Secretary UDALL. May I make one other observation on a timely subject? That is, this is an area of high productivity. The cotton

farmer can raise more cotton per acre here than almost anywhere in the United States. In terms of the cotton legislation passed by the Congress last week, the whole trend in this area will be to move out from under the support program rather than to come under it.

Mr. WYATT. I thank you, Mr. Secretary and Mr. Commissioner. I yield back my time.

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

Mr. UDALL. Mr. Chairman, in view of the hour I hate to take time but, as the chairman probably knows, this is a matter of some considerable interest to my State.

Mr. ASPINALL. The gentleman can take all of the time he thinks necessary because these people can come back here at any time later.

Mr. UDALL. I think I can cover my points in 10 or 15 minutes.

Let me just assure my friend from Oregon, so the record is very clear, the production of cotton and the acreage devoted to cotton in Arizona is going down, and this is the only price-supported crop of any consequence which we grow in this State. There are men right here in the room who are growing substantially less cotton acreage today than they were before because the water supply has diminished. If the additional water supply works in the project were in operation tomorrow morning, the number of acres devoted to cotton in Arizona would still go down because we are simply trying to save a part of the acreage we have, far from putting any additional acres into production.

The chairman of the committee mentioned earlier what would happen if we didn't get the water in Arizona, and we are going to show you tomorrow, with our Governor, some pictures of areas that some of the members of this committee have already seen, where homes have been abandoned, wells shut down, and communities have had stores closed, and many of them are really sick. We have a serious situation there we hope we can do something about in this legislation.

I want to commend both of these witnesses. I have known them both a long time, one a little longer than the other. I think they have made an excellent presentation here today. I think the thrust of their testimony and the approach of my bill and the other bills is that the easy water projects in this country have been accomplished, the nearby lakes, the nearby rivers have been tapped in all sections of the country. From here on out we are going to have to think big, we are going to have to think in terms of big projects that provide for the growth and prosperity of this Nation.

When I think that, with the amount of money the Defense Department will spend between now and Labor Day in just the next couple of weeks, we could make this river whole, we could put the Colorado River back where people thought it was when the great divisions and allocations were made, and when we made a very generous agreement with Mexico, I think it would be money very well spent in the interest of the future of this country.

There is one point I want to really nail down here because it came up this morning, and I hope if my colleagues get nothing else out of my examination at these hearings today they will get this one fact straight. We are all agreed there is going to be a shortage in the Colorado River Basin sooner or later. Some say sooner and some say 10 or 15 years later, but the shortage is going to come.

Mr. ASPINALL. Will the gentleman yield?

Mr. UDALL. Yes.

Mr. ASPINALL. He would agree there is a shortage in the lower basin at the present time, and with the upper basin developed potentially as it may be developed some time the shortage will come in the upper basin.

Mr. UDALL. The gentleman is entirely correct, and I certainly concede that point.

Now, you have testified—I want to make this clear—that, assuming we have no importation at all, assuming that we built the central Arizona project, assuming that the upper basin uses, as we want them to use, as soon as they can, their full entitlement under the compact, and have all of their legal rights to water and to put it to use, and assuming we take out Bridge Canyon Dam, as the Bureau of the Budget has suggested, with all of the revenues that it would put into this fund, and assuming that we take, not optimistic water projections but conservative water projections, this project will still pay back, will it not, to the Federal Government on schedule in a 50-year payout period, the cost of the project?

Mr. DOMINY. That is correct, sir.

Mr. UDALL. And, as a matter of fact, there are two factors here that I think my colleagues may not be fully aware of. Correct me if I am wrong. One of them is, if we get a pinch in the central Arizona project and eventually we don't have their full supply of water, the 1.2, as was indicated earlier, the use to which the water we do have will be put will be industrial and municipal, which is $50 water instead of $10 water in the case of a full supply used in large part by farmers.

Mr. DOMINY. That is correct. This is the trend already underway in Arizona and it will continue.

Mr. UDALL. Now, the second factor is it costs money to pump this water out of the river, assuming our project is built, and to lift it over the hills and run it down to Phoenix and Tucson. If your aqueduct is short, if the upper basin is using their water, and we have dry years and the aqueduct is short, while you don't get all of the revenues you might get from the farmers, you don't have to spend as much money for electrical pumping energy to lift that water over the hills.

Mr. DOMINY. That is correct.

Mr. UDALL. So that in the project that is before this committee, if we are short of water for the central Arizona project in 1990 or 1995 or 2000, the project is not just feasible, it is not even less feasible than otherwise; as a matter of fact, it is more feasible and has a better cost-benefit ratio in that circumstance, does it not?

Mr. DOMINY. I wouldn't say it has a better benefit-cost ratio. As a matter of fact, the benefit-cost ratio declines as the availability of water declines, but not in direct proportion, and to that extent I agree with you; that is, as we reduce the operating cost, then we have greater revenues to pay off the capital cost.

Mr. UDALL. We have had some discussion here today of so-called conditional authorizations. Is there any precedent that you are aware of, Mr. Commissioner or Mr. Secretary, for this kind of an act by Congress?

Mr. DOMINY. There have been some precedents on conditional authorization in the past, but never anything in the magnitude here

discussed unless it would be the assumption by Congress of the burden to stop the floods on the great Mississippi and Ohio streams, or our commitment to go to the moon regardless of cost. At the time we took of those burdens I am sure no one had valid estimates of what the total cost would be. So there, in effect, was conditional authorization.

The Curecanti project was a conditional authorization as part of the Upper Colorado storage project. That was just the three dams on the Curecanti were conditional on the secretarial finding that benefits would exceed costs.

Mr. ASPINALL. If the gentleman will yield, just so the record is clear, construction was conditional only on the question of economic feasibility, which was determined when the Congress was willing to give it the benefit of the interest rate in the Water Supply Act of 1958.

Mr. DOMINY. That is correct. It was a conditional authorization of a very special nature.

The Sacramento Canal unit of the Central Valley project was a conditional authorization. But, as I say, there has never been a precedent of the magnitude we are prospecting about here that I know of.

Mr. UDALL. Mr. Dominy, let me go to another very important aspect of this for the State of Arizona. The central Arizona aqueduct that would take water out of Parker Dam and run it into the central part of our State, under your planning, would be built at what capacity?

Mr. DOMINY. 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.

Mr. UDALL. To deliver the 1.2 million that Arizona is entitled to under the act of Congress, would this capacity that you have designed have to be running every day, 24 hours a day, to deliver that much water a year?

Mr. DOMINY. Not quite that much, but it would have to be, in order to deliver 1.2 million, in use a pretty good share of the time. For 11 months out of the 12 it would have to be occupied with water flowing up to its capacity.

Mr. UDALL. So it is practically fully utilized?

Mr. DOMINY. Yes.

Mr. UDALL. Let me give you three problems that might occur as a preface to some other questions. We have some tree ring experts in Arizona who have gone back a thousand years. I am sure you have seen these studies of what widely divergent flows we have had, and the actual stream recording back 70 years. And as you testified, we have had wide fluctuation of the riverflows. Some of our best experts tell us that, based on computers and any kind of long-range studies, we have gone through about a 30-year very dry cycle, and if the history of the river means anything we might be headed into some fairly wet cycles. Can you foresee, first, any possibility that in the next 25 or 30 or 40 years all of the present reservoirs on the Colorado River might be full.

Mr. DOMINY. Indeed I can. As a matter of fact, 1965 is turning out to be a very good year. The river still is flowing at a very fine level, approximately the same as it was flowing this time of year when we had that real good year of record. This may be the start of the new cycle. If the 1920 cycle were to repeat itself, we would have

spills from the Colorado River system beyond what we could divert out of an 1,800 second-foot canal for the central Arizona.

Mr. UDALL. And the water would simply go into the ocean unused and lost?

Mr. DOMINY. Correct.

Mr. ASPINALL. If my colleague will yield, I want to keep this straight. Your statement, Mr. Commissioner, representing the Bureau of Reclamation, does not show you can depend upon the flow.

Mr. DOMINY. No, sir.

Mr. ASPINALL. They show an irregularity of cyclic droughts or production of water. Is that correct?

Mr. DOMINY. That is correct. I certainly did not mean to imply I based my judgment on tree ring studies, as minute as they are, in terms of the total drainage basin of the Colorado. But based on the hydrology of record. If 1965, for example, was the start of a period such as we had in the twenties—let's put the water chart up there again—we would fill all of our reservoirs, and we would have spill greater than we could divert with an 1,800 second-foot canal.

Mr. ASPINALL. Would you have it before 5 years?

Mr. DOMINY. That is right, in about 5 years—if 1965, for example, were converted back to a period in the twenties that started that wet cycle, and it could very well be the start of that cycle.

Mr. HOSMER. Will the gentleman yield?

Mr. UDALL. I yield.

Mr. HOSMER. It does not show a cycle, it just shows irregularities, does it not?

Mr. UDALL. The black line——

Mr. HOSMER. Some years you get a lot of water and some years you don't. How do you strike a relationship?

Mr. DOMINY. You see a period of years there, in the 1920's, Mr. Hosmer.

Mr. UDALL. The black line is the 10-year cumulative flow and does show some general ups and downs, in my judgment.

Mr. HOSMER. In other words, the tree ring studies and the tea leaf studies are both the same.

Mr. DOMINY. The actual recorded flows on the river indicate you can get a series of 10 or 15 years of above average rainfall and runoff.

Mr. HOSMER. If you are myopic enough when you look at them.

Mr. DOMINY. Please look at it, sir. You can see for yourself in the twenties there were many more years above the average than there were for the last 20 years.

Mr. HOSMER. If you want to start some arbitrary place, you can get some arbitrary cycle if you conclude at an arbitrary place. But you haven't got enough to give you any cyclic information, have you?

Mr. UDALL. Let me assure my friend from California I am not relying on tea leaves or tree rings or anything else. I brought this out as a sort of a side issue and I am sorry I kicked off such a fuss.

Mr. HOSMER. Let me say to my friend from Arizona, between him and his brother I am getting a little lukewarm on this project. It started out here as a massive plan to take care of a basin, not only the lower basin but the upper basin, as a way to get enough water for everybody. And to just focus on the central Arizona and paying off without one dam, that is not the project as I conceive it. I am looking

for augmentation of the water supplies there and taking care of seven States, not one.

Mr. UDALL. So am I. This is the major thrust of what I am trying to do.

If I may continue, if your reservoirs were full and you were spilling, there would be no way in the world to send any more of that water into Arizona with the canal?

Mr. DOMINY. Not with an 1,800 second-foot canal capacity.

Mr. UDALL. I might say at this point, Arizona is in an unusual situation. Mother Nature puts back a million acre-feet a year into the ground, and if we could let the wells rest a year or 2, we might rebuild our underground water supply, and perhaps we could do it in this one contingency that I just brought up if we had additional canal capacity.

The second thing I want to raise is this: Suppose we do get the kind of import program which is the answer, in my judgment, to the needs of all these seven States, central Arizona could not benefit from that import program in case we develop large additional supplies for the basin with the aqueduct as now designed. Is that true?

Mr. DOMINY. That is correct.

Mr. UDALL. The third fact: We are trying to make this project as feasible as possible and to put as much money as possible into the basin so we can pay for it. Is it sometimes cheaper and better and raises more money for the importation of water and for the health of the basin fund to use off-peak pumping power that is available and really ram a big quantity through that aqueduct while you can, and then let it rest when you need the power for purposes where it will produce you more money if you sell it?

Mr. DOMINY. Yes, we have made some studies since our proposal was wrapped up and submitted as the administration-sponsored plan, because of all the estimates by others of the water supply picture and because as the plot unfolded there was agreement reached between Arizona and California that California would have the first call on 4.4 million acre-feet along with existing uses in Arizona and Nevada with the central Arizona project taking the first cut if there was not enough water in the river. We can support factually the justification for a larger canal that would guarantee the yield of greater water supplies at less cost as compared to benefits over the long pull, but this would be different than what has been presented to the Bureau of the Budget and has been sent to Congress.

Mr. UDALL. Once you build the aqueduct at 1.2 million, there would be no way in the world to enlarge the capacity of it. Would you not have to parallel it?

Mr. DOMINY. You would have to parallel it with the second canal. If you ultimately expected the need for a larger aqueduct it would be much more economic to build it to the larger capacity in the first instance.

Mr. UDALL. Would you say it might be a very small percentage of the additional cost to build it larger in the first place than it would be to parallel it later on?

Mr. DOMINY. We have made some preliminary estimates merely for our own edification, as to what a 3,800 second-foot granite reef aqueduct would cost. It is roughly $140 million more expensive as compared to the 1,800 second-foot canal.

Mr. UDALL. Would the project still be feasible?

Mr. DOMINY. Yes, it would be more feasible as far as the benefit-cost ratio is concerned. It would improve the benefit-cost ratio because we 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.

Mr. ASPINALL. I want to be sure he is talking about production of power at Hoover.

Mr. DOMINY. I was speaking in terms if we were to build a larger granite reef aqueduct and add approximately $140 million additional cost to the project which is now before you for consideration, absent bridge, we could get an average yield over the payout period in the neighborhood of 400,000 acre-feet of water additional to that which we could put into the central Arizona project area with the 1,800 cubic feet per second canal.

Mr. ASPINALL. The gentleman from Arizona was premising his remarks on securing revenues from the production of power. I wanted to know whether the power was to be produced at Marble or at Hoover or at a powerplant between there and the place of final use.

Mr. DOMINY. Your understanding and mine as to the import of his question differs. I thought he was asking specifically about the additional water supplies and costs involved in the enlargement of the central Arizona canal.

Mr. UDALL. I was talking in general terms, Mr. Chairman. It is obvious that electricity has to be used to lift this water out of the river and into the aqueduct. I was saying there might be times when you would want to use that power, wherever it is, on an offpeak basis to do the pumping, and then go back and use it for peaking power to bring a lot more money into the fund.

Mr. HOSMER. You are selling this water, then, as agricultural water, and the profits are not really great on it. You are not really netting your project anything, are you?

Mr. UDALL. This is another factor in the equation, of course, and I was merely asking the Commissioner his opinion as to the feasibility and the benefit-cost ratio based on these hypothetical questions I was raising.

Let me assure my colleagues as I leave this subject, particularly my friend from California, that we are anxious for water and we will take the aqueduct at the capacity provided for in the current studies, but I think we want to call to the attention of my friend that we are looking down the long road. We are talking about imports. We are talking about a part of the country that is 2½ million acre-feet short of its water needs now, without any additional population growth. At the proper time I may want to suggest to the committee and my friends in all the seven States that this is one thing that might be considered, and I think it is to their advantage as well as ours to take a look at it.

A related question, Mr. Dominy: Marble Canyon Dam as now designed in your study is at what hydroelectric capacity?

Mr. DOMINY. We have been contemplating 600,000 kilowatts of capacity, which would correlate it very closely with the output at Glen, considering the same water releases at Glen with the lesser head at Marble.

Mr. UDALL. This would be a run-of-the-river, so-called, hydroelectric plant, rather than a peaking plant?

Mr. DOMINY. No. It would be peaking to a considerable degree. We would design the plant for about a 38-percent load factor.

Mr. UDALL. Would it be possible to design and operate Marble as a straight peaking plant and thus get more revenue?

Mr. DOMINY. It is possible. This brings, of course, additional problems because of the stretch of the river between Marble and Lake Mead, as to what would be a reasonable surging and variation in flow. Bridge Canyon is really the ideal peaking structure because we have Lake Mead immediately below it and thus, no matter how widely you fluctuated the discharge at Bridge Canyon Dam, it would immediately be leveled out and absorbed in a huge reservoir immediately below it.

Mr. UDALL. Could not a toe dam, or small structure below that, level out the flow without the great additional cost, which would be many times repaid in additional revenue from peaking?

Mr. DOMINY. This subject is currently being reviewed in the Department as to whether or not a so-called afterbay structure would be desirable from an esthetic point of view. The Park Service has been approached as to its views. I have had the Bureau's chief engineer run a preliminary reconnaissance estimate concerning a possible afterbay dam. We had some geologists on the river during the high flows to study that prospect.

There is a site directly above the boundary of the national park where an afterbay dam could be provided to help level out the flows of the river.

Mr. UDALL. Let me hit just a few more things, and then I shall terminate my questions. I am sorry our friend from Pennsylvania is not here today. I do not want to steal his thunder.

There was some talk, apparently, of a study in which you used Hughes Aircraft Co. Can you tell us in just a few sentences why you had this summary made and summarize the conclusions, and if he wants it put in the record later on, I would be happy to do it. I am reluctant to do it in his absence.

Mr. DOMINY. Yes. This proposed project involving additional dams on the Colorado River has stirred up perhaps more controversy in advance of congressional hearings than any project in the 20 years that I have been identified with reclamation.

In answering questions about the feasibility of hydropower as contrasted to mine-mouth steampower it seemed that some of these correspondents were not prepared to take my judgment. So, I arranged for a private review by a competent firm that indicated an interest in undertaking the study. We contracted with the ground systems group of the Hughes Aircraft Corp. to give us an independent judgment to avoid charges of self-interest, as to the Bureau's views on Marble and Bridge Canyon Dams.

The conclusions of the studies made three points: No. 1, that water resource development should be evaluated as a system, that is, each component should be studied, not as a separate entity but, rather, its effect on the total system should be studied.

Second, that Marble Canyon and Bridge Canyon Dams are economically and financially feasible power developments. The facts reported indicated the Bureau of Reclamation has been extremely con-

servative in placing values on peaking power produced at these structures.

Third, that the recreational aspects of these reservoirs may outweigh even their tremendous power potential in their total effect on the economy of the area.

The results of this study have confirmed our own investigation and the technique of using a development fund as one measure of system application to financial analysis.

Mr. UDALL. I think this is essentially what I wanted. As a result of this outside independent study, I take it, then, the conclusions and recommendations you made to this committee are strengthened and confirmed, rather than shaken?

Mr. DOMINY. That is correct.

Mr. HOSMER. Did you say you had this thing limited to Marble Canyon?

Mr. DOMINY. We asked them to focus particularly on Marble as the study unfolded, since during the study the Budget Bureau recommended the deferment of Bridge Canyon Dam, but they had already incorporated a lot of information about Bridge Canyon in the study.

Mr. HOSMER. I read their conclusion: "The Bridge Canyon and Marble Canyon Dams will be built, as will the remainder of the water resources development system, in the configuration proposed by the Pacific Southwest Water Power. The dams will be built because in concept they help solve an inescapable problem of financing. When Bridge and Marble will be authorized for construction is an open question," they wisely add.

Mr. UDALL. The Secretary has been rather silent for a while, and I will throw him a question. We have had a lot of mail in my office, and I suspect my friends are in the same position, asking why in the world we cannot use fossil fuel plants and thermal plants for the water problems of this 7-State region. Would you care to comment on this? Why can we not eliminate both?

Secretary UDALL. The obvious answer to that is that traditionally, since the beginning of the reclamation program, it has been keyed to water development and hydroelectric development. What is being proposed by those who make a proposal of this kind is that there be a completely new departure which obviously would be highly controversial and which obviously would in itself be something that would be debated at great length.

So, one cannot say that this perhaps is not an alternative. It is. But it would be something that would require a complete change with regard to the whole traditional reclamation program.

The truth of the matter is that in this very region the west group, which consists of public and private utilities, is looking at a whole series of coal steam-fired plants, and some of these are going to move forward. They are going to move forward on what I think will be a very good basis for the entire region. I think this is the real answer to that argument.

Mr. UDALL. Mr. Dominy, the Congress has been quite generous with our American Indians, and we heard some testimony earlier about the possible benefits in this bill for Indian tribes. Could you very quickly tell us, are there any such benefits, and what would they consist of?

Mr. DOMINY. I would like to ask Dan McCarthy, of my planning staff, to answer that, if I may.

Mr. MCCARTHY. Mr. Udall, water supply for the central Arizona unit would provide water to Indian reservations within the area, and $20 million of the total central Arizona unit cost would be to provide irrigation distribution systems to permit the Indians in the central Arizona service area to utilize water.

Also, the Orme Dam is proposed as one of the major regulating structures at the end of the Granite Reef aqueduct. It would provide great recreation benefits for two Indian tribes.

Mr. UDALL. With reference to Orme Dam, some of the Indian tribes have indicated they do not want that dam unless particular arrangements are made. I have assured them if they do not want the dam on their reservation, it certainly will not be built.

As I understand, the function of this proposed structure is merely a bucket or a pool at the end of the aqueduct where you could store the water if you have a heavy rain or do not need it at that minute and you have a little bit of what is known as terminal storage. Are there other sites in the Salt River Valley where we could have along the aqueduct terminal storage facilities in the event the Indians decide they would rather use the reservation for some other purpose?

Mr. MCCARTHY. Yes, sir; there are other alternative sites. However, one of the major functions of Orme Reservoir would also be to provide major flood protection in the Phoenix area.

Mr. UDALL. If we took an alternative site, we would lose that advantage.

Mr. MCCARTHY. We would not get as much flood control from alternative sites.

Mr. ASPINALL. I want to be sure I understand what the gentleman is talking about, because I have a note here. As I understand it, Mr. Dominy's statement shows feasibility without Bridge Canyon. I do not find anything at all for the Indians. All that I find as far as facilities are concerned are Marble Canyon project, water salvage and recovery project, central Arizona project, and recreational, fish and wildlife. Is this right, or have I been misled about this? I know that in the Pacific Southwest water project you did have the Indians included. I want to be sure we are talking about the same thing.

Mr. MCCARTHY. In the Pacific Southwest water plan we had $10 million for Indian projects, mostly along the Colorado River, but there is existing authority already to construct those projects under basic Indian laws, and they are not included in the bills now before you.

Mr. ASPINALL. Are there facilities in the Lower Colorado River Basin project for the Indians? I do not want to get into this project any idea that it is an Indian project. This has worked very well in years past, but I do not want the Indians to be misled and I do not want the members of this committee or the Congress to be misled.

Mr. DOMINY. Permit me to file a statement with the committee, taking this from what we proposed in the Pacific Southwest plan and comparing it with what we propose now insofar as the Indian participation is concerned, so it will be crystal clear.

Mr. ASPINALL. All right. Unless there is objection, the request will be granted and the information will be put in the record.

Mr. DOMINY. Thank you, sir.

(The information follows:)

PROVISIONS FOR INDIANS CONTAINED IN LOWER COLORADO RIVER BASIN PROJECT AS COMPARED WITH PROVISIONS CONTAINED IN PACIFIC SOUTHWEST WATER PLAN AS PRESENTED IN REPORT OF JANUARY 1964

Direct costs for Indian lands are as follows:

	Pacific Southwest water plan, January 1964	Lower Colorado River Basin project, August 1965
Central Arizona unit: Distribution systems on Indian lands (San Carlos irrigation project and portions of Gila River, Ak Chin, Papago, Salt River, Fort McDowell, and San Xavier Reservations)	$19,970,000	$19,970,000
Indian irrigation projects:		
Colorado Indian irrigation project	7,500,000	(1)
White River irrigation project	2,175,000	(1)
Total	29,645,000	19,970,000

[1] Already authorized under existing legislation.

In both plans, water from the central Arizona unit would be available to serve Indian lands. The extent of such service will depend on future negotiations.

Bridge Canyon, Marble Canyon, and Orme Reservoirs would inundate lands on Indian reservations. Compensation for these lands must be negotiated, taking into account the rights and interests of the Indian tribes involved.

Significant fish and wildlife and recreation benefits would be provided from these same three reservoirs and their effects on the local Indian economies are expected to be marked. There undoubtedly will be opportunities to allow the Indians to reap these benefits by means of concessions along their right-of-way.

Construction of the Lower Colorado River Basin project undoubtedly will present major opportunities for employment of Indians.

Mr. ASPINALL. The gentleman from Arizona.

Mr. UDALL. One final line of questions. Part of the basin concept, Mr. Dominy, is that you take a basin fund which develops a region, and the costs of a great variety of projects in that basin are paid for out of the common fund.

Mr. DOMINY. That is correct.

Mr. UDALL. In some cases you may have a project which is highly desirable and helps a community or an area in real need. That project standing by itself may not have the hydroelectric sites or the particular payout features that would make it feasible, and yet you can put it in the basin fund and actually construct it and do the good things that are needed to be done.

Mr. DOMINY. That is correct. That is the very fundamental principle of the Colorado storage project, the Missouri River Basin, and the Central Valley.

Mr. UDALL. There is in the bill now a dam in western New Mexico called Hooker Dam.

Mr. DOMINY. Yes, sir.

Mr. UDALL. We have had a number of conversations and discussions, and this dam would have substantial benefit for the area.

Is this Hooker project standing by itself a feasible project?

Mr. DOMINY. No, sir. It would have to be embraced as part of the basin plan to be considered a feasible undertaking.

Mr. UDALL. What is the capacity of Hooker Dam as now designed?

Mr. DOMINY. The proposed dam that we have in the plan is for a 98,000-acre-foot structure.

Mr. UDALL. Would New Mexico be able to utilize or obtain more water through exchange if we eventually get imports into central Arizona from an import scheme that would give us more than our 1.2 for the aqueduct?

Mr. DOMINY. Actually, this reservoir at the site that we have proposed would be for the purpose of providing reregulation and a little more security to existing uses, rather than for any expanded uses for any purposes other than recreation and fish and wildlife.

Mr. UDALL. But if we were to work out eventually a larger import scheme for the benefit of all the seven basin States, it would be feasible at some future time, I assume, to exchange water downstream and to give New Mexico some enlarged uses in the neighborhood of Hooker Dam, if it were desired?

Mr. DOMINY. Yes; I think this might be possible.

Mr. UDALL. I want to work with our New Mexico friends and help resolve their problems there. I hope we can do this in the course of this legislation.

I undoubtedly should take up some other matters, Mr. Chairman, but I think this covers the major points.

Mr. ASPINALL. I would like to ask, Do you have any planning report such as you usually send to Congress for the Lower Colorado River Basin project as recommended? That planning report always contains basic information which we use in evaluating the studies and the recommendations made.

If you do not have it, I think you ought to come up with one as soon as you can.

Mr. DOMINY. Let me answer this way, Mr. Chairman: The whole package that has come to your attention, starting with the Southwest water plan proposal, does represent, I think, the total information that would normally be incorporated in the type of report you inquire about.

Mr. ASPINALL. Why do you not put it in a volume between two covers, front and back, so we can have it. You are asking us to take a lot of information which more than likely is perfectly all right, but for us to assemble that and make our decision from this is, I think, asking something that you have not asked of this committee since I have been a member of it.

Mr. DOMINY. I think that is right, Mr. Chairman. It is just that this has evolved with so many changes as we went along that we have not ever rewritten it and put in in the final package that you describe.

Mr. ASPINALL. I am a firm believer in evolution, but I like to see what I am the father of.

Mr. DOMINY. We do have a separate report on each feature which we can put together in one volume.

Mr. ASPINALL. We would be glad to receive it.

The gentlemen from California.

We are going to go until 5 o'clock, and then we will recess.

Mr. REINECKE. On the subject of availability of water, I would be interested in hearing from the Secretary as to his plans regarding the administration in the event of shortage below the 7.5.

Secretary UDALL. In the lower basin?

Mr. REINECKE. Yes.

Secretary UDALL. We would administer the water availabilities in accordance with any terms that might be laid out in this legislation and in terms of the basic compact between the three States. That is the only answer I could give you.

Mr. REINECKE. Is it your intention to respect the present perfected rights prior to the central Arizona project water?

Secretary UDALL. The amendment that represents the main Arizona-California compromise here with respect to priorities I think is in essence an alteration of the agreement previously entered into between the States; and as such, if the Congress desires to enact this as a compromise, this is what we would observe in terms of priority allocations.

Mr. REINECKE. Perhaps I do not understand the amendment, but in the event we are below 7.5 and on the assumption that the 1.2 for the Central Arizona project is within the 2.8 presently allotted to Arizona, will that 1.2 be diminished prior to the diminishment of the 4.4 for California?

Secretary UDALL. If this amendment is enacted, the answer is "Yes." The purpose of it is to give California's present uses priority.

Mr. REINECKE. If we import water to increase the river at Lee Ferry or below, what effect do you feel this will have on the upper basin States?

Secretary UDALL. I think it quite obvious that the logical beginning of an import program is to take care of the Mexican Treaty. This is not only the main bone of contention or point of dispute between the upper and lower basins, but it is the one paramount responsibility that the U.S. Government has undertaken as a solemn obligation with a neighbor country.

Mr. REINECKE. You mean that you would consider renegotiating the compact to relieve some of the 7.5 downstream obligation of the upper basin?

Secretary UDALL. Not at all. You would take care of the Mexican Treaty amount, which is 1.5 million acres, as a first and paramount obligation.

Mr. ASPINALL. What is involved here is interpretation of surplus water, whether or not the water of the Gila River is considered as part of the flow of the Colorado River Basin. The upper basin says yes. The lower basin says no. This is where we get into difficulty and controversy over this 750,000 acre-feet of water from the upper basin to deliver as a part of the commitment to Mexico.

The Secretary is saying if we could bring into the basin 2,500,000 acre-feet of water, this would immediately solve that particular situation and it would leave 1 million acre-feet to overcome losses in the lower basin.

Does my colleague understand that?

Mr. REINECKE. Yes. Thank you.

Would you anticipate that any water imported in excess of the 1.5 million would be divided between the upper and lower basins?

Secretary UDALL. It would be up to the committee to decide that.

Mr. REINECKE. This is why I asked if you anticipated renegotiating the Colorado River Compact.

Secretary UDALL. I do not think you renegotiate the compact. I think you decide what you do with new water, that is all.

Mr. REINECKE. To the extent that the upper basin is required to release 7.5 to the lower basin, if sufficient water were imported it might be that some of this obligation could be released.

Secretary UDALL. My own judgment is that the best way to develop an import program, the fairest way to approach the whole problem is to try to solve the problems of the entire basin and, therefore, everyone should share in the benefits and share in the obligations. It would be done for the benefit of all concerned. I think this is obviously the very best approach.

Mr. REINECKE. I do not want to belabor the point at this time.

In the original Southwest water plan, you indicated a total consumptive use of about 172,000-acre-feet planned for fish and wildlife and recreation. In the present analysis which Mr. Dominy gave us, the dollar value was reduced from $6 to $5 million. I would like to know what happened to the 172,000 acre-feet of water.

Mr. DOMINY. I am sorry, I was being whispered to in my left ear and didn't hear the question, sir.

Mr. REINECKE. In this analysis you indicated a number of fish and wildlife development projects. Total consumptive use was 117,000 acre-feet of water. Have those projects been abandoned? Are they still going ahead? Where is that water coming from?

Secretary UDALL. Let me give you a general answer while they are getting specifics.

With regard to fish and wildlife values we consider these very important values. It was suggested in the Bureau of the Budget's letter, you will find, there was a suggestion this be further refined and studied.

The Federal Government, because of the position we occupy, is in a position to protect these conservation values. It is not as though we are abandoning anything. It is a matter of deciding more precisely what the water amounts are so then we can present something more concrete to the committee.

Mr. WEINBERG. The 117,000 acre-feet was to provide for the off main stream fish and wildlife uses. This was recommended in the report prepared by the Fish and Wildlife Service.

In view of the fact that California is using more than its 4.4 basic allotment, there is no main stream water which would be available to provide, by exchange or otherwise, any water for this purpose in California.

The bill as introduced used a figure of 84,000 acre-feet, made up of 57,000 acre-feet for off stream fish and wildlife uses in Arizona, 22,000 acre-feet in Nevada, and 5,000 acre-feet in New Mexico. The 5,000 acre-feet in New Mexico also would require a modification of the decree in Arizona and California to make water available for use in New Mexico.

There is, of course, uncommitted water not now under contract which is allocated to Arizona.

The bill has proposed that this water be reserved so that it might be taken up by contract over a 50-year period, and it is that proposal that the Bureau of the Budget suggests be further studied.

Mr. REINECKE. The general administrative procedure would be that you would go ahead with the fish and wildlife projects but in view of the fact this is an area of extreme shortage if that water were needed for M. & I. purposes you would withdraw from those projects?

Mr. WEINBERG. The administration has proposed that before there is a decision on such a reservation of 84,000 acre-feet of water the whole subject of how much water should be reserved and relative values as between municipal and industrial water and fish and wildlife be given further study.

Mr. REINECKE. One further question on importation. Has the Department taken up any of the considerations proposed regarding an undersea acqueduct?

Mr. DOMINY. Many people have written us about various methods of moving water in an undersea aqueduct. Our engineers have examined them at least to a reconnaissance degree.

We have some reservations as to the applicability of this as being in the national interest. The disruption hazard during a war, for example, and various other problems which go with undersea transport of that distance is involved.

Mr. REINECKE. Are you familiar with the two companies which have prepared rather extensive documents, Nesco and Marquardt Aircraft?

Mr. DOMINY. These reports are available at the moment if you are talking about the same ones I have recently seen.

Mr. REINECKE. In the event water is imported, once again I ask this question, in the event there are exchanges effected by importing from the Northwest, will this in any way impair California's entitlement to 4.4 priority central Arizona project water?

Mr. DOMINY. The bill as drafted requires the importing of 2½ million acre-feet below Lee Ferry in the main stream before the California 4.4 priority would be relieved or modified.

Frankly, an import from the Columbia Basin, the Columbia River area, in my judgment would involve economically an aqueduct of considerably greater size than 2½ million acre-feet of water annually.

If the Columbia River proves to be the logical source of surplus water, and as the Secretary has pointed out a combined plan could be worked out which would benefit many States in the West, including Oregon, Nevada, and the upper basin as well by importing substantially more than 2½ million acre-feet and dropping off water perhaps into the Owens Valley and various places in Nevada and eastern Oregon. This is all within the realm of possibility from an engineering point of view. As I see it, if there were an import supply of more than 2½ million acre-feet in the lower river, introduced above Hoover Dam, for example, and the upper basin wanted to avail itself of part of this imported water, it would have to pay the proper fee to claim that water. By exchange the water would be left in the lower basin, and the upper basin would hold back more of the natural upper basin runoff.

This would satisfy part of the 7½ million acre-feet delivery by a lower basin supply which they pay for.

Mr. REINECKE. The question was asked awhile ago regarding the cost of imported water. It was indicated the users would pay the higher price if it was in fact higher priced water.

Does this mean on the basis of an exchange that California users may have to pay a higher cost of water because of importation from the north than they would pay out of the Colorado?

Mr. DOMINY. This depends entirely on the measure as finally adopted by the Congress. The administration has recommended that no commitment beyond the million and a half acre-feet be made to offset the Mexican delivery.

Actually if this were done there would not be a significant increase in cost because the quantities of water involved would not be significantly large.

There would be some additional cost but not of great magnitude in total.

Secretary UDALL. What he is saying in effect is that if you decided to import the Mexican Treaty amount and to guarantee it either as a national responsibility or out of the lower basin fund, perhaps, that this would in effect guarantee present users of the river water from the Colorado at present prices.

Mr. REINECKE. Perhaps I didn't make myself clear. Perhaps we import 2 million acre-feet from one of the northern States, and we effect and negotiate an exchange so 2 million feet less is taken out of the Colorado River.

Will the people of California pay more for that 2 million feet imported than if they had taken it from the river? I feel they are entitled to 4.4 at the agreed upon price and they should not be required to pay any additional cost.

Mr. DOMINY. Let us assume we import the 2½ million embodied in the provisions of this bill, and the first million and a half of that is made nonreimbursable as applying to the Mexican Treaty. That million and a half would be at present prices for water because you now have that in lieu of the million and a half committed to Mexico which the Colorado River must now provide.

The other million would be at somewhat higher cost depending on the availability of funds from the basin account to satisfy the increased cost involving the import.

Then if you had more than 2½ million acre-feet of imported water and there was to be an exchange with the upper basin, this is something which would have to be worked out. Presumably the upper basin would pay whatever the cost was and rely on its basin account as well as their ability to pay to pick up the balance.

Mr. REINECKE. I want to get into that more later.

Page 17 of the report indicates the cost of the Marble Canyon feature as $239 million. On page 18 it shows cost allocations toward commercial power of $156 million and an additional reimbursable fish and wildlife at $2 million. We have $158 million cost allocaiton and a cost of $239 million.

I am interested in the difference.

Mr. DOMINY. 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.

Mr. REINECKE. But this is not an irrigation project.

Mr. DOMINY. Power for pumping is an essential ingredient to making the water supply available both for irrigation and for M. & I. Therefore a portion of the project cost attributable to providing for

the irrigation pumping is justified as a cost to irrigation. There is $69,967,000 allocated to irrigation pumping, repaid without interest. There is $155,734,000 allocated to commercial power and it would be paid with interest.

Mr. REINECKE. Do I understand that Bridge is out of the question up to this point?

Secretary UDALL. The recommendation of the administration is that any decision on Bridge Canyon be deferred at this time. You will find it in the Bureau of the Budget letter.

Mr. ASPINALL. Bridge Canyon is before the committee. As long as it is in this legislation anybody who wishes to testify on this particular provision of the bill has just as much right as anybody else.

Mr. REINECKE. Thank you, Mr. Chairman.

I ran out a few calculations and I found that the flow through Bridge at full capacity is different from the flow through Marble at full capacity, that is, at capacity power generation.

I am wondering how you intend to manage the river when you have more water running through one than through the other if both dams are to run at full capacity which at some time or other I am sure they would.

Would it necessitate spilling water through the smaller dam, through Marble, in order to keep Bridge running at full capacity?

Mr. DOMINY. No. 1, you do get some flow in the Colorado River below Marble, the Little Colorado River and a few other minor tributaries.

Additionally we anticipate Marble Canyon will lose some water that will return to the river below the dam and not be put through the powerhouse. That water also would be available in the river and be available at Bridge were it is to be built.

Mr. REINECKE. You expect Marble will lose water?

Mr. DOMINY. Marble is not the tightest reservoir area in the world. It is not going to lose it away from the Colorado River and lose it completely, but there will be a certain amount of seepage our geologists estimate through the walls that will return to the river below the dam. This is true at Flaming Gorge on our project on the Green River.

Mr. REINECKE. Is this the same condition which is causing a loss up to 25 percent of the water from Lake Powell?

Mr. DOMINY. Not at all. Lake Powell bank storage is not a loss at all. The water is going into bank storage.

Mr. REINECKE. Who uses the bank storage?

Mr. DOMINY. It is there like in a big sponge. Once land adjacent to the reservoir fills up it will not hold any more water and as you draw down most of it comes back and it is just part of the reservoir storage.

Mr. REINECKE. We cannot draw that water back, can we, without pumping?

Mr. DOMINY. Oh, yes. Some will just come right back out into the reservoir as you pull the reservoir down. You have soaked up a larger periphery.

Mr. REINECKE. Marble Reservoir has an operating level of only 10 feet.

Mr. DOMINY. Speaking of bank storage at Glen, I thought——

Mr. REINECKE. What is the operating differential at Powell?

Mr. DOMINY. We hope to operate in the upper 60 feet when we fill. That is 3,700 feet above sea level which is the spillway elevation.

Mr. REINECKE. You feel you will get a substantial amount of that water back out of the top 60 feet?

Mr. DOMINY. That is right. What we don't get back will not be lost. It will not evaporate. It is like a sponge. Once filled it cannot hold any more.

Mr. REINECKE. Am I correct in understanding that the losses have been estimated to be as high as 25 percent out of Glen?

Mr. DOMINY. Let me give you two figures that will be of interest to you.

Mr. ASPINALL. We will recess the meeting with the understanding that the gentleman from California, Mr. Reinecke, will be allowed to question the Department witnesses first, and the gentleman from Idaho second, the gentleman from California, Mr. Tunney, third, the gentleman from Washington, Mr. Foley, fourth, and the acting chairman of the subcommittee fifth.

Mr. WHITE. I had one thing I would like to state. On their projected use of available water supply in central Arizona, this table which Mr. Dominy said was one of the most important of the various charts, there is no scale on the side of it. I wish he would come back here the next time with a scale on the side of it, and also include a curve for agricultural requirements as well.

Mr. ASPINALL. The committee will stand in recess until tomorrow morning at which time the Governors will be heard.

(Whereupon, at 5 p.m., the subcommittee was recessed, to reconvene at 9:45 a.m., Tuesday, August 24, 1965.)

(The following pages of Wednesday, August 25, 1965, have been combined with the pages of Monday, August 23, 1965, in order that all of Secretary Udall's and Mr. Dominy's testimony may appear in the printed hearing uninterrupted.)

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

WEDNESDAY, AUGUST 25, 1965

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

The subcommittee met, pursuant to recess, at 2 p.m., in room 1324, Longworth House Office Building, Hon. Walter Rogers of Texas (chairman of the subcommittee) presiding.

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

This afternoon we have as witnesses the Secretary of the Interior, Mr. Udall—we are glad to welcome you again, Mr. Secretary, to the subcommittee—and Mr. Dominy, the Commissioner of the Bureau of Reclamation.

It is good to have you back with us, Mr. Dominy. And we will try to get through with you as quickly as possible. If the members of the committee will direct their questions to issues involved, it will be appreciated by the Chair and everyone will have ample opportunity to ask questions that are in their minds.

I think the first member to be recognized this afternoon in due order of the proceeding is Mr. Reinecke, the gentleman from California. The Chair recognizes you.

Mr. REINECKE. Thank you, Mr. Chairman.

First I would like to ask for unanimous-consent request that Senator Murphy of California be permitted to enter a statement immediately following the remarks of Senator Kuchel, of California.

Mr. ROGERS. Is there objection? The Chair hears none and it is so ordered.

(Senator Murphy's statement will be found on p. 98.)

STATEMENT OF HON. STEWART L. UDALL, SECRETARY OF THE INTERIOR; ACCOMPANIED BY FLOYD E. DOMINY, COMMISSIONER, BUREAU OF RECLAMATION; AND NEWCOMB B. BENNETT, JR., ASSISTANT COMMISSIONER, BUREAU OF RECLAMATION, DEPARTMENT OF THE INTERIOR—Resumed

Mr. REINECKE. Mr. Dominy, we were discussing the problem of evaporation and seepage when we terminated the discussion the other day. I believe you indicated that up to 25 percent of the water stored behind Lake Powell is presently disappearing either into the atmos-

phere or into the ground, and I believe you indicated that you felt this was acting like a sponge and a good bit of this water would be returnable at such time as the reservoir was drawn down.

What is the depth of that reservoir when it is full?

Mr. DOMINY. The Glen Canyon Reservoir when it spills at elevation 3,700 would be 562 feet deep at the dam.

Mr. REINECKE. 562. Then I believe you indicated the operating differential was 60 feet, so that we will be drawing down a little over 10 percent of the vertical depth of the reservoir.

Mr. DOMINY. Yes. Let me discuss these two problems separately. The first major reservoir in the world was created behind Hoover Dam and we had no historical experience filling a large reservoir of that magnitude prior to that time.

The experience we had at Lake Mead in the early years of filling was that about 20 percent of the surface storage as the lake filled went into the bank storage of the reservoir. This is not necessarily lost. As a matter of fact, it isn't lost at all. It is just added storage capacity. And when we finished filling Lake Mead, the computed total bank storage was about 13 percent of the water—in other words, we had 13 percent greater storage because of the bank storage.

As we draw the lake down, much of this bank storage comes right back out into the reservoir and is therefore available. That which doesn't come out is, of course, not depleted. It is there. It is not evaporating.

Mr. REINECKE. It is not usable, though, is it?

Mr. DOMINY. No, but it isn't lost. You lose it as you fill it but then it is not lost repeatedly.

We are experiencing the same thing at Lake Powell to a little greater extent. Instead of 20 percent in the early months of filling, we went as high as 33 percent for a few weeks in bank storage. That has begun to taper off, and we now believe that instead of experiencing about a 13-percent bank storage as we did at Mead, we will have about a 19-percent bank storage in the final figure.

Mr. REINECKE. The point I wanted to make is the fact that on the assumption that some of this will percolate back into the lake as the reservoir level is drawn down, actually you are only going to let the level of the reservoir drop approximately 10 percent, so certainly something less than 10 percent of that water will ever be recoverable unless you drain the entire reservoir.

Mr. DOMINY. Except it is like any storage. It is like dead storage, so to speak, in any reservoir. Once you fill it, it is there and you don't lose it any more.

Mr. REINECKE. Isn't it true, however, on Lake Mead we are losing somewhere between 750,00 and 900,000 acre-feet per year through seepage and evaporation?

Mr. DOMINY. Evaporation, yes.

Mr. REINECKE. Do you feel this is all evaporation and none of this seepage into the ground?

Mr. DOMINY. Once bank storage is filled, you have reached a static condition with the ground water that was there naturally and it doesn't fluctuate.

Mr. REINECKE. Is it the feeling of your geologists, then, that under all circumstances, whether it be Lake Mead or Lake Powell or Marble

Canyon Reservoir, that there will be a limit to this amount of dead storage that must be saturated into the ground before we can start building a reservoir?

Mr. DOMINY. Indeed, the bank storage on any reservoir as contrasted to one that actually leaks or actually has channels where the water can move away from the reservoir, the bank storage once filled is just like a sponge. It fills up and stays full.

Mr. REINECKE. Your people do not feel, then, that there will be continual seepage.

Mr. DOMINY. No, sir. We have practically no seepage at either Mead or Glen Canyon in terms of losses from the river going around the dam and coming back into the river.

Mr. REINECKE. Do you have any estimates of the total loss in the upper basin at the present time?

Mr. DOMINY. Yes. I can give you the evaporation losses and these are carefully computed from evaporation pan experiments at all these locations.

Blue Mesa Reservoir, for example, when it is completely filled, would evaporate about 19,000 acre-feet a year. And when it is at the rated head, it would evaporate only 12,000 acre-feet a year.

Mr. REINECKE. For the sake of time, Mr. Dominy, could you just give us the total?

Mr. DOMINY. Yes. But Lake Powell and Lake Mead I think you would like to have. When Lake Powell is completely filled at 3,700 feet elevation it would evaporate 650,000 acre-feet a year. At rated head it will evaporate 306,000 acre-feet a year, and at the present levels, about 165,000 acre-feet a year.

Lake Mead, when it is completely filled, this being a reservoir with larger surface acres, and in a less canyon area—it is flatter and the winds get to it more readily—it evaporates when it is completely full 1,071,000 acre-feet a year. When it is at rated head, it evaporates about 730,000 acre-feet a year, and when it is down to the minimum, as it was last year, only 617,000 acre-feet a year.

So it is hard for me to give you an average figure because these reservoirs will fluctuate from time to time and when one is full, another might only be at rated head.

Mr. REINECKE. What do you feel is the total evaporative loss over the entire upper and lower basins at the present time?

Mr. DOMINY. In the upper basin only about between 350,000 and 500,000 acre-feet.

Mr. REINECKE. And the lower——

Mr. DOMINY. The lower basin right now at Hoover, Parker, and Davis would be roughly 900,000 acre-feet.

Mr. REINECKE. So that is a total of just a little over a million.

Mr. DOMINY. About a million and a half. Between 1.2 million and 1.5 million; yes.

Mr. REINECKE. Last year before the Senate under questioning from Senator Bible, he indicated that perhaps the loss is something on the order of 3 million and you said, "I would guess pretty close to that with all reservoirs on the Colorado River full."

Mr. DOMINY. If we had all the reservoirs full, including Bridge and Marble, and you took a maximum evaporation figure from all of them, you would be up to—at that time we were talking about not only

the Federal reservoirs but all of the participating project reservoirs and private reservoirs and the city of Denver reservoirs and all of it would total up to the 3 million figure. The Federal reservoirs on the upper Colorado storage project and the lower Colorado River project with both Bridge and Marble and Mead and Parker and Davis would be about 2 million.

Mr. REINECKE. This total evaporative loss for all of these works put together then represents somewhere between 25 and 30 percent of all of our water being lost simply by means of evaporation and seepage, is that correct?

Mr. DOMINY. Well, I don't like this term seepage because I don't know of any seepage from any of the reservoirs that is getting out of the river system, so it is not lost.

Mr. REINECKE. All right. Just say evaporation.

Mr. DOMINY. From evaporation, yes. You are losing about—you could lose as much as 2 million acre-feet a year if all the reservoirs were filled.

Mr. REINECKE. We just agreed on three, didn't we?

Mr. DOMINY. That is over and beyond the Federal reservoirs.

Mr. REINECKE. Has the Department ever made a study of the point of diminishing return, or diminishing water, perhaps I should say, where it no longer is economical to build additional reservoirs, where the losses exceed the value of the reservoirs?

Mr. DOMINY. Yes. This is very definitely considered.

Mr. REINECKE. What percentage would that be?

Mr. DOMINY. Well, it isn't quite that simple because you have these compacts on the river and, for instance, Glen Canyon is necessary in order for the upper basin States to survive and have use of their water. So even though that might mean a net depletion of the total available water in the river, it still is a desirable addition to the project.

Mr. REINECKE. In other words, you feel that constructing works is more important than having water available.

Mr. DOMINY. No; not at all.

Mr. REINECKE. That is the impression I get, Mr. Dominy.

Mr. DOMINY. Not at all, but without constructing works you don't have water available. That is the point I was making, sir.

Mr. REINECKE. But there is a limit at which you don't build additional works because it will deplete more water than is available.

Mr. DOMINY. That is correct. We haven't reached that point yet and we won't reach that point with the projects recommended in this bill.

Mr. REINECKE. I think a 30-percent loss is a very serious thing.

Mr. DOMINY. Excuse me, but it is not a loss if you haven't got the water to use unless you build the structures and have the impoundment. So I don't see how you can consider it a loss. It is a reduction in total computed run-off available but you wouldn't have it available unless you stored it and had it there by storing the flood flows.

Mr. REINECKE. In the brief on Marble Canyon Dam you have indicated that when the reservoir is full the water will back up to encroach on the tail waters of the Glen Canyon Dam and that you will therefore lose a little bit of the power head at Glen. Your statement in the book indicates that you will more than make up for that by the additional power head at Marble. I fail to see how this would work because Glen

has a greater generating capacity than Marble. And the same differential in head is the same amount of potential energy regardless of what elevation you are generating electricity but Glen could use the full potential while Marble may be limited.

Mr. DOMINY. Well, I have real confidence in the technical competence of the engineering staff of the Bureau and I am sure that everything was taken into account, including the permanence of a proper level at the tail of Glen Canyon Dam in conjunction with the maximum possible production from the two facilities in designing Marble, because if there was an advantage to reducing the height of Marble a few feet and save that cost, I am sure that that would have been the way it would have been designed, and I believe we could satisfy you if you want a statement from the technical people on that point, sir.

Mr. REINECKE. I don't want to get into a lot of details.

Was Glen Canyon built with the idea that tail water would back up, that this isn't going to flood out any of the switching rooms or generating rooms?

Mr. DOMINY. We have had on the planning boards the possible construction of Bridge and Marble Canyon for years and Glen was designed with that fully in mind.

Mr. REINECKE. I would appreciate if it you could show me the justification because my information shows that Glen has a capacity of 900,000 kilowatts whereas Marble will have 600,000 kilowatts, and inasmuch as they are on the same stream, the same water is going to flow through both, it seems to me there will be the opportunity of taking better advantage of that water with the larger generating capacity than it will at the smaller.

Mr. DOMINY. Yes. I think the real answer perhaps is not as complicated as we might think. Marble will only be at the maximum possible elevation a small percent of the time, so it will only infringe on the head at Glen to a minor degree part of the time.

Mr. REINECKE. Perhaps I misunderstood. How deep will the backup be on Glen?

Mr. DOMINY. Just a few feet. It just barely comes back to Glen.

Mr. ASPINALL. If my colleague will yield at that point, what the Commissioner is trying to say is that it depends upon the operation at Glen Canyon.

Mr. REINECKE. The fact that Marble only has a 10-foot operating differential made me feel that there would be a residual backup against Glen that would reduce its generating capacity.

Mr. ASPINALL. That is correct.

Mr. HOSMER. Will the gentleman yield?

Mr. REINECKE. Certainly.

Mr. HOSMER. I think it was stated that the Marble operation would be placing emphasis on peaking power.

Mr. DOMINY. That is correct.

Mr. HOSMER. And as a consequence, it is in a little bit different status than Glen.

Mr. DOMINY. Exactly.

Mr. HOSMER. Where you either sell dump or firm.

Mr. DOMINY. Exactly.

Mr. HOSMER. So your revenues—you can afford to sacrifice some revenues on dump power to increase the peaking power.

Mr. DOMINY. You have put——

Mr. HOSMER. It is a matter of electric utility economics and not just sheer capacity of the generator.

Mr. DOMINY. Actually this effect is most noticeable when there is extremely high flood flows and when we are releasing heavy quantities of water out of Glen. It will only be a small percentage of the time that it will interfere with the head at Glen at all.

Mr. HOSMER. The water would be well worth——

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 kilowatthours, 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 percent. 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 percent.

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 percent, 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.

Mr. REINECKE. When we begin to consider regional power supplies or grid networks, as I presume you are referring to, aren't we asking for a substantial increase in the cost of transmission lines due to the large size by virtue of the fact that we may be transmitting large loads from Four Corners to Los Angeles instead of generating that power close to the load points?

Secretary UDALL. Well, the technology of extra-high-voltage transmission is such that when you go to very high voltages it doesn't matter if you go long distances. It is still cheaper if you move big loads. Since Los Angeles can't build big steamplant in the southern California area—unless they are nuclear—because of air pollution, they have been looking outside at four different sites right now for large coal plants, and certainly we envision very-high-voltage, extra-high-voltage transmission lines into the California area from this region which has the coal and the water.

Mr. REINECKE. I think we differ there.

Mr. HOSMER. Will the gentleman yield?

Mr. REINECKE. Certainly.

Mr. HOSMER. The total cost of producing electricity is the capital investment in generating facilities and the operating costs. I think what the Secretary was getting at is you have to play those back and forth against each other and if you have a hydro source, even though the capital investment is greater than the conventional source, yet the conventional source charge for fuel is high. Then you have a break-over point where it is economic to get a long line transmission.

Mr. REINECKE. The point I was getting at is that line loss is a function strictly of distance for the same size cable and the same load. The closer the generating capacity can be built to the load, the less line loss there will be and therefore reduce the transmission line size.

Mr. HOSMER. That is true, but there is still a crossover point between costs and transmission line losses.

Mr. REINECKE. Perhaps that is not exactly what we are talking about, but we might put in the record at this point that there are coal sources available in the Arizona area that will provide coal on the order of 12 to 15 cents per million B.t.u.'s, which is a very low price for that type of fuel, and I think leaves at least a possibility of looking into this type of power generation.

Back to the dams. I considered some possibilities about Bridge at the same time and on these other assumptions I came up with adding 2,500 second-feet for augmentation between Lake Powell and Bridge,

a flow rate at Bridge of about 13,700 second-feet. This again is on the steady state 11-month basis that I was speaking of before. Then the possible power coming from Bridge at that flow rate is something on the order of 605,000 kilowatts which provides a 40.2-percent operating characteristics. Does that sound reasonable also?

Mr. DOMINY. Well, actually our project at Bridge is based on a rated head of 644 feet. We would be producing 5.1 billion kilowatt-hours at rated head. So we would approach the figure you have calculated.

Mr. REINECKE. Hoover operates, I believe, at 25- to 30-percent efficiency; is that right? Ideal operating characteristics about 36?

Mr. DOMINY. Mr. Bennett?

Mr. BENNETT. Overall efficiency at Hoover can run right close to 90 percent. The machinery is capable of this efficiency but it is used today at a very low efficiency because of the peaking operation rather than energy output. So the actual overall production is at a low efficiency.

Mr. REINECKE. Are there any steady State or baseload generations from Hoover?

Mr. BENNETT. Very little today. It is almost entirely operated for peaking.

Mr. REINECKE. Are any figures available yet of the cost of producing power at Marble and/or Bridge?

Mr. DOMINY. Well, we have run all of our analyses on an average rate that would return the same revenue per kilowatt-hour as the upper Colorado storage project at 6 mills. This would give us a good return on the investment, would take care of all the operation and maintenance and replacement costs, and would add significant revenues to the development fund.

Now, this would mean a sale at about $10 per kilowatt-year for capacity and 3 mills per kilowatt-hour for energy, and our studies would indicate that this is a very reasonable fee and the power would be in demand at those prices.

Mr. REINECKE. I am sorry. Perhaps I misunderstood. I thought you said 6 mills a minute ago and then you——

Mr. DOMINY. Six mills is what it would average out in terms of——

Mr. REINECKE. Are you selling it at 3 and averaging it at 6?

Mr. DOMINY. No. Your contract would actually be for $10 per year per kilowatt per year, and then 3 mills per kilowatt-hour of energy, and that averages out to about 6 mills per kilowatt-hour for the energy actually used.

Mr. REINECKE. What are we presently selling Hoover power for?

Mr. DOMINY. I will have to call on Mr. Bennett again.

Mr. BENNETT. The Hoover rates, of course, vary annually depending upon cost of operation and maintenance. Speaking pretty generally, the energy including secondary goes at about 1.6 mills. The capital cost or the so-called generating cost is just a little less than that for a total of about 3 mills.

Mr. DOMINY. Of course, that is at the bus bar and there is no transmission involved there at all and the rates we use for the Colorado storage project and the rates we are proposing here would be at load centers. So that you can't compare 6 to 3.

Mr. REINECKE. In these grid networks what do you consider your load center?

Mr. DOMINY. Usually it is the vicinity of a major concentration of industry or people that are the customers. In other words, we don't distribute but we do bring it into the vicinity of the community or to an area where a powerline is already available to carry it into the center.

Mr. REINECKE. Have you inquired as to the possibility of any contractors purchasing or being willing to sign up at the $10 per kilowatt-year rate?

Mr. DOMINY. Yes; and I think you are going to have some testimony from the Arizona Public Service as to the adequacy of this rate.

Mr. REINECKE. We have heard quite a bit about the requirements and necessity for peaking power. I think I understand it pretty well. How will this alter the overall plans of the area if Bridge is not included?

Mr. DOMINY. Well, of course, Bridge would be the significant producer on the river. Just for comparison purposes I can give you some average figures. Glen Canyon with a rated head of 430 feet produces 3,820 million kilowatt-hours of energy annually. Marble Canyon with a rated head of 295 feet produces 2,200 million kilowatt-hours. Bridge with a rated head of 644 would produce over 5 billion kilowatt-hours annually. Hoover with a rated head of 480 feet produces 3.5 billion. Davis with a rated head of 127 produces 976 million. And Parker with a rated head of between 77 and 80 feet produces 472 million. So you can see that Bridge, as far as power production, is the giant of all the potential on the river.

Mr. REINECKE. I have seen surveys of the anticipated power deficit. I have here several sets of figures indicating the anticipated deficit in peaking power capacity and it appears that by 1972 we are going to be in trouble regardless of whether Bridge is built or not. Where do we go from there? What do we do for peaking power after we have eliminated or exceeded all the possibilities for hydropower?

Mr. DOMINY. Then you just have to use it from existing and new thermal power and it is more expensive on the average.

Mr. REINECKE. Thermal powerplants can produce peaking power?

Mr. DOMINY. Oh, yes. You can produce peaking but you have the problem of spinning the generators during the offpeak hours. You can't turn them off and start them up again quickly, so you have fuel consumption and operation and maintenance costs while the machine is spinning.

Secretary UDALL. Congressman, I don't know—I think I question your 1972 figures there. I don't know where you got them from. The big new element in the picture as far as peaking is the Northwest-Southwest intertie. We have two direct lines, one into Hoover and one into Los Angeles, and this linkup with the Bonneville system which is by far the largest and best hydroelectric system in the whole country will be a tremendous new asset to the Southwest and to the Northwest and this will supply a major source—be the big new source of peaking power for the entire region.

Mr. DOMINY. And there is also the possibility of pump storage production out of existing reservoirs by arranging for pump back facilities.

Mr. REINECKE. Just so we understand, it is your desire if possible to include Bridge in this project; is that right?

Mr. DOMINY. Bridge was originally part of the package that we recommended but in the process of considering the overall project and the budget requirements and other matters of national interest, the Administration has recommended that Bridge be deferred at this time.

Mr. ASPINALL. Would the gentleman yield?

Mr. REINECKE. Certainly.

Mr. ASPINALL. I would like to have the real answer on this particular problem. You talk about the national interest. What do you mean? When you say that it is going to be deferred at the present time, you know that in our generation and next generation there isn't going to be any Bridge Canyon unless it is included in this legislation. If that is to be the desire of the administration, all right.

But, I want to have the real answer to that question because when you talk about national interest, you are talking about the desires of a minority group who do not wish to have in this bill any invasion of the national park, Grand Canyon National Park. It is the same thing that we quarreled over in the upper Colorado River program with the Echo Park project. This matter is going to be considered during the last days of these hearings, and I would like to know what the thinking of the Department was as you proceeded against the position of the Bureau of the Budget in this matter, because I know that the Bureau of the Budget usually speaks for the administration and the Secretary of the Interior's Office and the Commissioner's Office are a part of the administration.

So I am not content with any statement that this was because of the Bureau of the Budget. I want to know where the Department was.

Secretary UDALL. Let me comment on that.

Mr. ASPINALL. All right. I think it is in order that you should comment.

Secretary UDALL. I think the committee is entitled to a direct answer, a very candid answer on this point.

As you know, the committee knows also and those who studied the original Pacific Southwest plan that we proposed, both Bridge and Marble were included in all of our planning.

Mr. ASPINALL. That was in answer to the letter I directed to you, Mr. Secretary.

Secretary UDALL. Our plan, the plan of the Department that we presented last year to the Senate committee, that we sent to the Bureau of the Budget this year, included both Bridge and Marble in it. We felt that this was the best solution in terms of the resource development of the region. We recommended it and this was an argument that we lost with the Bureau of the Budget within the executive branch, and I am sure you are familiar with the way that decisions are made.

I want to make one other point quite clear. The decision of the administration as expressed in Deputy Director Staats' letter was not that Bridge not be built but that the decision be deferred at this time. I don't think we would entirely agre with the chairman's statement

that it is now or never. I think that at this stage of the lower Colorado project, it was felt that since it was not essential in terms of the economics of the project, that decision had to be made at that time and that it should be studied further. I would certainly say as far as the Department is concerned, if we go to a second stage, if we have an import program, I think that Bridge very definitely has to be in the picture.

Mr. ASPINALL. All right. Now, let's be honest. Isn't it true that the decision was made before the question of the economics of this project was figured and that after the decision was made, the economics of this project were then figured to fit the cloth instead of before?

Secretary UDALL. No. Mr. Chairman, I think again, if I may be as candid as possible, and I am describing the argument that went on and it raged for a considerable time, I think the decisive factor in terms of this, what we are proposing here, recommending to the committee, was the fact that once you created the lower basin account and you put Hoover and Parker-Davis in after payout, that in terms of the economics you didn't need Bridge to make the works authorized economically feasible.

When you go to a second stage this is another matter. This is the thing that the Bureau of the Budget seized on and I think you will find this in the report to a degree.

Mr. ASPINALL. It has been my understanding that the Department assisted in the preparation of these bills and that they were introduced at the request of the Department, and yet after they were introduced, the Department recommends major changes.

Now, I am not an introducer of one of these bills, of course, but I can tell you that I would have felt rather strange indeed if after I had introduced a bill, the Department then had seen fit to cut out from it one of the major provisions for reasons that were not made apparent at the time that the bill was introduced.

Mr. HOSMER. Will the gentleman yield?

Mr. REINECKE. Certainly.

Mr. HOSMER. Following that out, Mr. Dominy has submitted statements on the payoff study of the Lower Colorado Basin project. As I understand it we have a dropout dam and a dropout importation scheme and we have got a Central Arizona project.

I think that we ought to have before us, since the bills direct themselves to the lower basin project, in the record for comparison, table 25 of the Pacific Southwest water plan which is a comparable calculation including Bridge Canyon Dam rather than excluding it, and I would like to ask unanimous consent that that be included in the record, Mr. Chairman.

Mr. ROGERS. That is not in the record at this time?

Secretary UDALL. We will be very pleased to provide it.

Mr. ROGERS. Without objection it will be included.

Mr. HOSMER. Thank you.

(The material referred to will be found facing p. 235.)

Mr. ROGERS. May the Chair inquire, Mr. Reinecke, how much longer you have?

Mr. REINECKE. About 5 minutes.

Mr. ROGERS. You have consumed about 35 minutes.

Mr. REINECKE. I appreciate that, Mr. Chairman.

Just a comment that I have. Knowing that peaking power is available from steamplants at approximately $90 a kilowatt, that would indicate that the capacity being generated on the average at Marble would only cost $20 million instead of $239 million for a dam, and that the same capacity at Bridge would cost $54 million instead of $500 to $511 million. There is almost a ratio of 10 to 1 between the capital costs of the steam versus the hydro power, and with fuel at this 12-to-15-cent rate, I feel like I would like to see a further analysis on the comparison of the two.

Mr. DOMINY. We will be pleased to supply that for the record, Mr. Chairman, if the committee wishes.

Mr. REINECKE. Thank you kindly.

Mr. ROGERS. Without objection it will be included in the record.

(The material referred to follows:)

Comparison of the capital costs associated with alternate power sources having entirely different characteristics is not meaningful. The cost of fuel, higher operation and maintenance costs, and the shorter plant life of a comparable peaking steam facility exceed the savings attributable to the reduced capital investment requirement. To obtain a true comparison it is necessary to develop the annual cost of power from the alternative plants.

Steamplants designed specifically for peaking purposes can be built at an investment cost of about $90 per kilowatt, but at this low cost there is some sacrifice of efficiency. A steam peaking plant located where the cost of fuel would be 15 cents per million British thermal units would require about the same length of transmission lines to reach load centers as would the Marble Canyon hydroelectric facilities. The following summary compares the annual cost of power at load centers from a privately owned low capital cost 600,000-kilowatt steamplant designed for peaking purposes located in the Four Corners area with the cost of power at load centers from the 600,000-kilowatt Marble Canyon facilities. Both plants would operate at 37 to 38 percent plant factors. For comparative purposes the load center was assumed to be in the Phoenix, Ariz., area.

	Powerplant and transmission annual costs (dollars per kilowatt)	
	Privately financed peaking steamplant	Marble Canyon hydro
Fixed charges	20	15
Operation and maintenance, transmission losses, general expense, and miscellaneous	8	5
Fuel	7	
Total	35	20

Mr. REINECKE. Is the central Arizona project an end in itself or is it the long-range plan of the Department to incorporate other features of the original Southwest water plan in the future?

Secretary UDALL. I think the important answer to that is that the main feature of the bill, to me the heart of the bill, is not the central Arizona project. The heart of the bill is the basin account and the

basinwide approach which opens the door to whatever the region needs in the future. I think that this is a first phase and an import program of some kind is the obvious second phase. We now propose a vehicle with the major hydroelectric dams on the river committed to produce revenues for whatever the region needs in the future. I think this is the real——

Mr. REINECKE. The reason I asked that, if I understand properly, some of this basic account money will go toward the paying of any potential importation rates that may come in the future and if we have extensive works planned for California, Arizona, and Nevada, we will be using perhaps more funds than are available because I rather imagine the importation costs will be very, very high.

Secretary UDALL. Well, the figures that Commissioner Dominy gave in his statement yesterday, as you may recall, showed an accumulation of I think over $1.3 billion of surplus by the year 2047 as envisioned by the plan that we are talking about.

Mr. REINECKE. Now, to a different subject. If the lakes are completed, I personally feel that both of these lakes, that is, Bridge and Marble, will be relatively unsafe by virtue of the fact that they have almost sheer walls along their entire perimeter. I have experienced the situation on Lake Powell where high winds come up in the afternoon, high waves accordingly, and if a boat swamps in the middle of that, there is no place for anyone to get out of the water.

Do you have any comments on that?

Mr. DOMINY. It is true that for a part of the periphery of either of these lakes, there are sheer walls, but there are side pockets and side channels as well. I flew over both proposed reservoir areas by helicopter at reservoir level and took pictures so that anyone can see what the shoreline characteristics would be with the reservoir in the canyons.

Mr. REINECKE. I mentioned——

Mr. HOSMER. Will the gentleman yield? You say you flew and took pictures?

Mr. DOMINY. Yes. I was down there for 2 days at the end of May and flew at reservoir level by helicopter and took colored pictures of every foot of canyon all the way down—250 miles of river from Glen Canyon Dam to headwaters of Lake Mead—including the 105 miles that would not be affected by either reservoir.

Mr. HOSMER. You wouldn't happen to have any of those pictures with you, would you?

Mr. DOMINY. Yes; I do have.

Secretary UDALL. We have a Reclamation Commissioner who is a very good amateur photographer.

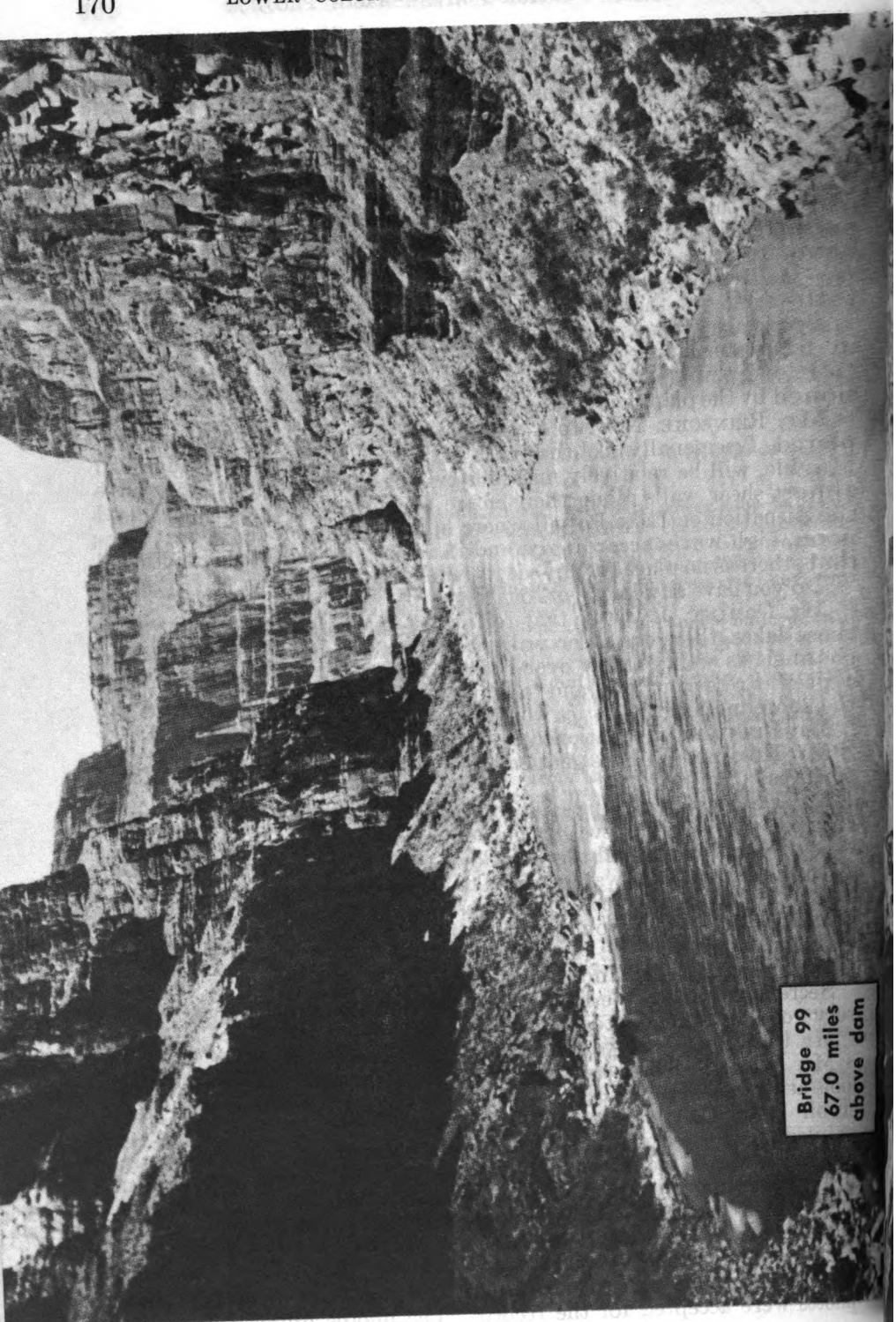
Mr. UDALL. As luck would have it.

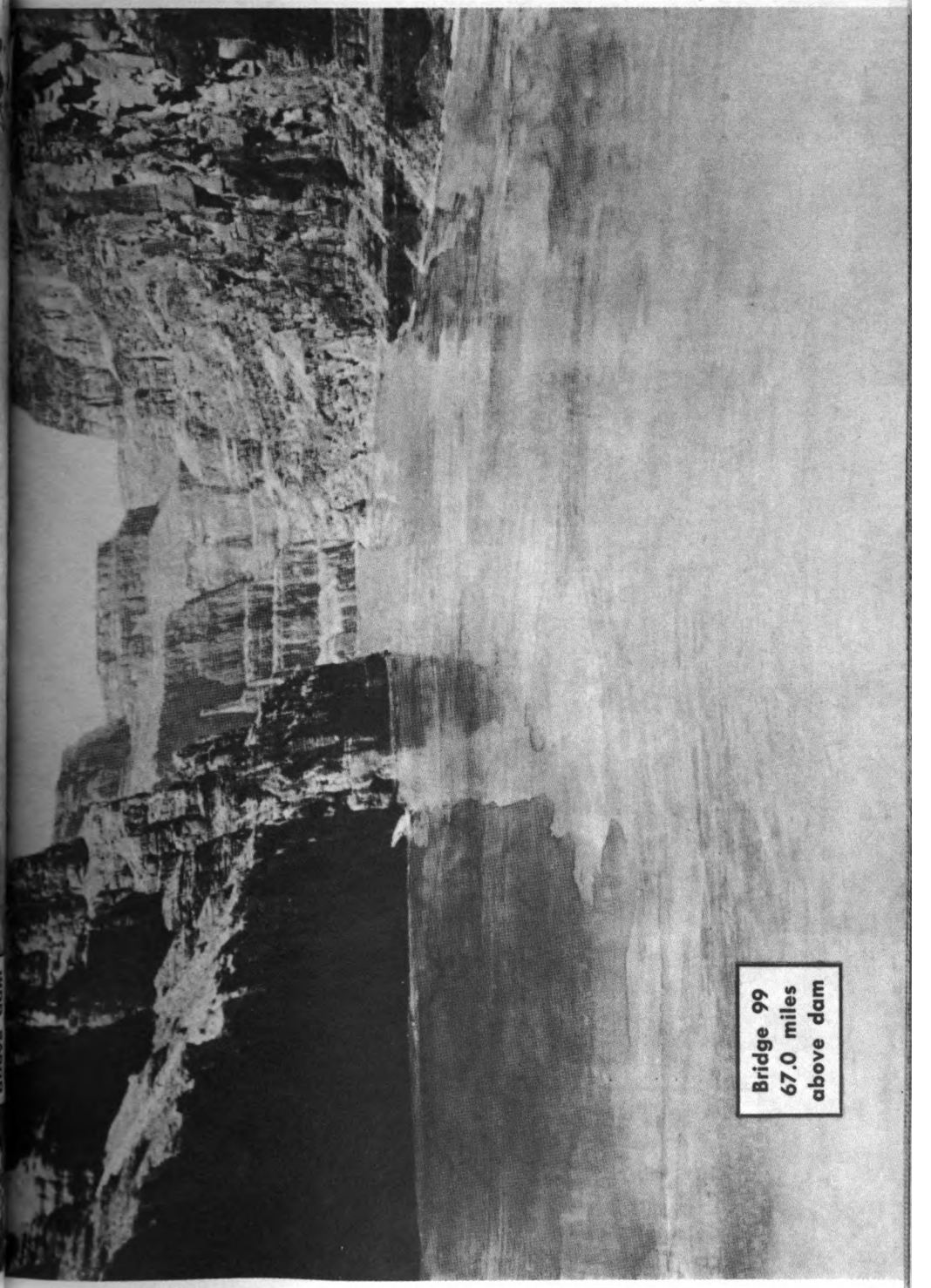
Mr. DOMINY. These are the pictures, if the committee wishes to look at them—here is Bridge and this is the canyon without the reservoir [indicating]. Here is a duplicate picture with the reservoir painted on at the elevation that would be there if the dam were built. And they are in sequence, so if you can keep them that way as you look at them, you will get an idea of exactly what it looks like now and what it will look like after the reservoirs are in place.

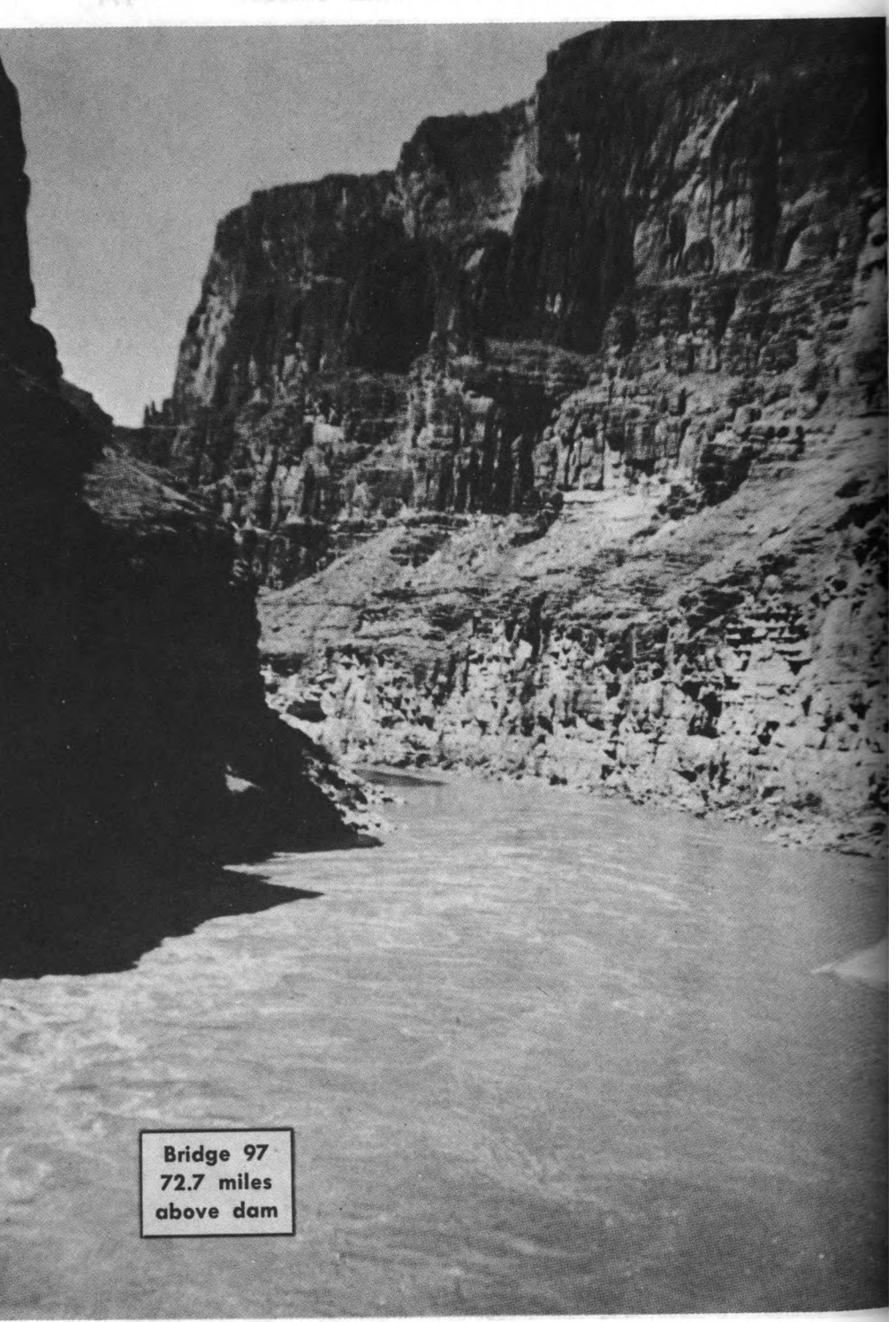
Mr. ASPINALL. Off the record.

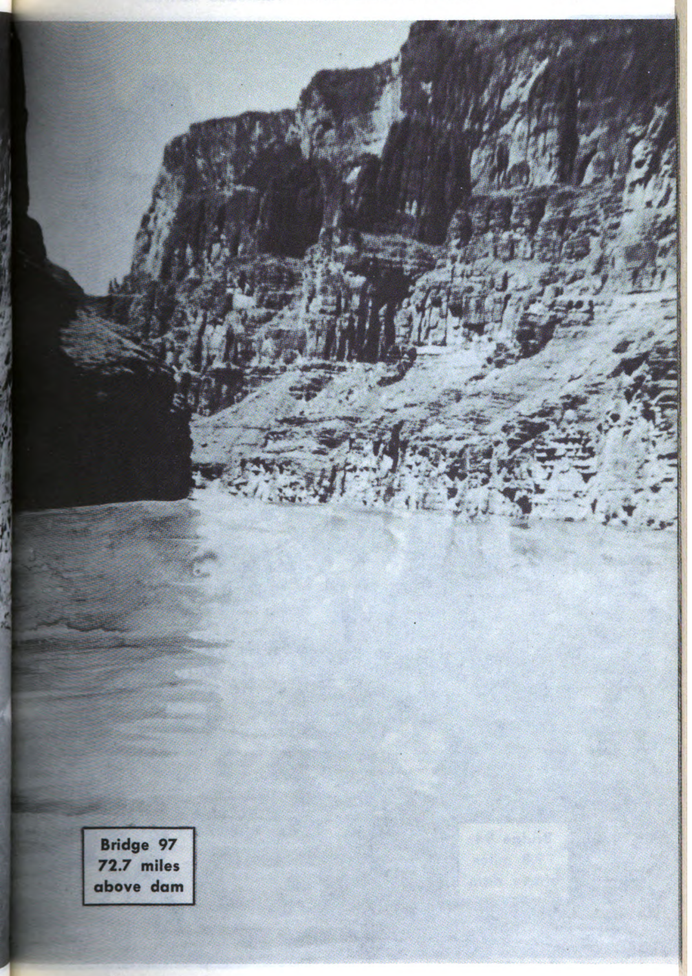
(Discussion off the record.)

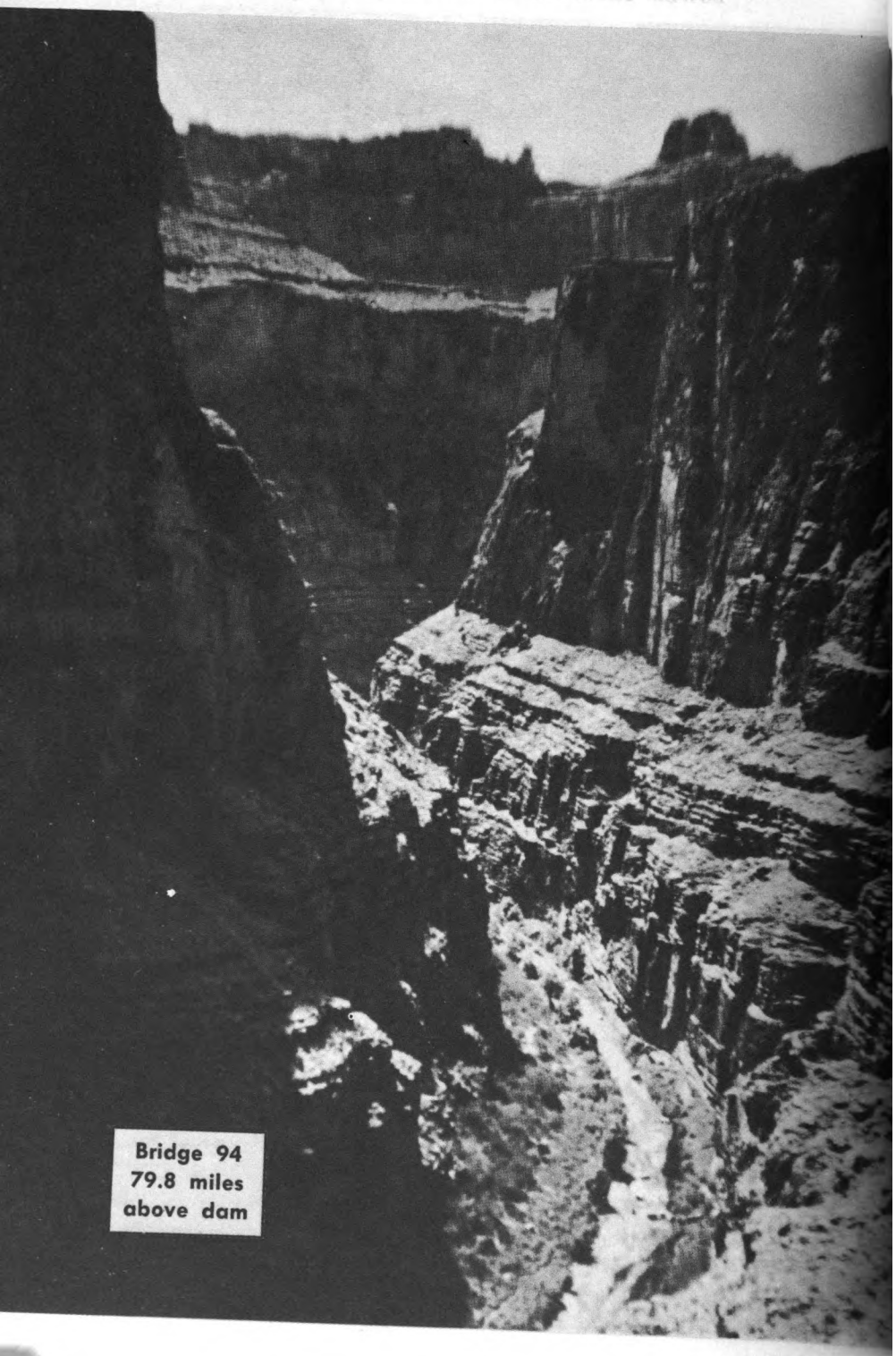
(By unanimous consent, see p. 562, selected pairs of comparative photos were accepted for the record. The photos follow:)

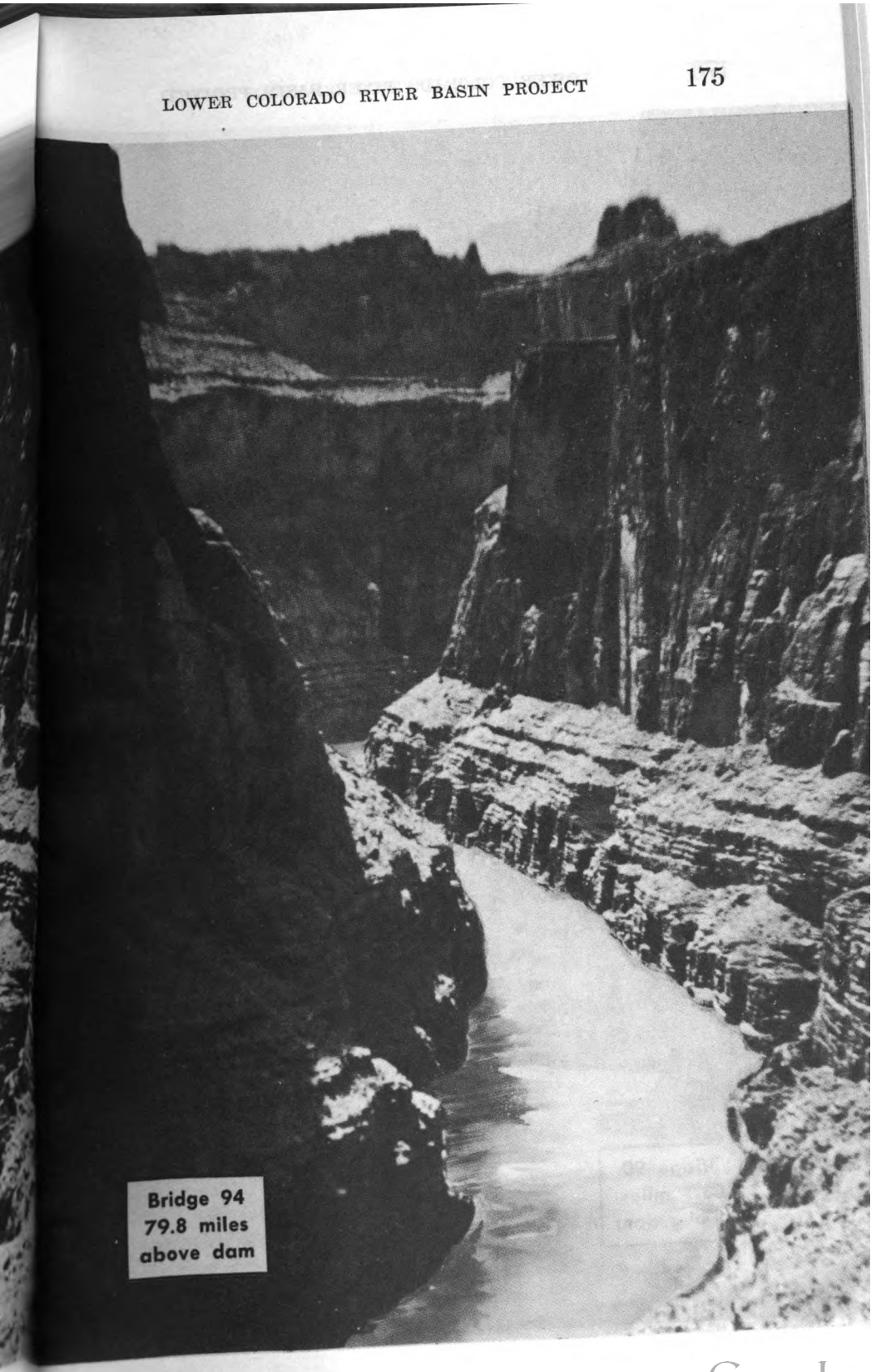


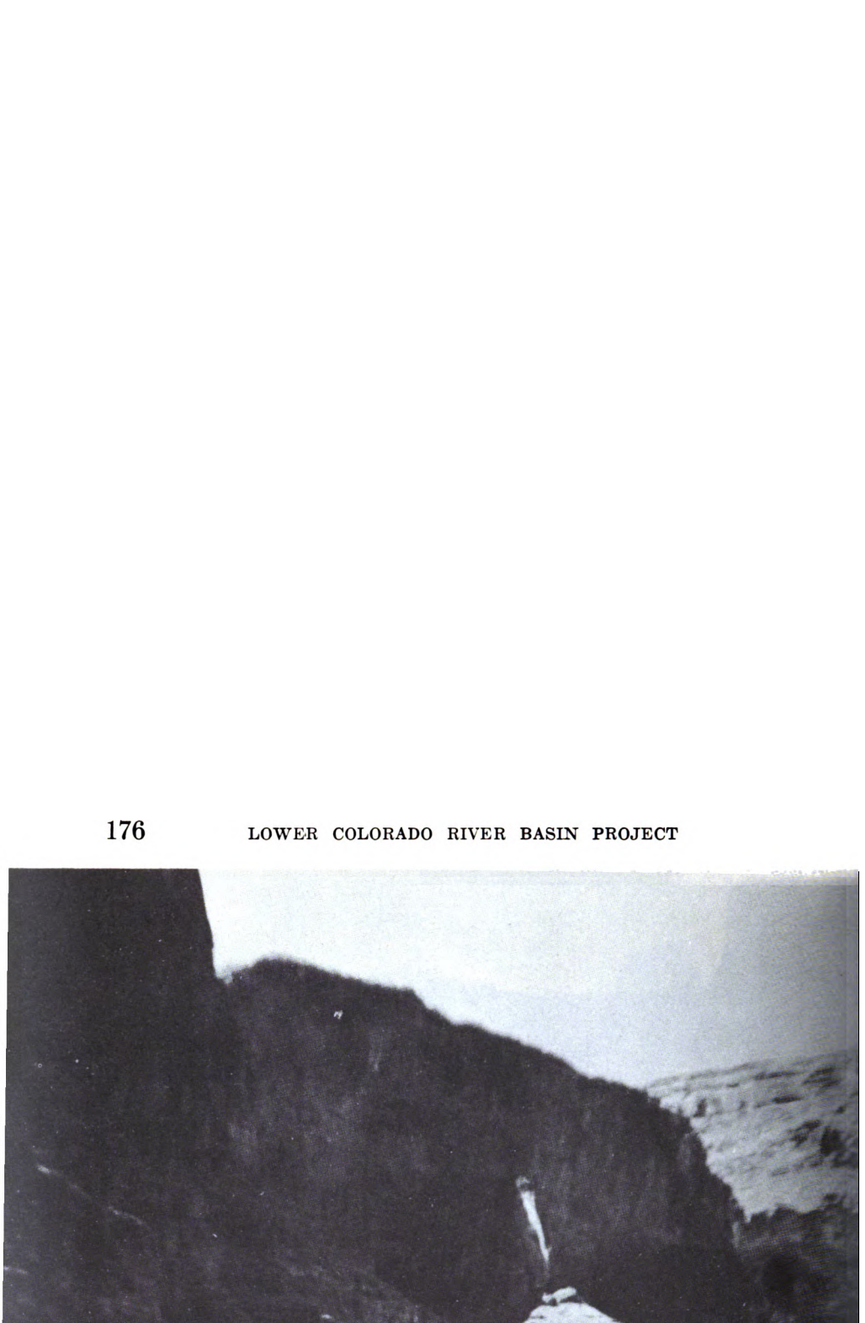




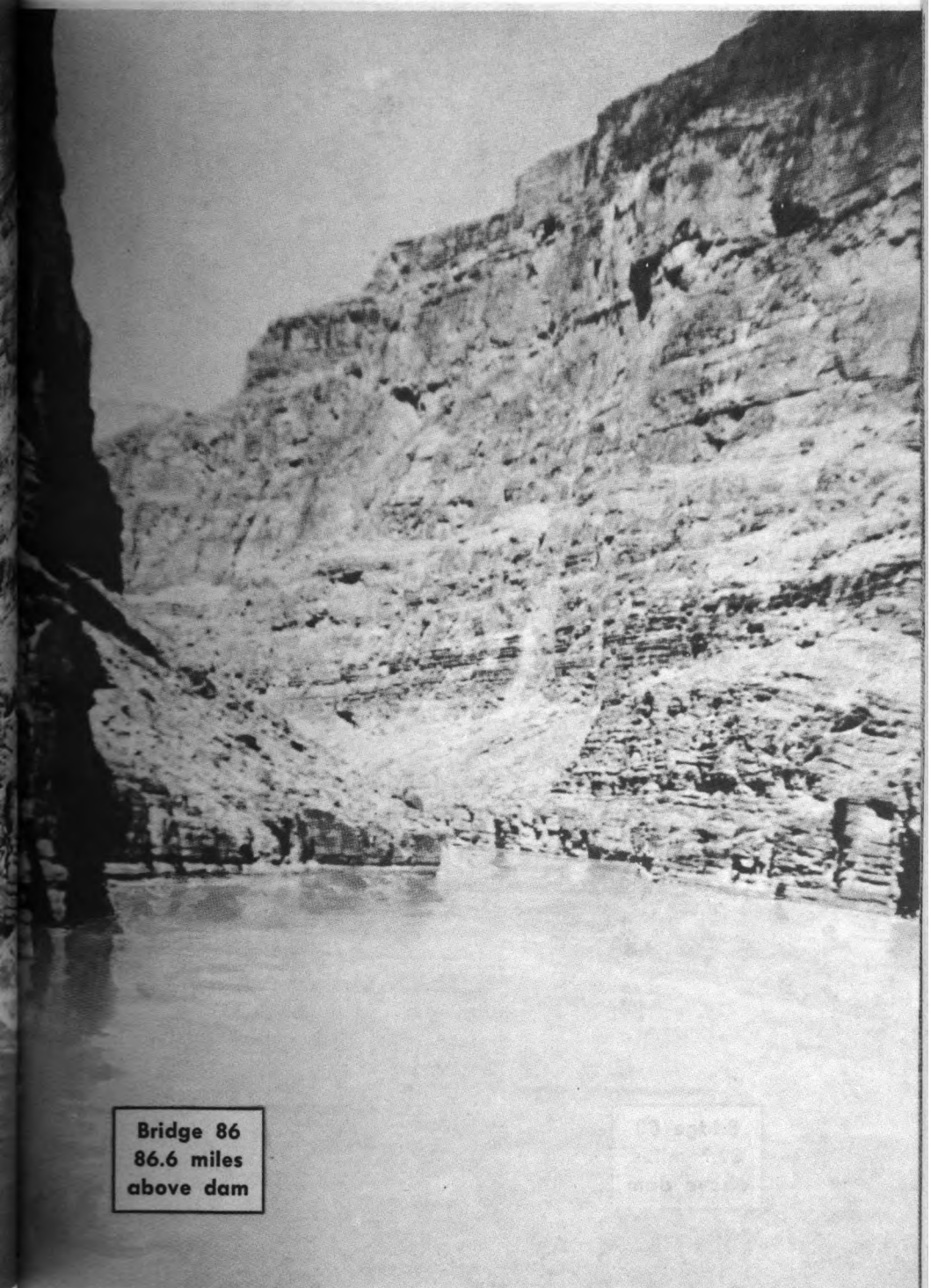


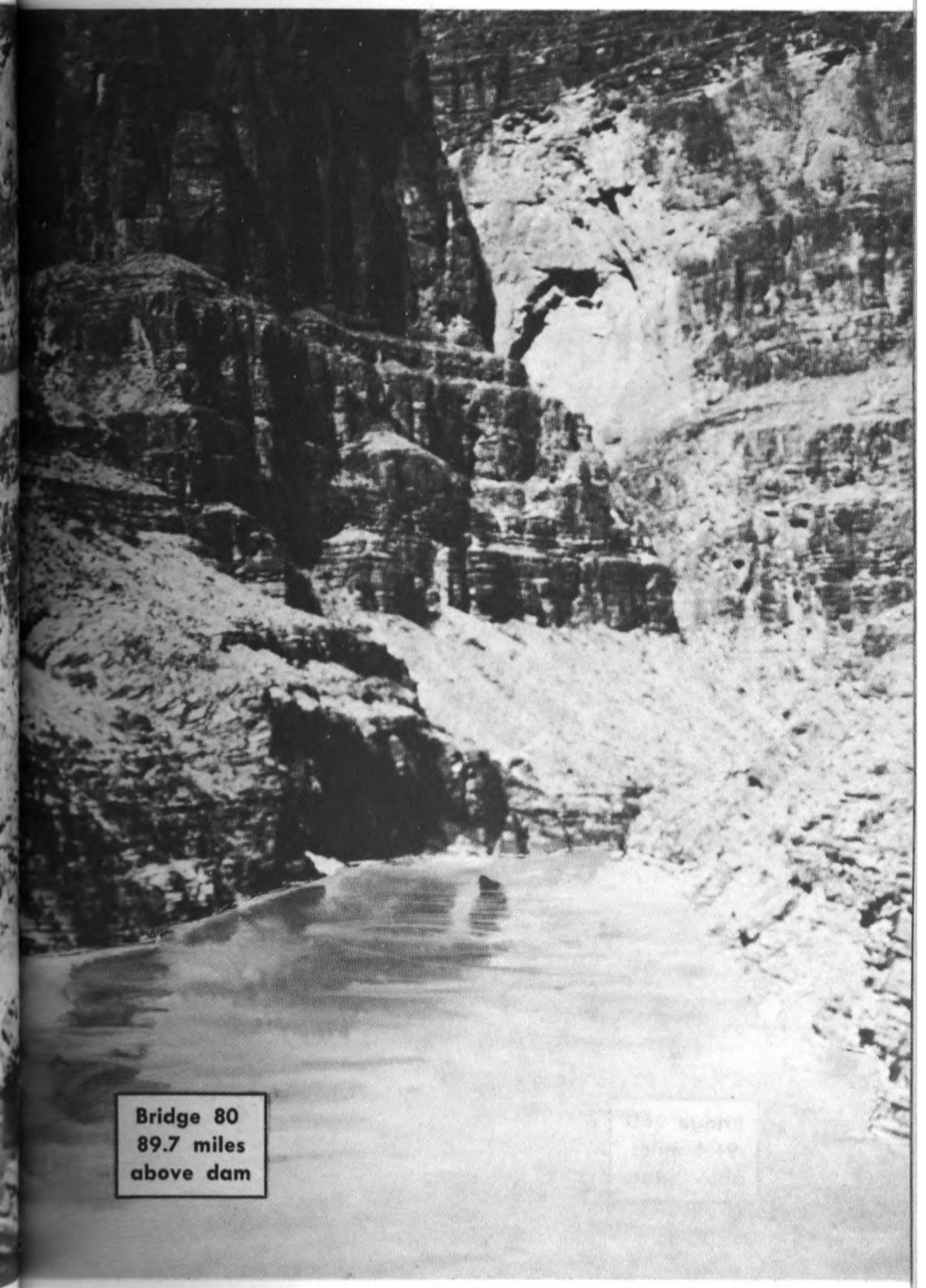


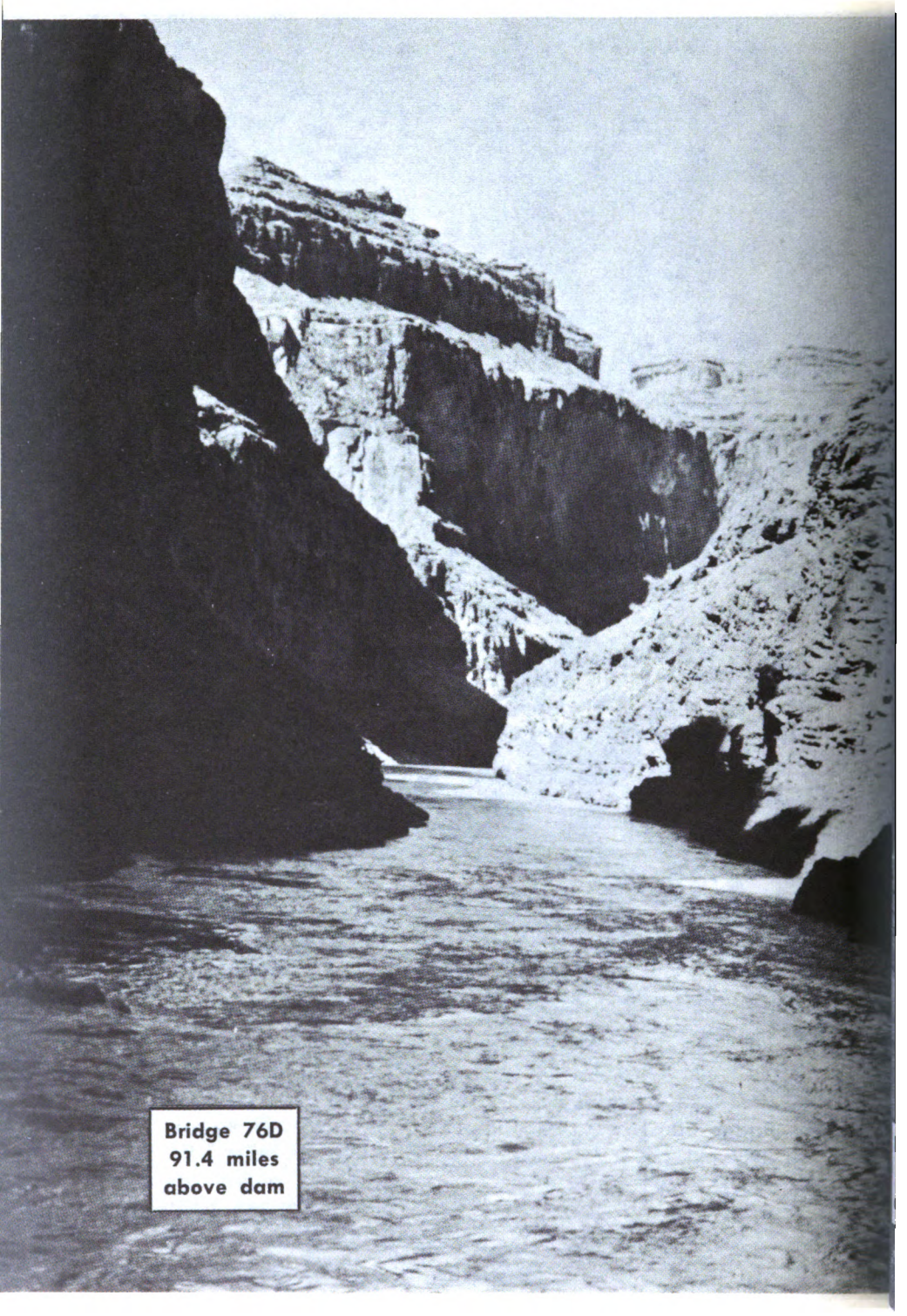


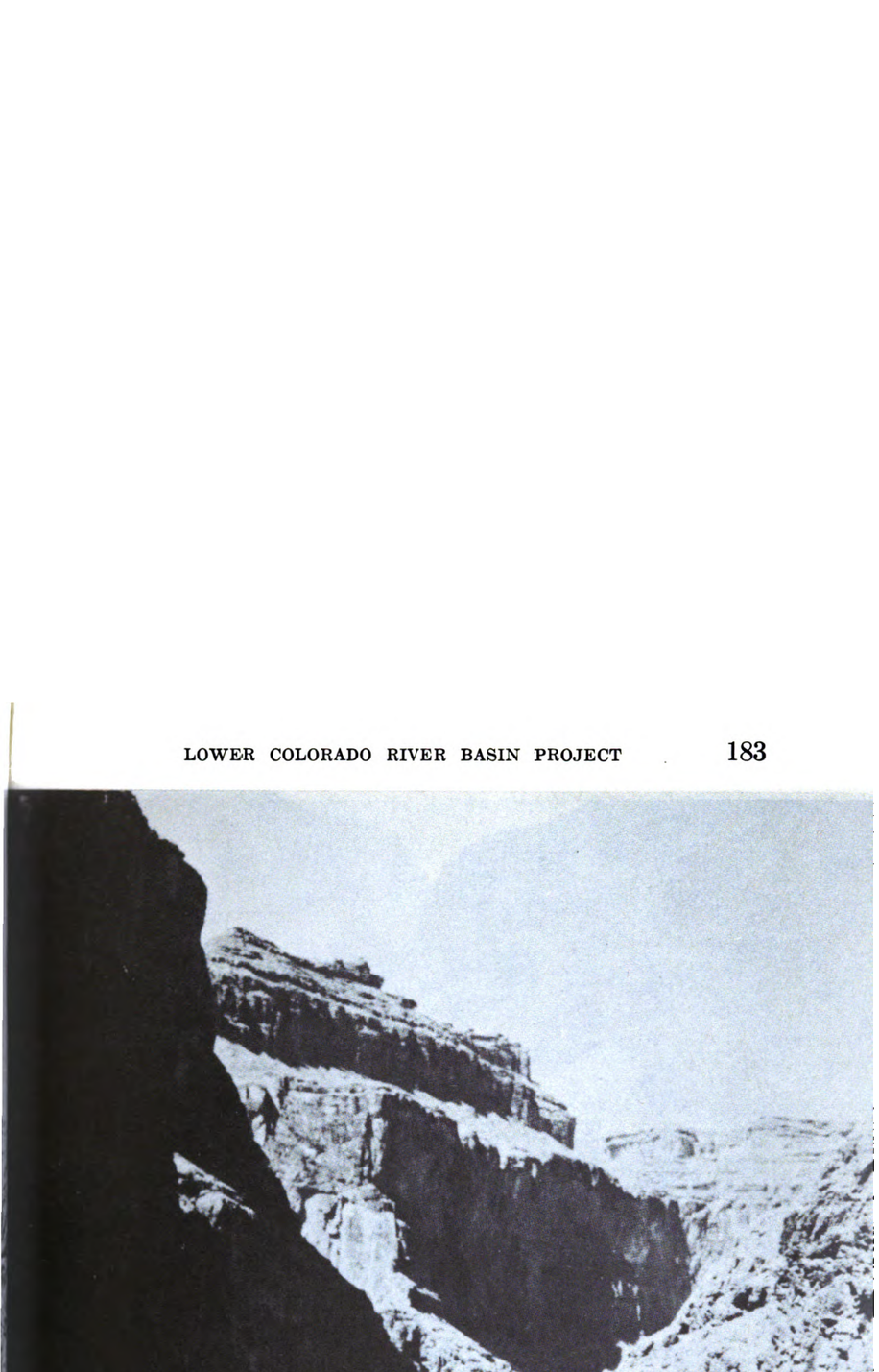


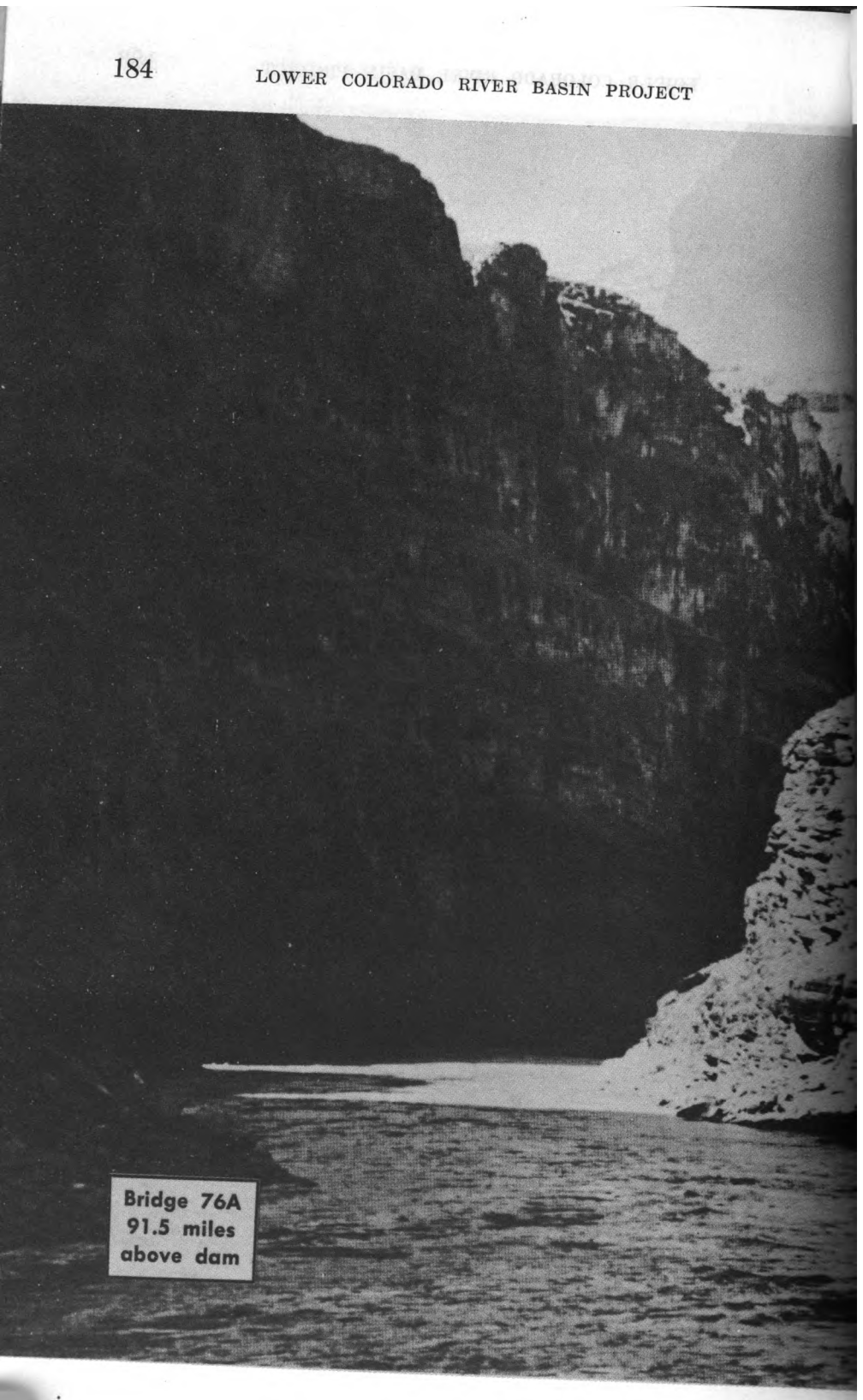
Bridge 90
83.1 miles
above dam

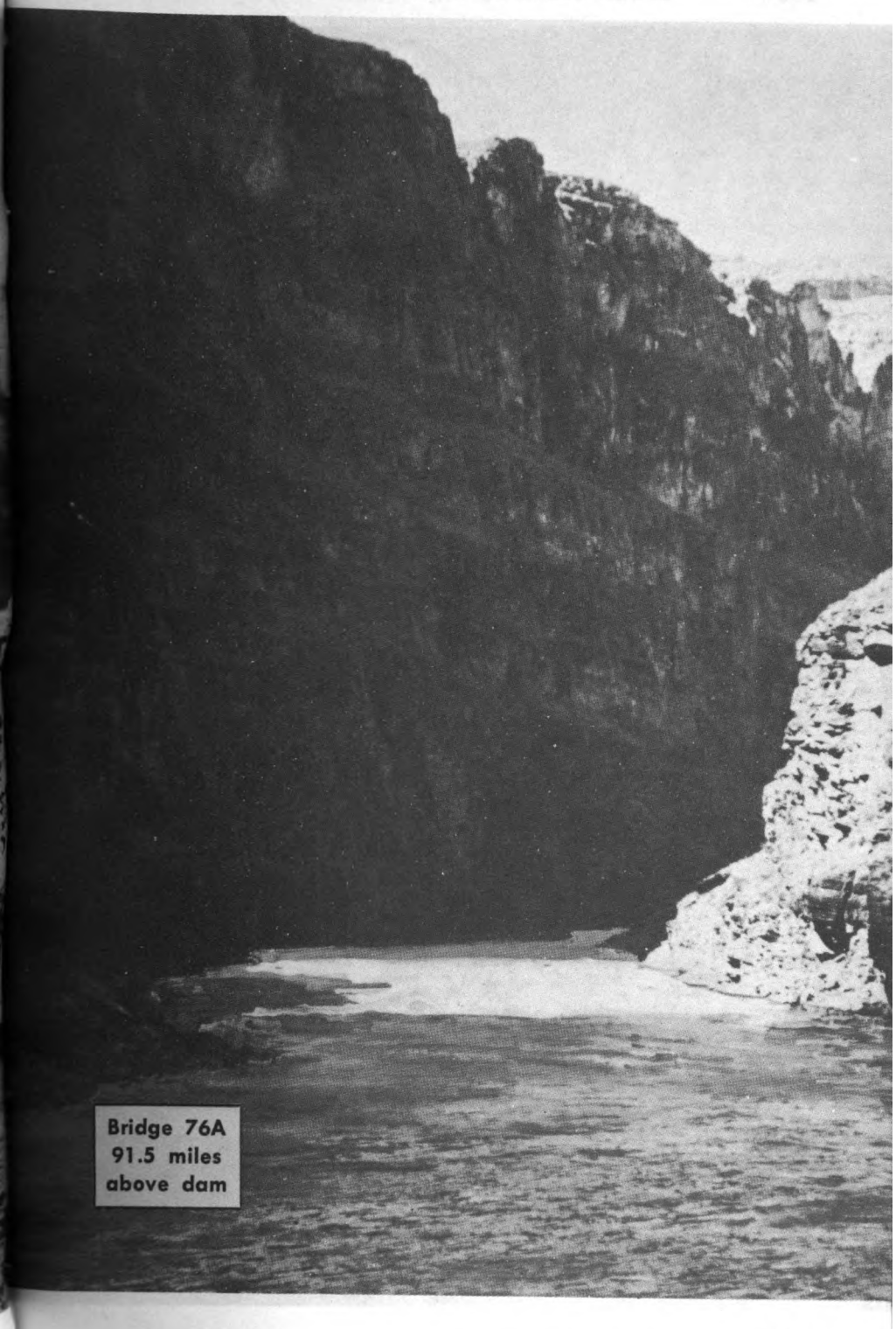


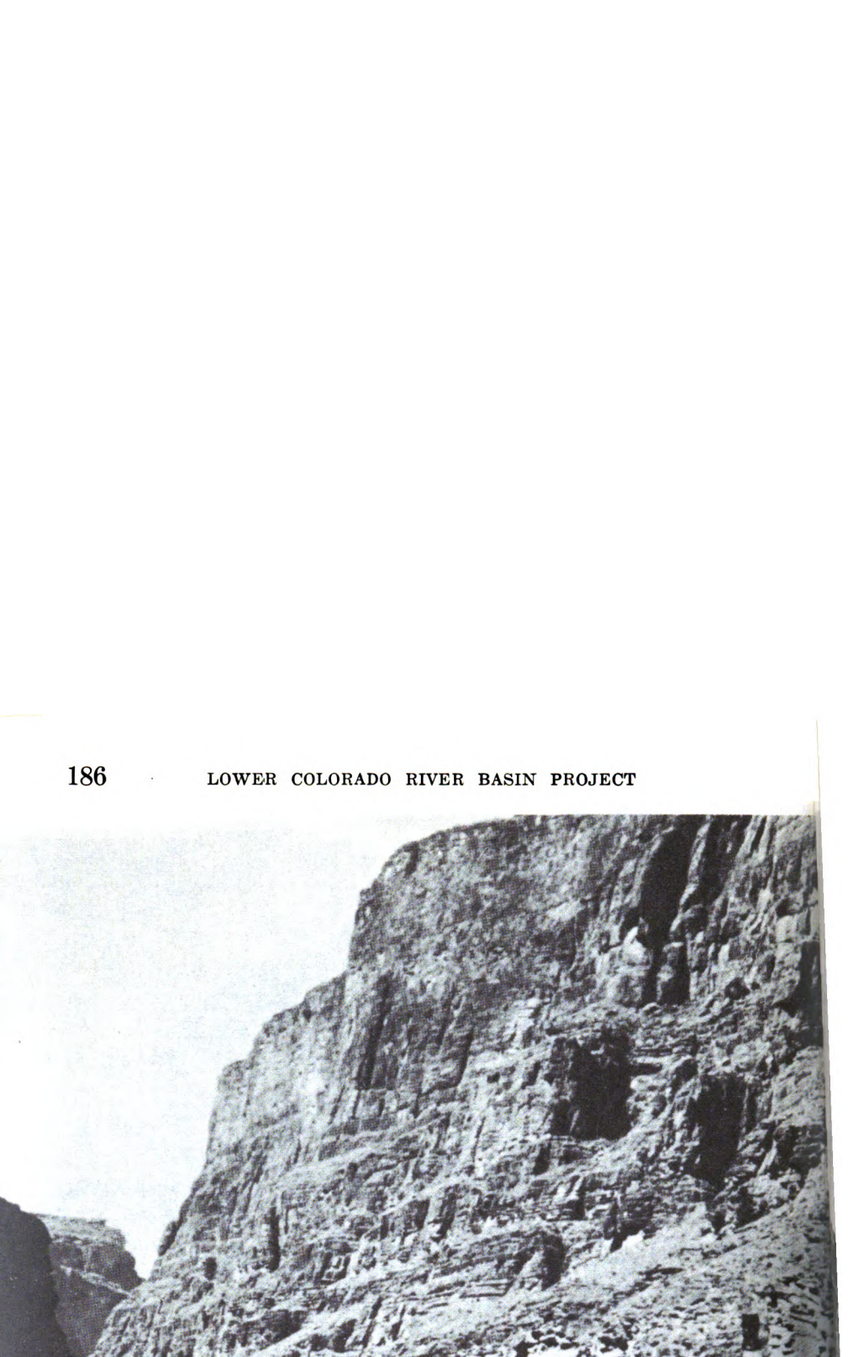


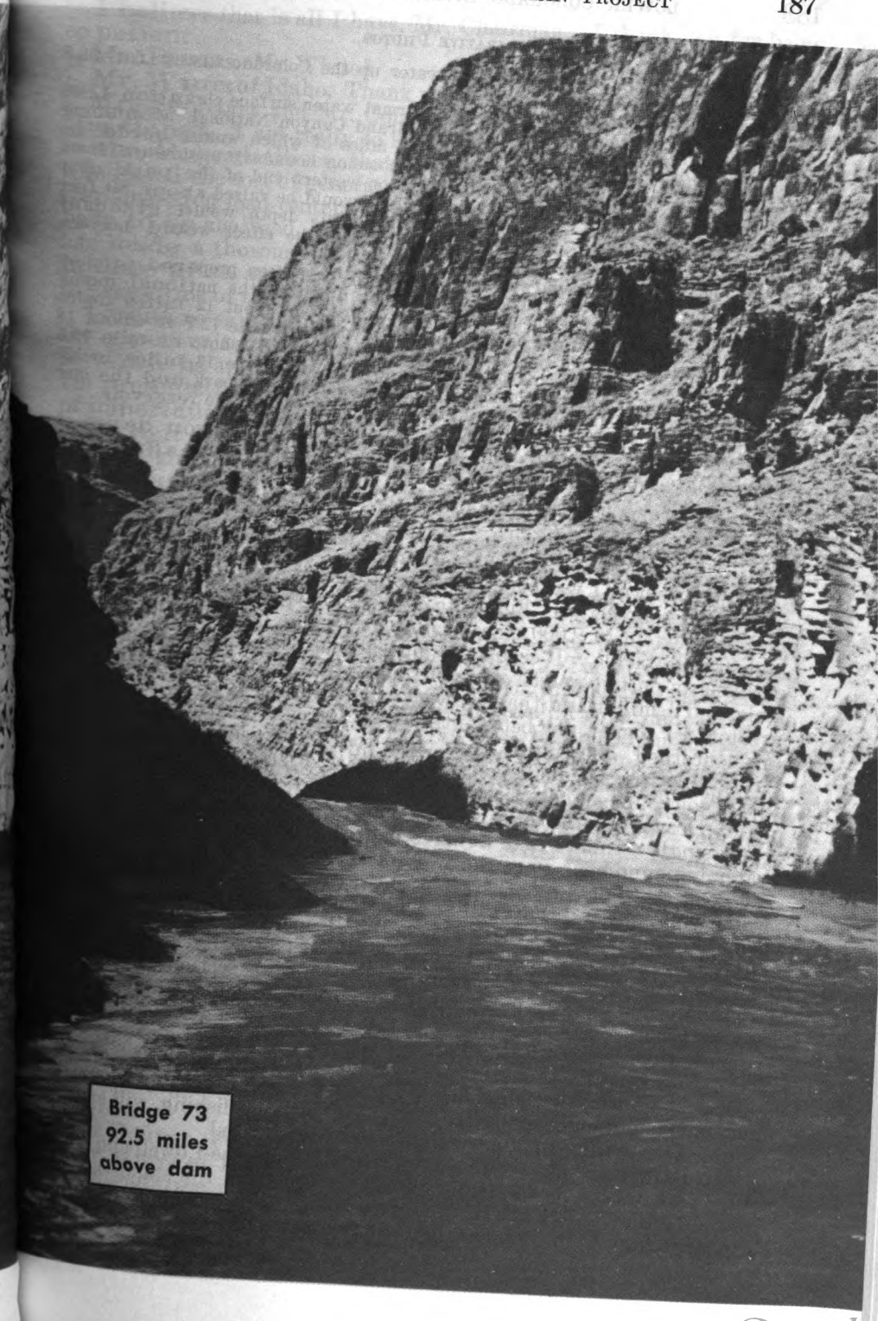












COMPARATIVE PHOTOS

The Bridge Canyon Dam would back water up the Colorado River for 93.8 miles.

Storage of water in the reservoir to its normal water surface elevation 1,866 would raise the water surface through the Grand Canyon National Monument for a distance of 39 miles, approximately 13 miles of which would border on the Grand Canyon National Park along the common boundary upstream from the mouth of Havasu Canyon. At the lower or western end of the park, near the mouth of Havasu Canyon, the water surface would be raised about 89 feet above natural conditions at normal riverflow. This depth would gradually lessen going upstream from Havasu Canyon until the effect would become imperceptible.

The comparative photos on the preceding pages have been prepared to show the effect of the reservoir. These photos are all within the national monument and national park. The first photo at mile 67 is about 12 miles inside the monument but not in the park. The second photo at mile 72.7 is about 18 miles inside the monument but outside the park. The third photo at mile 79.8 is 1 mile outside the park. The other photos are all in the 13 miles inside the park, the one at mile 83.1 being about 2 miles inside the park and the last photo at mile 92.5 being about a mile from the upper end of the reservoir.

Mr. DOMINY. And here is Bridge Canyon. And if you desire it I can show you the 105 river miles that aren't going to be affected as well.

Mr. ROGERS. Off the record.

(Discussion off the record.)

Mr. HOSMER. Thank you. Mr. Reinecke.

Mr. REINECKE. I was concerned about this because your anticipated visitor-days show a very high rate of occupancy, or high rate of usage up to the extent of 2,000 men per day on Bridge on a 250-day season and 500 on Marble. It seems like a great many fishermen and boating enthusiasts on two relatively small lakes that are relatively inaccessible, and I might add that are very close to other lakes that are far greater, far bigger, far better utilized as far as recreational facilities are concerned. Marble is very close to Powell, as you know, and Bridge likewise is equally close to, at least, Pierce Landing Point at which you could get onto Lake Mead.

Mr. DOMINY. I can only say to you, Congressman Reinecke, that every single estimate that we have had of visitor use at every single water impoundment since the war on an annual use basis is usually exceeded the first 3 months after the reservoir is filled. People are water conscious and they will go where there is beauty and water and fish. For instance, on these 2 days that I spent taking a good first-hand look at this canyon, Lake Powell was literally covered with campers and boaters, while there was the 250-mile section of the river with only one boating party on it because of no quiet water and no use that the average family could put it to—just a few hardy river runners that could use it. Then we get to Lake Mead and here you again find literally thousands of people. As the number of users increases, I am sure that Marble and Bridge Canyon Reservoirs would be a tremendous scenic wonderland and that this, plus fishing, will attract people even greater in number than we have estimated.

Mr. REINECKE. My feeling there was that both the Powell and Lake Mead are far more accessible and far safer from the standpoint of shoreline than either one of these two lakes. They are both closer to the large population centers than the two new lakes.

I believe that is all I have, Mr. Chairman. I thank you for being so patient.

Mr. ROGERS. Mr. White?

Mr. WHITE of Idaho. Thank you very much, Mr. Chairman.

Mr. Secretary and Mr. Commissioner, I am ready to stipulate certain things. I am ready to stipulate that there is not enough water in the Colorado River, that the bank area is going to have to be filled and the cost of generating plants is going to have to be analyzed, transmission load centers, recreation, all of these things are going to have to be analyzed, and I will have to assume that the Department has made a thorough analysis, as thorough an analysis as they can in these areas, and have tried to come forth with forthright figures in every one of these instances.

I want to say one other thing to the Secretary that I didn't have the opportunity to say the other day, that I did appreciate the manner in which he approached importation of water when he was making his presentation. Of course, my main interest will be in this area of importation of water.

At your last appearance here I asked Commissioner Dominy to prepare through his offices a compilation of the shortage of available use, a chart, and I believe that has been prepared, is that true?

Mr. DOMINY. Yes, sir.

Will you put that revised chart up so that we can show the material that the Congressman asked us to put on it a little more clearly?

This chart shows the water demand—water supply relationship for the Colorado River Basin as a whole. Note that by the year 1990 all of the water supplies of the basin plus imports under the California State plan will be fully utilized. There are other estimates that this will occur earlier than 1990. After that date as the demand increases, the shortages will increase in equal amounts.

Even if water supplies of the Colorado River are augmented in the future to the extent of 1.5 million acre-feet to offset the Mexican treaty requirement, we will still have a water shortage developing in an impressive amount. During the period 1965 to 1975 water supplies of the Colorado River not available for consumptive use purposes will be used to fill the storage reservoirs. After that we begin to face up to the shortages.

The tabulation on the side will indicate the magnitude of the shortages. Northcutt Ely I believe testified yesterday that in his judgment about a 6-million-acre-foot shortage would develop for the lower basin without regard to the upper basin. If I were to answer the same question, I would agree with Northcutt Ely and point out that the total shortage anticipated for both the upper and lower basin would be in the magnitude of 8 to 8½, 9 million acre-feet, and this is what we are facing for the future, by the year 2030.

Mr. WHITE of Idaho. Well, yesterday Mr. Ely started out with a base figure of 6 million acre-feet and rounded it off at 10 million acre-feet.

Mr. DOMINY. For both the upper and lower basins.

Mr. WHITE of Idaho. Is this for both the upper and lower basins, to replenish the underground water table of Arizona, to take care

of the municipal and industrial anticipated growth and California's needs out of the Colorado area?

Mr. DOMINY. Yes. I wouldn't disagree with his figure. It is somewhere in the magnitude of 8½ to 10 million acre-feet.

Mr. WHITE of Idaho. This is a figure I am going to be asked over and over again and I have to try to either agree or disagree with you as to availability of this water from the logical region of importation or diversion.

Mr. DOMINY. Yes; and I think as you discuss that, you ought to put it in this framework. The maximum recorded flow for any year on the Columbia River near The Dalles was 227 million acre-feet.

Mr. WHITE of Idaho. In 1894.

Mr. DOMINY. That was in 1894.

Mr. WHITE of Idaho. And the second high was 1948.

Mr. DOMINY. That is right.

Mr. WHITE of Idaho. What was the flow in 1948?

Mr. DOMINY. We don't have that here.

Mr. WHITE of Idaho. Flooded out.

Mr. DOMINY. It came pretty close.

The minimum flow—this is the historic minimum flow on the Columbia River—these poor Colorado River people shudder when they hear this—85 million and a half.

The average virgin flow at the mouth of the Columbia River, 178,600,000 as compared to the Colorado River virgin flow of 16 million at the mouth.

The average depleted flow of the Columbia River after you have taken out all of the irrigation and all of the consumptive uses, is still 168,300,000 acre-feet. If you can forecast that your uses are going to quadruple or be six or eight times greater than they now are, you have still a tremendous resource that in my judgment is way and beyond anything that your maximum potential industrial and agricultural economy could ever completely utilize.

Mr. WHITE of Idaho. This is an assumption of a diversion at the mouth of the Columbia, is it not?

Mr. DOMINY. Yes. I can tell you that the Secretary of the Interior has given me firm and emphatic and unequivocal orders that there will be no consideration whatever of trying to take it from any other source, because he recognizes that all of the tributaries that help supply this ought to first be utilized to develop the local economy to the maximum extent possible.

Mr. WHITE of Idaho. Well, in that particular vein, then, as we have had previous correspondence, communication, with respect to such development, we would like to see this development go hand in hand with the type of program that we are talking about here today.

Mr. DOMINY. Exactly, and we have some very fine plans for further development on the Snake River.

Mr. WHITE of Idaho. I appreciate the cooperation I have had from your office in the past. I think my next question is more or less answered, that anticipated with respect to importation and diversion from the Columbia Basin as now envisioned and under the instructions of the present Secretary would be to divert the water from the mouth of the Columbia River, is that correct?

Mr. DOMINY. Below the Bonneville Dam which is the last point.

Mr. WHITE of Idaho. Below the last——

Mr. DOMINY. Below the last point of use of diversion and power production on the river, yes, sir.

Mr. WHITE of Idaho. Assuming that the needs of Portland and the downriver area would be taken care of.

Secretary UDALL. Congressman, let me underscore this even further because the thing that I think we ought to put very squarely on the record here is that we don't think it would even be wise to study anything other than that source. It seems to me, and I would like to say loud and clear to all the people in the upper basin, the lower basin, and in southern California, that I think it would be foolish for anyone to contemplate disturbing the status quo as far as water and power are concerned on the entire stretch of the Columbia River at this point in history. I just don't see any necessity for it. I think that this can only invite controversy and trouble and I think we ought to talk in terms of study of only one alternative and that is water at the mouth of the Columbia River which otherwise would be wasted. I want to add one other point to that, because of all the things that I have participated in since becoming Secretary 4½ years ago, I think the thing that is most significant to the country in terms of resource development, most significant in terms of the future, is the Northwest-Southwest electric power intertie that we put together a year ago. This is a project that, when finished, will involve integration of systems at an expense of nearly three-quarters of a billion dollars, and here we have put together, linked together, power systems to the mutual benefit of both regions; and I am convinced, and I don't think anyone has to be a visionary today, that ultimately you are going to see some kind of water intertie that will be to the mutual advantage of both regions.

If we can plan together and work together on that basis and approach it as we did with the electric power intertie, I think that we are going to find we emerge with something that is good for the country, that is good for the Northwest, that is good for the entire Colorado River Basin and Pacific Southwest.

Mr. WHITE of Idaho. I don't know whether you read the testimony that I gave yesterday but this was the thrust that I made in my testimony at that time.

Mr. DOMINY. I heard your testimony, Congressman White, and I couldn't disagree with your point of view as expressed. I think the Secretary's directive to me is fully compatible with your concern and with your reasonable desire to develop your own economy to the maximum extent possible.

Mr. WHITE of Idaho. I would like to ask one other thing with respect to a down-river diversion below Bonneville Dam. This would be on the assumption that there would be uses of the water above that area. However, the flow figures that we just talked about makes this perhaps a rather abstract question. But would it not in effect be a downstream water right that, if the water were not available at that point, there could be no further diversion in the upper reaches of the river?

Mr. DOMINY. I am confident that this diversion should not nor will it ever occur unless the States of the Pacific Northwest have, by

their own economic studies, their own water supply forecasts, reached substantial agreement that there is a surplus and that the total economy of the West will be benefited by such an import to the Colorado River, and that there would be protection written into it so that if the projections for the future were erroneous and that there was need for a greater supply than contemplated, that there would be protection in the plan.

But my own judgment, sir, leads me to the conclusion that after all possible uses of water supply to take care of the area north of San Francisco have been met, that there will still be tremendous quantities of water available to move into the more arid sections of the Southwest.

There are 300 million acre-feet annually of water being discharged into the Pacific Ocean from streams north of the Sacramento River, not including the Sacramento River, of which the Columbia River, of course, is the giant. This is the area that has the mountains close to the sea with a tremendous reservoir of water supply pouring off of those mountains and into the ocean.

Mr. WHITE of Idaho. Mr. Commissioner, yesterday or the day before yesterday when the testimony was being given by the Department by both you and the Secretary, I think it was the Secretary who said, "Well, we could increase the size of these works and perhaps have some water for Oregon, have some for Nevada, have some for Utah, and in that way interest them in participating in this particular project."

Does anyone have any idea of what amounts you might be talking about?

Secretary UDALL. Congressman, I think it is very important at this point to only focus attention, because any amounts are only estimates. This hasn't been studied and it would have to be studied very thoroughly. I am convinced myself that there will never be a plan that does not provide benefits of some kind for the Pacific Northwest. I think this is absolutely essential. I think this would have to be part of the plan and I think it is the way it should be put together, just the way we put the electric power intertie in terms of benefits for both regions, and in terms of protection for both regions.

Mr. WHITE of Idaho. Well, I think that is better legislation than anything else, Mr. Secretary. The fact that we are putting together works, planning for the central Arizona project, diversion to California, making whole the Colorado River, and analyzing this very closely, at the same time assuming just by the nature of what information we have now that there is sufficient water to do this and that diversion works could be put in from the Columbia that would make this Colorado River whole without that analysis. It seems like we should have some information on the feasibility of that particular part of the program because we are alluding to it here, not less than 2½ million feet, with national responsibility for the million and a half feet to Mexico. I think in fairness to yourself and to the project that these things should be made available to the people of the Northwest so that they will not have the unfounded fears that perhaps they hold at the present time.

Secretary UDALL. Congressman, I couldn't agree with you more and I think that anybody who is talking about any kind of import program ought to say loud and clear to the people of Idaho, of Wash-

ington, of the Northwest States in the drainage basin of the Columbia, that no one covets or proposes using a drop of water that is usable on the watershed except surplus waters that would otherwise waste into the mouth of the Columbia—point No. 1.

And point No. 2, that this should be studied very thoroughly and that an attempt should be made as part of that study to develop a plan that would provide benefits for both regions. Once those studies are completed, then it would be time for the making of decisions and hopefully those decisions could be reached with a broad unanimity if the planning were done in the right way.

Mr. WHITE of Idaho. Well, I think it is incumbent upon your office to do this as rapidly as possible so that my people will not be talking about diverting the Snake River at Thousand Springs when there are only 10 million acre-feet in the Snake going past Hells Canyon today and you talk about 10 million acre-feet into the arid Southwest so that they will be assured of the planning and the potential of the program.

Mr. UDALL. Would the gentleman yield? I think it is important to hammer away to emphasize to our Northwest friends that the bill before them provides for nothing but a study. The bill doesn't provide for importation of water. It says let's talk and look and study, and think about it, and the language on pages 3 and 4 of the bill simply instruct the Secretary to do what you have been telling him he ought to do, make these studies, and on page 4 it instructs him—I think it is on page 4—that in any event, he cannot study unless the area of origin, prospection—down at the bottom of page 3—and planning works and import and studies, and so forth, 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 us therein adequate to satisfy their ultimate requirements, of the Northwest in this case, at prices to users not adversely affected by the exportation of water, and so forth.

Mr. WHITE of Idaho. I agree very definitely with what the gentleman from Arizona said but also I listened to testimony here by Mr. Ely yesterday that said that we expect positive action under this particular portion of the bill, and I believe that when you are developing and designing works for the use of imported water to make the Colorado River whole, that this has gone beyond just the study stage at this particular time, and I think I have made my point clear—I don't want to belabor the point.

Secretary UDALL. Congressman, I would like to add I think you have made a very good record. I hope we helped you to make the kind of record you wanted to make. I would like to make a prediction, and that is if whatever import plan is ultimately devised, if one is, if it isn't such a plan that has sufficient protection and benefits so that the Congressmen and Senators in the Pacific Northwest vote for the bill and are for the bill, I think any plan of this kind will be in difficulty. I am convinced that such a plan can be devised if the best people, the most talented people in water project planning, set out to study and devise such a plan.

In other words, a plan that the people in the Northwest would not only not fight but be positively for in terms of what it might hold for their own region.

Mr. WYATT. Would the gentleman yield?

Mr. WHITE of Idaho. This is very true, Mr. Secretary, and we feel at the present time that perhaps we haven't been taken into the confidence that we should have been taken into with respect to some of the planning that has been completed up to this point, and we hope that from now on we will be an integral part of this planning so that we can have the benefit of all of the information available.

I will be glad to yield to the gentleman from Oregon.

Mr. WYATT. I would like to comment at this time. I appreciate the reassurances of my colleague from Arizona that the plan in regard to imports only amounts to a provision for studies, but I think that we know that studies lead to action and we sat here yesterday and heard the attorney general of the State of California say that he anticipated that this would lead to action and that importation was the first legislative step toward importation of water.

Now, whether that is the intention of the Department of the Interior under you, Mr. Secretary, is more or less beside the point because the largest State in these United States feels this way.

Water and power in the Northwest are our greatest natural asset and really our greatest potential for growth, and it is of great concern to us. I share the concern of Congressman White and I would like to see a little more emphasis put upon the possibilities of conservation, of desalting, of reuse, and importations from northern California which the Secretary covered in the original testimony, and have these avenues explored perhaps on an equal basis with importing water from the Northwest.

Secretary UDALL. I would certainly agree, Congressman, that we are going to need all the conservation we can get and this is where you begin.

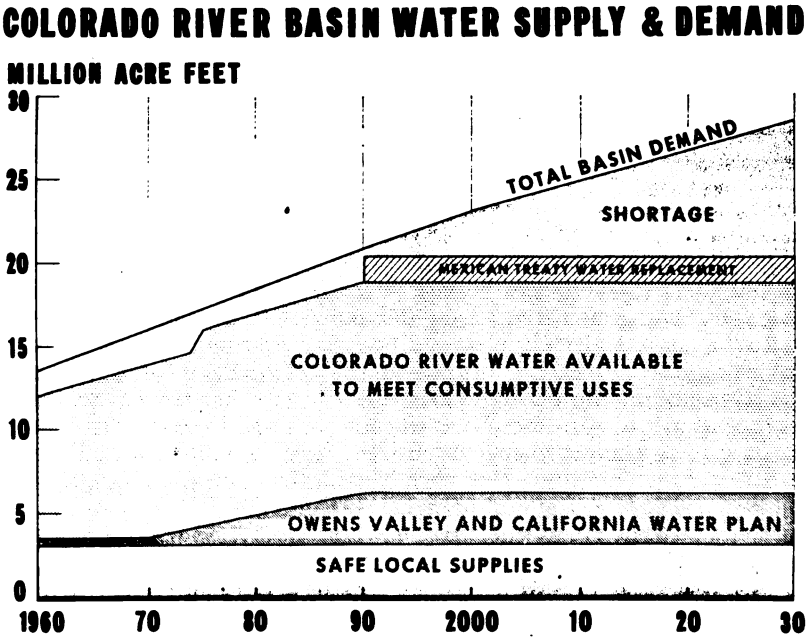
The other point, however, that I want to stress because I want to make a record here today for the benefit of the Congressmen from the Northwest and for everyone concerned, is one of the things that we take great satisfaction in, that we have achieved in the last year, that is to bring Arizona and California together. I think this department, and whoever is Secretary in the future, must work to bring the Northwest and the Southwest and the States of the Colorado River Basin together on a common plan. If a Secretary or a Commissioner becomes a champion of one region, I think this is the way to insure failure of any plan. I think you have to have an approach whereby you look at what is best for both regions and you tailor your planning accordingly. Unless you approach it in that fashion I think you are headed for disaster and controversy.

Mr. WYATT. We can hope that there would be a common ground of meeting but it is possible that there may not be, Mr. Secretary.

Thank you.

Mr. WHITE of Idaho. Mr. Chairman, the chart that was shown here, I would like to ask unanimous consent that it be included in the record.

Mr. ROGERS. Is there objection? The Chair hears none, and it is so ordered.



Mr. WHITE of Idaho. The gentleman from California, Mr. Tunney, informs me he has an appointment at 3 o'clock and he is already late and would like to ask some questions, and if I may, I would like to yield to him and reserve the balance of my time.

Mr. ROGERS. You may yield.

Mr. TUNNEY. Thank you very much, Mr. White. I certainly appreciate it.

I would like to ask Mr. Dominy: What do you anticipate the difference will be in the amount of the Lower Colorado River Development Fund at the end of 75 years with Bridge Canyon Dam included and without it being included?

Mr. DOMINY. This is to be put in the record, but it will take just a moment to give you some figures.

The Bridge Canyon project surplus revenues when integrated into the development fund would accumulate to approximately $450 million at the end of year 2025 and at the end of year 2047 the accumulation would be $950 million. The contribution to the development fund in net annual surplus revenues would approximate $23 million per year from about 2005.

Mr. TUNNEY. So that at the end of 75 years it is fair to say that the Bridge Canyon Dam would contribute a billion dollars—roughly a billion dollars.

Mr. DOMINY. Yes, sir.

Mr. TUNNEY. To the development fund.

Mr. DOMINY. Yes.

Mr. TUNNEY. In your opinion——

Mr. HOSMER. Excuse me. Is that with Bridge and Marble?

Mr. DOMINY. No. That is just Bridge. This is the net addition to the fund that would be possible from Bridge Canyon Dam and powerplant.

Mr. HOSMER. I wonder if we could get, Mr. Tunney, Bridge and Marble combined as against Marble only, as recommended——

Mr. DOMINY. Yes. We can supply that for the record very readily, sir.

Mr. TUNNEY. What in your opinion—I haven't seen the pictures yet—would be the effect on the Grand Canyon by building Bridge Canyon Dam?

Mr. DOMINY. Well, the actual effect on Grand Canyon National Park from these two structures—let me put it in perspective. Glen Canyon Dam has already changed the character of the river. It runs with clear water from Glen down to about Lee Ferry at the moment, then it starts picking up a silt load again which has been accumulated over the years in sandbars and silt beds along the river, and by the time it gets to the confluence with the Little Colorado, it is a heavily silt-laden stream again. But with Marble Dam on the river, this will clear up and except for when the Little Colorado River would be carrying silt into the river, you will have a trout stream of extreme clearness down through the stretch of the 105 miles between the Marble Canyon Dam and the headwaters of Bridge Canyon Reservoir.

Now, the headwaters of the Bridge Canyon Reservoir reach 13 miles along the river where the Colorado River is the northwest boundary of the Grand Canyon National Park. At Kanab Creek it would have zero effect on the river. At Havasu, which is the boundary of the park, it would be about 80 to 90 feet above the present river level and it would back water into Havasu Canyon for about 2 miles. There would, of course, be 644 feet of water at the dam itself 80 river-miles below the Grand Canyon National Park boundary.

Now, I think the pictures will indicate to you that for the most part the actual impoundment of the blue water lake that covers the talus slopes and the less picturesque sections of the canyon as contrasted to inundating the beautiful walls in the canyon——

Mr. TUNNEY. It would inundate the walls of the canyon.

Mr. DOMINY. Only as the pictures indicate. It would very rarely get up onto the canyon wall except for a few miles directly above the dam itself. Of course, you can read accounts of how we are going to flood out the canyon, but it is a little hard to flood out a canyon that is more than a mile deep in places with only 644 feet of water at the dam and with zero effect 93 miles upstream.

Mr. TUNNEY. Ninety-three miles?

Mr. DOMINY. Yes. The Bridge Canyon Reservoir would be about 93 river-miles long and the Marble Canyon one would be 54 miles long. There would remain 105 miles of fast water between Marble Canyon Dam and the headwaters of the Bridge Canyon Reservoir. This is a completely inaccessible area, as I pointed out. During the 2 days that I spent by helicopter at the end of May getting familiar with this, there was only one small boating party on the entire stretch

of the river. And this was the time when normal spring runoff provides the water that makes it possible for float trips.

Mr. TUNNEY. Assuming that the Bridge Canyon Dam isn't built and this billion dollars of revenues is lost over a period of 75 years, and also assuming that there is some eventual importation project, who would have to pick up the tab of the billion dollars that is lost in revenues?

Mr. DOMINY. There haven't been any of these large projects that we have built in recent years where the full capital costs allotted to irrigation plus operation and maintenance and replacement can economically be borne by the ultimate user. In every case we have had to rely to a significant degree on the power revenue or cash register aspects of reclamation law which is provided for in the 1939 act. So I can only say to you that in my judgment the project would not be built or it would not be built until after a serious impairment of the economic growth and the Southwest was forced to pay a very uneconomic price for water and that, of course, would limit your economic growth potential.

Mr. TUNNEY. In the financial studies of the Colorado River storage project, how much water per annum is assumed to pass through Glen Canyon——

Mr. DOMINY. This is a question that, of course, is of great import to both the upper and lower basin States. It is absolutely true, as Chairman Aspinall has established in questioning previous witnesses, that in the early years of the projected water supply for the Lower Colorado River Basin project as provided for in this bill, that flows in excess of the amount required under the compact to be released to Lee Ferry by the upper basin are envisioned. I must also point out that our payout studies for the Colorado River storage project also envision this, and the project that has proceeded in construction at a more rapid pace I think than any other reclamation project of major size in history. It could not have been built at that pace except that we anticipated quantities of water more than an average of 7.5 million acre-feet a year in the early years when the interest payments are highest during the payout requirement.

Mr. ASPINALL. Would my colleague yield?

Mr. TUNNEY. Yes.

Mr. ASPINALL. Would you explain for the record at this place, Mr. Dominy, what was the record that you made of the Colorado storage project in this respect in 1955 and 1956?

Mr. DOMINY. Yes.

Mr. ASPINALL. I ask unanimous consent that that information be placed in the record.

Mr. ROGERS. Without objection, so ordered.

(The information requested concerning the Colorado River storage project record for 1955 and 1956 is shown on pp. 164 through 167, inclusive, of H.R. 364, 83d Cong., 2d sess., follows:)

The following table is a summary of the operation of all project reservoirs during a 20-year period of construction and initial filling. The table shows the manner in which the reservoirs would be filled, the annual growth in firm energy generation, and the residual flows at Lee Ferry. Since variations in annual

stream flows during this 20-year period cannot be foretold, average flows were assumed each year. The flows used were the averages for the 1914–45 period, corrected for the effect of progressive development of water-consuming uses above the reservoirs and for upstream storage regulation. Sediment encroachment on reservoir capacity was considered negligible during this short period. The occurrence of protracted subnormal flows during the initial filling period would require temporary adjustments in project operation and the correlation of power operations in the upper and lower basins.

Data shown for year 20 in the initial filling tabulation differ in some aspects from those for an average year 20 in a closed-cycle operation study. In a closed-type study the reservoirs would not have remained full at all times so that the average evaporation would be only 810,000 acre-feet annually, compared to 1,045,000 acre-feet from full reservoirs. With less reservoir evaporation and no average annual increase in reservoir content during a closed-cycle operation the residual flow at Lee Ferry would be increased accordingly.

Project operation during construction and initial filling of reservoirs

Development year	Water year [1]	Total system firm energy generation (million kilowatt-hours)	Annual water utilization in upper basin (1,000 acre-feet)				Residual annual flow at Lee Ferry (1,000 acre-feet)
			Depletion exclusive of project reservoir evaporation	Project reservoir evaporation	Storage gain in project reservoirs	Total	
0	1956	0	2,548	17	880	3,445	12,198
1	1957	274	2,614	136	5,388	8,138	7,500
2	1958	831	2,679	217	5,238	8,134	7,504
3	1959	2,592	2,745	307	5,081	8,133	7,505
4	1960	3,710	2,811	462	4,874	8,147	7,491
5	1961	4,730	2,876	539	2,989	6,404	9,234
6	1962	5,564	2,942	599	3,612	6,153	9,485
7	1963	5,995	3,007	647	1,726	5,380	10,258
8	1964	6,015	3,073	689	1,711	5,473	10,165
9	1965	6,040	3,139	721	1,688	5,548	10,090
10	1966	6,314	3,204	758	1,702	5,664	9,974
11	1967	6,479	3,270	796	1,749	5,815	9,823
12	1968	6,579	3,336	844	1,762	5,942	9,696
13	1969	6,601	3,401	867	1,672	5,940	9,698
14	1970	6,637	3,467	899	1,673	6,039	9,599
15	1971	6,745	3,532	929	1,501	5,962	9,676
16	1972	7,469	3,598	944	1,363	5,905	9,733
17	1973	8,011	3,664	970	1,332	5,966	9,672
18	1974	8,267	3,729	1,007	1,234	5,970	9,668
19	1975	8,849	3,795	1,017	1,215	6,027	9,611
20	1976	8,962	3,861	1,045	1,165	6,071	9,567
Total					48,555		

[1] Year ending Sept. 30 of year shown; based on assumed construction schedule.

INITIAL OPERATION OF COMPLETED PROJECT, YEAR 20

By year 20 all units of the Colorado River storage project would be operated as an integrated system with final control of the river flow at the Glen Canyon Reservoir. Depletions at Lee Ferry from upstream uses and reservoir evaporation would then amount to about 62 percent of the use apportioned the upper basin. The maximum annual firm electric energy output for the project, estimated at 8,962 million kilowatt-hours, would be attained in year 20. Thereafter the annual generation would decrease with increased upstream water depletions and with reduced reservoir capacity for the regulation of power water due to sedimentation and increasing storage requirements for river regulation. Operation of the system under conditions prevailing in year 20 to provide maximum firm-energy generation would require large withdrawals from storage to supplement the below-average flows of the 1931–40 period. The regulatory capacity of the reservoirs would not have been completely emptied, however. The annual closed-cycle project operation as of year 20 at the Glen Canyon Reservoir and the resulting flows at Lee Ferry are shown by the following table.

Initial operation of completed project, year 20—Final point of control at Glen Canyon Reservoir

[Unit, 1,000 acre-feet]

Water year	Inflow to Glen Canyon Reservoir [1]	Net evaporation from Glen Canyon Reservoir	Controlled release from Glen Canyon Reservoir	Reservoir content end of year [2]	Inflow below reservoir (Paria River)	Regulated flow Colorado River at Lee Ferry	
						Annual	10-year moving total
1914	14,080	440	10,870	16,660	30	10,900	----------
1915	11,290	470	10,720	16,760	10	10,730	----------
1916	13,210	500	10,830	18,640	40	10,870	----------
1917	15,630	560	11,570	22,140	30	11,600	----------
1918	10,880	590	11,080	21,350	30	11,110	----------
1919	8,930	580	13,680	16,070	20	13,700	----------
1920	13,650	440	14,500	14,780	20	14,520	----------
1921	15,210	480	10,400	19,110	20	10,420	----------
1922	12,560	540	11,110	20,020	30	11,140	----------
1923	11,940	550	11,730	19,680	20	11,750	116,740
1924	10,400	580	11,600	17,950	20	11,620	117,460
1925	9,940	580	11,550	15,810	30	11,580	118,310
1926	11,710	450	11,570	15,500	30	11,600	119,040
1927	13,200	470	10,330	17,900	50	10,380	117,820
1928	12,760	530	10,330	19,800	20	10,350	117,060
1929	15,680	600	10,560	24,320	30	10,590	113,950
1930	11,410	660	10,760	24,310	20	10,780	110,210
1931	7,850	630	8,790	22,740	10	8,800	108,590
1932	10,360	560	12,390	20,150	40	12,430	109,880
1933	8,910	530	9,730	18,800	20	9,750	107,880
1934	7,000	500	8,570	16,730	20	8,590	104,850
1935	9,160	430	9,780	15,680	20	9,800	103,070
1936	10,360	440	9,990	15,610	30	10,020	101,490
1937	10,710	460	9,090	16,770	30	9,120	100,230
1938	12,810	510	8,740	20,330	30	8,770	98,650
1939	10,000	590	7,470	22,270	30	7,500	95,560
1940	8,230	550	11,400	18,550	30	11,430	96,210
1941	13,070	520	11,430	19,670	30	11,460	98,870
1942	13,850	580	11,100	21,840	20	11,120	97,560
1943	9,700	570	10,290	20,680	20	10,310	98,120
1944	11,140	560	10,280	20,980	20	10,300	99,830
1945	9,770	550	10,670	19,530	20	10,690	100,720
1946	8,200	480	11,900	15,350	20	11,920	102,620
1947	10,730	400	11,770	13,910	20	11,790	105,290
Mean	11,300	520	10,780	----------	30	10,810	----------

[1] Partially regulated by upstream project reservoirs.
[2] Glen Canyon Reservoir capacity reduced by 1,650,000 acre-feet of sediment accumulation in 20 years.

ULTIMATE PROJECT OPERATION, YEAR 75

Another closed-cycle operation study was made for year 75, when it is assumed that water uses in the upper basin, including reservoir evaporation, will result in an average annual depletion of 7,500,000 acre-feet in the flow of the Colorado River at Lee Ferry. At this stage in upper-basin development the reservoir system would be operated primarily to satisfy the 10-year Lee Ferry flow obligation. The 23 million acre-feet of regulatory capacity in the reservoirs would be required for that purpose. Firm electric energy generation, limited to storage releases for stream regulation, would average about 6 million kilowatt-hour annually.

The maintenance of uniform annual flows at Lee Ferry would not be economical nor necessary to satisfy the compact requirements which are based on 10-year moving total flows. Fairly uniform annual deliveries would be made but some variations would be caused by spills beyond control of project reservoirs. With a near-constant release from the Glen Canyon Reservoir the energy generation at the Glen Canyon powerplant would vary in relation to the hydrostatic head as determined by the reservoir water-surface elevation. Through coordinated operation, however, generation at upstream powerplants could be increased while the head at Glen Canyon is low, thus maintaining firm power production for the system.

The estimated long-time average annual evaporation from project reservoirs under conditions as of year 75 is shown below.

Average annual evaporation

Reservoir:	*Acre-feet*	Reservoir—Continued	*Acre-feet*
Whitewater	21,000	Split Mountain	8,000
Echo Park	87,000	Cross Mountain	70,000
Glen Canyon	526,000	Gray Canyon	30,000
Navaho	16,000	Crystal	negligible
Flaming Gorge	56,000		
Curecanti	32,000	Total	846,000

Annual project operation at year 75 is summarized in the following table. Project operation similar to that of year 75 would be continued after that year under the present apportionment of water to the upper basin. After year 200, however, sediment at the present rate of erosion would encroach on the reservoir capacity required for river regulation. Without other measures to control sediment, the effectiveness of the project in providing necessary river regulation would then gradually diminish.

Ultimate project operation, year 75—Final point of control at Glen Canyon Reservoir

[Unit, 1,000 acre-feet]

Water year	Inflow to Glen Canyon Reservoir [1]	Net evaporation from Glen Canyon Reservoir	Controlled release from Glen Canyon Reservoir	Reservoir content end of year [2]	Inflow below reservoir (Paria River)	Regulated flow Colorado River at Lee Ferry	
						Annual	10-year moving total
1914	10,450	460	7,470	14,130	30	7,500	----------
1915	7,950	500	7,490	14,090	10	7,500	----------
1916	9,780	510	7,460	15,900	40	7,500	----------
1917	11,910	590	7,470	19,750	30	7,500	----------
1918	7,510	620	7,470	19,170	30	7,500	----------
1919	7,060	600	7,480	18,150	20	7,500	----------
1920	12,200	620	9,810	19,920	20	9,830	----------
1921	12,620	630	11,840	20,070	20	11,860	----------
1922	10,600	640	9,960	20,070	30	9,990	----------
1923	9,520	630	8,890	20,070	20	8,910	85,590
1924	7,820	650	7,480	19,760	20	7,500	85,590
1925	7,000	610	7,470	18,680	30	7,500	85,590
1926	8,730	620	7,470	19,320	30	7,500	85,590
1927	9,510	620	8,150	20,060	50	8,200	86,290
1928	9,820	640	9,280	19,960	20	9,300	88,090
1929	12,500	630	11,760	20,070	30	11,790	92,380
1930	8,330	640	7,690	20,070	20	7,710	90,260
1931	4,870	600	7,490	16,850	10	7,500	85,900
1932	8,440	570	7,460	17,260	40	7,500	83,410
1933	5,970	540	7,480	15,210	20	7,500	82,000
1934	4,640	480	7,480	11,890	20	7,500	82,000
1935	6,360	400	7,480	10,370	20	7,500	82,000
1936	7,250	380	7,470	9,770	30	7,500	82,000
1937	7,720	380	7,470	9,640	30	7,500	81,300
1938	9,560	400	7,470	11,330	30	7,500	79,500
1939	6,500	400	7,470	9,960	30	7,500	75,210
1940	6,180	360	7,470	8,310	30	7,500	75,000
1941	10,590	380	7,470	11,050	30	7,500	75,000
1942	11,120	480	7,480	14,210	20	7,500	75,000
1943	6,970	480	7,480	13,220	20	7,500	75,000
1944	8,350	480	7,480	13,610	20	7,500	75,000
1945	7,440	480	7,480	13,090	20	7,500	75,000
1946	6,050	440	7,480	11,220	20	7,500	75,000
1947	8,290	420	7,480	11,610	20	7,500	75,000
Mean	8,520	530	7,990	----------	30	8,020	----------

[1] Partially regulated by upstream project reservoirs.
[2] Glen Canyon Reservoir capacity reduced by 5,895,000 acre-feet of sediment accumulation in 75 years.

Mr. DOMINY. The actual operating plan in direct answer to Congressman Tunney's question is that we expect to release an average of about 8.8 million acre-feet during the period 1966 to 1975. That is the period in which, if history repeats itself, we anticipate we will have our reservoirs filled. We would actually step up the releases after 1975 because there would be spill releases, if history on the hydrology of the river repeats itself. So after 1975 we in some years release as much as 9.5 million. But it would be on a declining basis until by 1985 when we would be down back again to about the 8.8 million acre-feet release.

Between 1985 and the year 2030 we project, in our payout studies for the Colorado storage project releases, that the average would continue to decline and get down to about 8.25 million acre-feet, except that occassionally we would have some spills if we get the runoff that would be anticipated based on historical averages.

If the upper basin depletion rates should be greater than we have estimated in our studies, then the reduction in water supplies could occur as early as 1985. We have recently restudied our payout on the Colorado storage project with this projection and we could still pay out on the works now underway, participating projects and all of the big dams, with such a reduction in water flows.

Mr. TUNNEY. I have heard that there may be some legal objections to putting the Bridge Canyon Dam in. I am wondering is there any provision made anywhere in the law as it is written for the construction of dams in that national park?

Mr. DOMINY. Yes. When the Grand Canyon National Park was created in 1919, the Congress anticipated that necessity might require the balancing of water development values and park preservation values, and the following language was included in the Act that establishes Grand Canyon National Park, and I quote:

> Whenever consistent with the primary purposes of said park the Secretary of the Interior is authorized to permit the utilization of areas therein which may be necessary for the development and maintenance of a Government reclamation project.

In addition to that, we have correspondence in files from the Superintendent of the Park Service, the Director of the Park Service, to the then Commissioner when the Grand Canyon National Monument was first considered in which he interposed no objection whatever to Bridge Canyon Dam and Reservoir.

Mr. TUNNEY. Thank you very much. I want to thank Mr. White for having yielded to me his time. I yield it back.

Mr. ROGERS. Mr. White, do you have further questions?

Mr. WHITE. Yes, Mr. Chairman.

I want to thank the Secretary for his forthright answers, and the Commissioner, and I believe that in the major part of the rest of the testimony we will develop some of the other answers.

Mr. ROGERS. Mr. Foley?

Mr. FOLEY. Mr. Secretary, we heard some testimony yesterday from Mr. Ely regarding both the economic feasibility and the availability of water from the central Arizona project. Assuming that no imports from any outside source were made to the Colorado River Basin, is there sufficient water in any projected periods of study to satisfy the needs of the central Arizona project to justify its authorization?

Secretary UDALL. There is sufficient water for the project to be economically feasible. There isn't sufficient water to take care of Arizona's very serious deficit. So I have to give you those two answers.

Mr. FOLEY. Putting it this way, in the absence of special importations of water in the future, would the Department support the central Arizona project?

Secretary UDALL. The answer is "Yes," of course. In other words, we aren't presenting a project here today that is contingent on an importation plan. We are all discussing an import program of some kind I think as the ultimate answer to the problems, the entire basin, not merely the lower Colorado.

Mr. FOLEY. Then the expectation of imported water is not essential to the Department's support of the lower Colorado Basin project.

Secretary UDALL. The answer is "yes."

Mr. FOLEY. Didn't I hear you just a few moments ago say that the primary purpose of this legislation was to lay the groundwork for augmenting the water supply?

Secretary UDALL. Yes. The point that I made there was that, although the Arizona project is a large component of it, the most important feature of this legislation is the creation of a basin account, the adoption of comprehensive planning, and putting Hoover and Parker-Davis, the existing major structures on the lower river, to work for the basin account after payout and of putting any further reservoirs in the lower basin into that structure so that you have a vehicle for the future.

Mr. FOLEY. In other words, the central Arizona project and the other projects contained in the bill, together with the basin account concept and the regional planning concept, would create a viable legislative package to present to the Congress which the Department could support in the absence of any references to studies of imported water or any references to receiving water into the Colorado River Basin from outside areas. Is that correct?

Secretary UDALL. This is a correct statement, with the reservation, of course, Congressman, that we anticipate, indeed, this is the main value of the basin account, that this makes it possible since it builds up revenues and builds up surpluses to consider various plans for augmenting the supplies in the entire region. Just so that we get this back into focus we had it in 2 days ago, and to realize that people aren't just casting eyes at your region of the country, the other alternatives, the other two alternatives that we discussed before, are I think at this point viable as alternatives that should be very thoroughly explored.

In other words, when we say "importation" we are not just talking about importation from the Northwest. We are talking about a study of various sources to help make the river whole for the benefit of the entire basin.

Mr. FOLEY. Well, I would like to come back to that a little later, Mr. Secretary, but at this point—what I am trying to nail down is this, Could this bill be amended to remove those portions of titles II and IV which imply or in any way suggest importation or authorize any studies of importation of water from outside the Colorado River Basin and still have the support of the Department of the Interior?

Secretary UDALL. Well, in terms of the viability of the legislation, I think that it would be good legislation and that we could support it.

I don't think that these portions are the essence of the bill. However, I think that because the entire river is in trouble, because of shortages, that these portions of the bill are very important in terms of beginning the process of trying to make up the shortage, and I think that the only way in the long run that you are going to have the different States work together is if they are also working together to make up the shortage, and from that point of view——

Mr. FOLEY. My point is——

Secretary UDALL (continuing). I think a study of some kind of import plan to augment is very vital to the legislation.

Mr. FOLEY. Would you have any objection to that question being considered in separate legislation?

Secretary UDALL. Of course the committees of Congress have wide latitude to consider this subject and this is a subject that you should consider any way that you want to. All I am saying is that in terms of what we have recommended, we feel that because of the shortage in the entire region, a study of the various alternatives available to augment the water available to the region is in order at this time.

Mr. FOLEY. Mr. Secretary, I have a copy of the August 1965 newsletter of the Colorado River Association in which you are quoted indirectly from the Oregon Statesman of Salem, Oreg., in an interview with A. Robert Smith as saying you have no objection to waiting for specific legislation in order to proceed with the studies. The studies relate to the—perhaps I had better read the whole quotation:

Secretary Udall July 16 told A. Robert Smith of the Oregon Statesman (Salem) that he favored studies of a Columbia River diversion to the Southwest, and that his staff has talked only of a pickup point below Bonneville Dam "after the water has gone through the last turbine and is wasting to the Pacific." Udall added he has no objection to waiting for specific legislation to order him to proceed with the study.

Now, do you recall that interview?

Secretary UDALL. Yes. I recall this was at my press conference and I think I made the record in past press conferences, the same record I made here today, in terms of feeling that this is the time now to begin studies of the import alternatives to augment the river. If Mr. Smith understood otherwise, he misunderstood me, because it seems to me that with the river already in trouble, that certainly this is the time when everyone should get together on a study to get the river out of trouble. It is almost that simple. The Congress now has before it these bills which authorize that study.

Mr. FOLEY. This is directed to either you, Mr. Secretary, or to the Commissioner. Isn't it true that over the past several years the Bureau of Reclamation has conducted a number of reconnaissance studies on diversion of water from the Columbia River?

Mr. DOMINY. Let me put that in just as definite and specific terms as I possibly can. The united western investigation which we called it was made in 1949 through 1951 at a cost of $334,000. This study was made in accordance with the provisions of H.R. 244, 80th Congress which was reported by the Committee on Public Lands of the House of Representatives on July 15, 1947, and which requested the Secretary of the Interior through the Bureau of Reclamation—

to investigate and report as soon as practicable to the President and the Congress on the engineering and economic feasibility and economic justification of diverting surplus waters from other basins to southern California and the Colorado River Basin and the practicability of exchanges of water and other

possibilities for effecting improvement in the distribution and utilization of the water resources of the West.

Now, with that $334,000, a reconnaissance was made and a report was presented, and that was the end of that one. It never got off the ground because the timing—the necessity wasn't there at that time and nothing further was done.

The only other study that has been made by the Department of the Interior and the Bureau of Reclamation is in connection with the desalinization studies where Congress appropriated $108,802 recently, a couple of years ago, to make a study, and I quote from the justification statement:

In addition, studies will be underway in cooperation with the Office of Saline Water of the feasibility of utilizing techniques that have been developed in recent years for the desalinization of mineralized water for the purposes of irrigation, municipal, and industrial use.

We were asked to make a very rough estimate for comparative cost purposes of a possible importation from below Bonneville Dam, for example, into the Lake Mead area as compared to present-day costs of desalinzation. This was all done from the office, it was all done from existing aerial photographs and topographic maps of the Geological Survey. There was no fieldwork done, no detailed engineering of any kind, and the results that we gave the Secretary and Assistant Secretary were that the costs were of a level that without detailed engineering and economic analysis, no one could give a final answer presently as to whether it would be cheaper to supply new water in the Colorado River by desalinization or cheaper to supply it by import.

So that is the end of any studies that have been made up to this time.

Mr. FOLEY. In other words, your preliminary study on desalinization indicated that it was difficult to determine which would be more expensive.

Mr. DOMINY. Exactly. Without detailed engineering and detailed layout and detailed cost estimating, we couldn't give more than an educated guess.

Mr. FOLEY. We heard yesterday, Mr. Commissioner, the chairman of the full committee estimates that if prices dropped 2½ times in desalinization, it would cost in the magnitude of $150 million a year just to provide the water for the Mexican treaty obligation. And do I understand that you are telling the committee now that your studies so far indicate, without going further, that the costs of desalinization and importation from the Columbia are roughly approximate?

Mr. DOMINY. We can only say that on the basis of very rough reconnaissance estimating, both for the large desalinization plants that would be required as well as the alinement of a 700- or 800-mile canal and pumping plant and tunnel, that we just don't have the finiteness of engineering detail and economic studies and costs to tell him whether they are equal or one would be considerably better than the other. We just don't have that refinement.

Mr. FOLEY. Mr. Commissioner, I don't want to cause confusion in the testimony by hanging up, so to speak, on words of art that are used in the Bureau, but what I would like to ask you is this, Has the Bureau formally or informally in specific reconnaissance studies or

otherwise considered diversions of the Columbia above Bonneville Dam? Hasn't that been done within the last several years?

Mr. DOMINY. No, sir. The united western plan did consider a diversion out of the Columbia from the Snake River, that is true.

Mr. FOLEY. There have been no studies of diversions at Pasco, Wash., for example?

Mr. DOMINY. No, sir. Not by the Bureau of Reclamation or the Department of the Interior.

Mr. FOLEY. No studies at The Dalles?

Mr. DOMINY. Yes. There was a study of Sam Nelson of the Los Angeles Department of Water and Power for diversion from the Snake River and we reviewed that at the request of someone and commented on it, but——

Mr. FOLEY. Did you provide any technical assistance from the Bureau for any of those studies?

Mr. DOMINY. No, sir.

Mr. FOLEY. There have been, however, a number of other studies outside the Bureau of Reclamation that you definitely know of, I am sure, Mr. Commissioner, that studied diversions other than at the mouth and up——

Mr. DOMINY. I wouldn't go so far as to say they were studies. There have been projections and reports written on a very reconnaissance basis. There has been nobody I know of who has done any detailed investigations.

Mr. FOLEY. Have you seen the Colorado Association Newsletter for August, this month?

Mr. DOMINY. No, sir; I don't believe so.

Mr. FOLEY. This current month. I will pass it down to you in just a minute. For the benefit of the committee, a map by the Colorado River Association shows regional water transfer alternatives and it lists five studies, including Miller, Perkey, Dunn, Nelson, and Parsons studies. Two of these, the Miller study and the Perkey study, involve diversions of the Columbia River at a considerable distance upward of the mouth.

Now, do I understand, Mr. Commissioner, and Mr. Secretary, that the Department's present position is that in no case would the Department of the Interior favor any studies of diversions of the Columbia River other than at the mouth?

Secretary UDALL. I would go further than that. I think that the people who are dredging up these old studies and talking in terms of this newsletter are very unwise and very foolish at this point because I would anticipate that the only type of plan that the two regions can get together on, and this is what I think the Department must be for, Congressman, I want to reiterate that again, is the type of plan that has benefits for both regions, that does not use a drop of water that would otherwise be passed through the powerhouses of the Bonneville system, that does not deprive the region of a single kilowatt of power that will be present under present or projected plans or that does not deprive the region of water for its own needs. Therefore I think that the only plan that really is worth discussing that could possibly be viable is a plan of the type that we are talking about today, with it being studied on the basis of devising something that would be beneficial to and acceptable to both regions.

Mr. FOLEY. Mr. Secretary, is there any line, word, or phrase in the legislation before us that restricts any studies on the Columbia to that area?

Secretary UDALL. I think that if the legislation that the Congressmen have introduced doesn't provide such restrictions, as far as I am concerned, it would certainly be most welcome if the committee were to provide whatever guidance it wanted in the legislation with regard to restrictions on studies. I think that the people in the Northwest, the Congressmen we have discussed this with here today, are entitled to have these points tied down very clearly to comply with the testimony that we have presented here, if that is the desire.

Mr. FOLEY. Do I understand the Department's—I will just ask you is the Department willing to submit that as a proposed amendment to the bill?

Secretary UDALL. I think we would be very pleased to provide language that would conform study legislation to the testimony we have presented here. We would be delighted to do that.

Mr. FOLEY. Now, the concern that has been general in the Northwest has been well expressed by my colleagues, Mr. White and Mr. Wyatt. Going back to your testimony of the day before yesterday when I asked you what possible sources of augmentation to the water of the Colorado River Basin you envisaged, you named four, to my recollection. First of all, conservation and salvage, which as I recall you mentioned as a first step which should be taken. Second, desalinization. Third, examination of sources in northern California. And last, an examination of the Columbia River at the mouth.

Mr. Secretary, have we ever authorized, in the history of the West, diversions of water from one regional basin to another except where those basins were in the same State?

Secretary UDALL. I think that the answer in the West is "No," at least not on a significant scale. The answer in the East I found out in the last 2 or 3 weeks is to the contrary, because New York City, for example, looks to the Delaware River watershed as a primary source of water.

Mr. FOLEY. That is why I asked you about the West.

Secretary UDALL. I do think, however, that we have passed over historically, in terms of providing water needs, into a whole new era just as we have in electric power. No one except a few visionaries, or so they were called, in the Northwest talked about an electric power intertie until just a few years ago. Now because of technology, it is feasible. Let me be very frank with you, because we are not only friends, but I know the fears that must be present in your mind and in the minds of some of your constituents.

There were some leaders in the Northwest who only very recently felt that an intertie with the Pacific Southwest held great danger because the Northwest would lose control of its power. We were able, and with Senator Jackson and with others calling the shots on this, to design protections for the Northwest which protected its position and yet made it possible for it to realize the revenues from the sale of surplus power in the Pacific Southwest region. This is one of the reasons that leads me to believe that if we all keep our heads and if we in the Department truly preserve a neutral and impartial position and try to find the facts, that this other problem is not insurmountable and that we can devise a plan that would protect your region and pro-

vide benefits for it and would be good for the country as well as being good for the States of the Colorado River Basin.

Mr. FOLEY. Well, Mr. Secretary, go back to my previous question. The more I hear the testimony and the more some of my colleagues from the Northwest hear the testimony, the more we are convinced that the Department has made a judgment that imports into the Colorado River Basin should come from the Columbia River. When the testimony is presented that other sources such as northern California are to be considered, those statements have to be judged in the light of the fact that we keep coming back again and again to statements and intimations that the Columbia River, of course, is supposedly the logical source.

Now, can you answer this from the Department's standpoint: Has a decision been made by the Department that the Columbia River should be diverted to meet the needs of the Colorado River Basin?

Secretary UDALL. My answer to that, of course, Congressman, is a categorical "No."

As a matter of fact, there are not studies available on which any judgment could be formed on that in the terms of alternatives.

Mr. FOLEY. In view of that work that you have just described, if authorized, these studies would initiate a historical break in the pattern of western water regional planning. Is there any reason that the Department has why this whole question of studying diversions from other basins cannot be considered in separate legislation where it does not involve itself with the needs of the Southwest—of the central Arizona project and these other immediate proposals that are before the committee today?

Secretary UDALL. Congressman, the only answer I can give you is that it seems to me that the really compelling reason for studies to begin now is that the river is already short and the region is already in trouble, and that now is as good a beginning time as any. Technically, it could be separated. But it seems to me that it does properly belong in this legislation in some form.

Mr. FOLEY. Do you feel that the legislation as presently written constitutes a commitment to the importation of water into the Colorado River Basin?

Secretary UDALL. No, it constitutes merely a commitment by the Congress to have a study made upon which the Congress can ultimately make decisions.

Mr. FOLEY. Mr. Dominy, in your statement, you refer on page 5 to section 304(a) of the bill, which provides that in any year in which there is insufficient main stream Colorado River water available to satisfy the annual consumptive use of 7,500,000 acre-feet in Arizona, California, and Nevada, diversions from the main stream for the purposes of 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 of 4.4 million acre-feet in California. Then you go on to say that these priorities cease whenever the President proclaims that works have been completed and are in operation capable, in his judgment, of delivering annually not more than 2.5 million acre-feet of water into the main stream of the Colorado below Lee Ferry from sources outside the natural drainage area of the Colorado River system.

Would not, Mr. Secretary, or Mr. Dominy, either one, that constitute a commitment that such works will be built?

Secretary UDALL. Let me answer that question very explicitly. I think it does not constitute such a commitment. Indeed, I think the Arizona people find themselves in the position that if such works are not built, if such importation does not occur, this condition of limitation on Arizona's supply continues and therefore, I think it is merely intended as an agreement between the States to determine when the guarantee would cease. If no such importation works are built, no importation plans adopted, the condition, then, is permanent.

Mr. FOLEY. Mr. Secretary, on the bottom on page 5, the Commissioner states it is important to recognize, however, that an agreement between Arizona and California was reached only in the expectation that an affirmative program to lay to rest the water shortage problems of the Colorado River Basin would be forthcoming and thus assure that statutory priorities would never have to be invoked.

Secretary UDALL. I think that is what both States envision. I must——

Mr. FOLEY. Would you still stand by your statement that there is no commitment to the construction of the works and the importation of the water if Congress authorizes this project with this language?

Secretary UDALL. Congressman, I do not see how you can turn that language into any kind of even remote conditional authorization of works. I think that both Arizona and California because of the shortages they see staring themselves in the face, are pretty well committed now. That is the reason they are together, the fact that there has to be augmentation of water from some source and that they had better begin searching now. I think it is out of a faith that the water will be provided from some source that they are really moving ahead. There is a strong element of faith in this, I think particulary on the Arizona side.

Mr. FOLEY. Is it fair to say that there is a strong element of speculation and expectation in this bill as to the importation of water from other sources outside the Colorado River Basin?

Secretary UDALL. I think the bill does not constitute any kind of conditional authorization. That is all I can say. I think that the expectation is that studies will disclose a plan that will be a viable plan for augmentation, viable in the sense that Congress will give it favorable consideration.

Mr. FOLEY. I cannot recall specifically now whether it was you, Mr. Secretary, or the Commissioner who stated that you felt—this was this afternoon—that before any steps were taken with regard to the importation of water from the Northwest, the States of the Northwest themselves should have an opportunity to study their water needs. I believe it was the Commissioner who made the statement.

Secretary UDALL. Congressman, may I comment on that, and I think this is a very good point. As I understand it, this is what the State of Oregon, for example, is working on right now; I think they have studies underway. This is what the western Governors envision.

But I want to make one other very big broad point, if I may, because the Parsons study was mentioned a moment ago, which is a very broad and bold plan that concerns the use of surplus waters in Canada. I think it is very foolish of us to envision trying to get Canada to share surplus waters if there are surplus waters within the United States

and we are not wise enough to devise a plan to use them for the general good. We certainly should not be turning to our neighbor, Canada, and saying we cannot agree among ourselves on a plan and, therefore, we want you to agree to share a surplus.

Mr. FOLEY. One final question, Mr. Secretary, would you agree similarly that the States of the Colorado Basin, including northern California, although it is not in the basin, should explore other means of augmenting their water before the waters of the Columbia Basin are studied for purposes of diversion?

Secretary UDALL. I think the more studies, the better—the more studies in a region by the individual States, the States of the Columbia River Basin themselves, the more analyses that are made. Of course, you are familiar with the standard practice whereby any studies that the Department prepares with regard to any project are circulated to States for comments. I think much more than this is needed and I think because of the fact that we have passed into this new water era where we must think in terms of more than one river basin, the more studies, the better by individual States, by river basins I think this is really what this committee had in mind in passing the Water Resources Planning Act, which has already attracted a great deal of interest and attention all over the country in terms of focusing on the need to do a much more thorough job of planning and forecasting water needs than we have done in the past.

Mr. FOLEY. Well, in other words, you would not feel that there should be any priority given to studies of available water in the Colorado River Basin and northern California before studies are made of areas outside?

Secretary UDALL. Of course, northern California is no more in the basin than the Columbia is.

Mr. FOLEY. But California is much more involved in the problems of the basin.

Secretary UDALL. It would seem to us in terms of following the very best and latest water conservation and water planning practices, you study all of the alternatives so that choices may then be made on the basis of those alternatives and they may be thoroughly evaluated. This is the reason we have indicated that there are three main alternatives, that should be very thoroughly analyzed, so we could come back to the committee sometime in the future and you could have those alternatives before you as choices.

Mr. HOSMER. Will the gentleman yield?

Mr. FOLEY. Surely.

Mr. HOSMER. I take it you do not regard the various regions of this country as areas surrounded by Chinese walls, but that we all have one country here, trying to integrate in a water sense and the electric sense as well as some other things the Great Society has in mind. Is that right?

Secretary UDALL. Congressman, the point you are making that I completely agree with is the point I was making with regard to the Parsons study. If we are going to draw Chinese walls around regions of our country in terms of use of resources, how can we turn to a neighbor country and say, "We want to participate and share in a surplus of this resource or that resource which you have," when we cannot even agree among ourselves.

Mr. FOLEY. Will the gentleman yield?

Mr. HOSMER. If that is on State lines, and necessarily a better water resource.

Mr. FOLEY. If the gentleman will yield back for a moment—by the same token, Mr. Secretary, would it not be logical for those States most intimately involved in the water shortage problem, California and the Southwestern States, to look within their own areas for answers to their water problems before going outside those areas?

Secretary UDALL. I think in terms of the long-term needs, all of the alternatives should be studied and that the Congress will make the final judgment on this. All we can do is to line up the alternatives, to analyze them as thoroughly as possible, and to let you gentlemen make the ultimate decisions. We cannot make them under law or under the Constitution. You must be the final arbiters. All we can do is analyze the alternatives so you can make the choices.

Mr. FOLEY. Following Mr. Hosmer's suggestion and your agreement that this is a problem of national importance would it not be reasonable to have a national water study? I believe it is the recommendation of the Bureau of the Budget that any studies be made by a National Water Commission. It that recommendation at variance with the Department position?

Secretary UDALL. No, indeed. In fact, the Great Lakes are in trouble. There are parts of Canada that are in trouble. It will not surprise me to see the United States and Canada in the next few years engaging in joint studies, because this is an international problem. I think, really, that we are entering right now—we are already in it—a whole new era in terms of water planning, where we are going to have international planning of a type we have not had. We are already doing it in power on the Columbia Basin, and in terms of water.

The big question is, Is there enough statesmanship to go around so we can provide for the needs for growth and provide benefits to all regions and to all countries that might be involved?

Mr. UDALL. I would make an observation along the same line.

The chairman of our subcommittee is from Texas, which has in the ground huge resources of gas and oil, and Texas has never said, "We may need this 200 years from now." They have run pipelines from the fields to Los Angeles and as far back as Washington in the East. We produce half the Nation's copper in my State. We have never said, "We are going to sit on this until such time as we might need it some centuries from now."

SHARING OF THESE RESOURCES BUILDS THE WHOLE NATION

I suppose the gentleman's area provides half the Nation's salmon and the Mesabi Range provides a good part of the Nation's iron. There are many, many commodities other than the commodity we have been focusing on, apart from water. I thank my friend for yielding for that friendly observation.

Mr. FOLEY. Mr. Secretary, I appreciate your answers to my questions. I do not wish to prolong the examination, Mr. Chairman. There may be other witnesses, I think, and other members may wish to ask questions.

Mr. ROGERS. Mr. Secretary, in the interest of time, would you or Mr. Dominy furnish me with a breakdown of final conclusions with regard to costs of this project, both with and without Bridge Canyon?

Secretary UDALL. I will be very glad to provide that.

Mr. ROGERS. And a breakdown of the allocations and the formulas used in making those allocations and the components used in the application of the formula. I realize that this may be in documents that are presently in existence, but it takes so long to get together and I think it would be well if the committee had this in very terse, concise form.

Secretary UDALL. We will give it to you as concise as possible, Mr. Chairman.

(The information requested is as follows:)

LOWER COLORADO RIVER BASIN PROJECT ECONOMIC AND FINANCIAL ANALYSIS

The purpose of this statement is to present a comparison of the cost, benefit-cost ratios, and payout of the Lower Colorado River Basin project as presented to the committee and with Bridge Canyon added.

Financial analysis

Cost of features	LCRBP	LCRBP (Bridge added)
Bridge Canyon project		$511,000,000
Marble Canyon project	$239,000,000	239,000,000
Water salvage and recovery	42,000,000	42,000,000
Central Arizona project	526,000,000	526,000,000
Fish and Wildlife	5,000,000	5,000,000
Total Federal cost	812,000,000	1,323,000,000

Economic analysis

Cost allocation of construction costs	LCRBP	LCRBP (Bridge added)
Irrigation	$341,000,000	$341,000,000
Municipal and industrial water supply	191,000,000	191,000,000
Commercial power	156,000,000	631,000,000
Flood control	11,000,000	11,000,000
Water salvage	42,000,000	42,000,000
Recreation and fish and wildlife	49,000,000	85,000,000
Reimbursable	(2,000,000)	(2,000,000)
Nonreimbursable	(47,000,000)	(83,000,000)
Indian projects and distribution systems	20,000,000	20,000,000
Investigation costs paid from other sources	2,000,000	2,000,000
Total	812,000,000	1,323,000,000
Benefit-cost ratios:		
100-year period	2.2:1	2.1:1
50-year period	2.0:1	1.9:1

FINANCIAL ANALYSIS

Both plans would pay out their allocated cost within 50 years of the completion of construction of each feature.

	Payout year 2025	
	LCRBP	LCRBP (Bridge added)
Financial assistance to irrigation	$184,000,000	$184,000,000
Development fund surplus in 2025	481,000,000	917,000,000
Development fund surplus in 2030	661,000,000	1,214,000,000
Development fund surplus in 2047	1,266,000,000	2,219,000,000

The following payout schedule, showing the details of the financial analysis of the Lower Colorado River Basin project with Bridge Canyon added, is in a form comparable to that presented in attachment No. 3 of Commissioner Dominy's statement.

COST ALLOCATION

The separable cost-remaining benefit method of cost allocation was used to allocate the costs for units of the Lower Colorado River Basin project. Costs allocated to each of the various purposes are limited by the value of the benefits or the cost of the single-purpose alternative project, whichever is less. The justifiable expenditure for inclusion of a function in the project is measured by the lesser amount.

Benefits.—Power benefits for Marble Canyon and Bridge Canyon were estimated to equal the cost of providing equivalent power from fuel-fired steamplants using non-Federal financing.

Municipal and industrial water benefits for the central Arizona project were estimated to be equal to the cost of the most likely single-purpose alternative for providing service to the project area using non-Federal financing.

Benefit values for irrigation water to be delivered to the central Arizona project were measured from farm budget studies, which reflect the types of farming, revenues, and costs appurtenant to the project area.

Flood control benefits were evaluated for the dams and channel improvement works proposed for construction and which would provide flood control for downstream areas. The evaluations were made by the Corps of Engineers.

Benefits from fish and wildlife activities, to be carried on as a result of constructing the project, were evaluated by the Bureau of Sport Fisheries and Wildlife.

Outdoor recreation activity benefits, other than those for hunting and fishing, were evaluated by the Bureau of Outdoor Recreation and the National Park Service.

Single-purpose alternatives.—The single-purpose alternative for power at Bridge Canyon and Marble Canyon was assumed to be a federally financed dam and reservoir for power production at each of the sites.

The single-purpose alternative for municipal and industrial water for the central Arizona project was assumed to be a federally financed pump and canal delivery system to provide the same water deliveries as furnished by the multipurpose project.

The single-purpose alternative for irrigation for the central Arizona project was assumed to be a delivery system of pumps and canals that would provide the same water deliveries from the Colorado River as furnished by the multipurpose project.

The single-purpose alternative for flood control at Orme Dam and Reservoir was assumed to be a flood control channel that would produce flood control benefits equal to those attributable to the multipurpose dam and reservoir. The costs for single-purpose alternatives for other flood control facilities were estimated to be in excess of the benefits, and no cost estimates were prepared for these single-purpose alternatives.

Separable costs.—The separable costs for each function are derived by subtracting the cost of a project without that function from the cost of the multipurpose project. The difference in cost between the two projects, in each case, is assigned as the separable cost to each function. Separable costs are allocated to each purpose as a minimum assignment.

Joint costs.—The summation of all separable costs is subtracted from total project costs to derive the amount of costs associated with facilities jointly used by all purposes. The joint-use facilities costs are allocated to each function in proportion to the remaining justifiable expenditure for each function after separable costs have been deducted from the justifiable expenditure for that function.

Allocated costs.—Total costs allocated to a purpose in a multipurpose project are derived by adding separable costs to the joint-use costs allocated to that purpose.

(Table entitled "Consolidated Payout Study, Lower Colorado River Basin Project Including Bridge and Marble Canyon Dams ($1,000's)," will be found facing p. 235.)

Mr. ROGERS. The Chair recognizes the gentleman from Pennsylvania, Mr. Saylor, who reserved his time.

Mr. SAYLOR. Mr. Secretary, it is always a pleasure to see you before the committee. I have a few searching questions to ask you with regard to your statement and with regard to some other matters that have come to my attention and are either on your desk on in your Department.

First, let me ask you whether or not the report referred to by you at the bottom of page 2 and the top of page 3 of your statement has ever been presented to the Congress.

Secretary UDALL. The answer to that is "Yes." This is the report that we sent to the Senate committee and we had a hearing in the Senate a year ago April, as you will recall.

Mr. SAYLOR. Well, it is my understanding that the——

Mr. HOSMER. Will you identify specifically that report?

Secretary UDALL. This is the January 1964 report on the Pacific Southwest water plan.

Mr. SAYLOR. It is my understanding of the reclamation law, it has been the policy followed by you in other projects and your predecessors in other projects, that when these reports are transferred—are referred to the Congress, that you send them to the President and the President then submits them, either directly, himself, to the Speaker of the House of Representatives and the President of the Senate. I have not found yet in any paper that has been referred to anywhere along the line that your agency has complied with the law telling you how to forward these reports to Congress.

Secretary UDALL. Congressman, I may be wrong, but my staff tells me quickly that I erred a moment ago, that the report did go to the Speaker of the House as well as to the President of the Senate. Now, I may be wrong, but I am relying on staff advice.

Mr. SAYLOR. As near as I am able to determine, if it was, it has never been referred yet by the Speaker to this committee when it came up here. It is very interesting to note that last year, you furnished the report to the Senate Interior and Insular Affairs Committee, and either deliberately or unintentionally I find no reference whatsoever to furnishing a report to this committee.

Secretary UDALL. Congressman, I am hearing other voices that say it was not sent to the Speaker, so I correct myself again. I think its existence was well known and well publicized and that it was made available to some members of the committee who were interested in it. I hope I do not have to correct myself again.

Mr. SAYLOR. Now, Mr. Secretary, let me tell you that it has not been referred to the Speaker and the President pro tem of the Senate, and until it is, I think we are talking about something that so far does not have much reality.

Now, it is my understanding that when this report—namely, the Pacific Southwest water plan, together with supplemental information on the Pacific Southwest plan—was circulated among the various agencies of the Government, there were certain objections to it, is this correct?

Secretary UDALL. Naturally, a report as voluminous as that, which was circulated in the usual way among the departments, attracted considerable dissent on various points and considerable discussion yes.

Mr. SAYLOR. One of the agencies of Government that you and other people are required to furnish these reports to for comments is the Bureau of the Budget, is that correct?

Secretary UDALL. Yes.

Mr. SAYLOR. Do you know when the Pacific Southwest water plan, together with the supplemental information, was referred to the Bureau of the Budget?

Secretary UDALL. I would rather, because of the hot water I got in a moment ago, give you the precise dates. I do know that both the original Pacific Southwest plan and the one that was modified after the circulation a year ago spent considerable weeks in the bosom of the Bureau of the Budget.

Mr. SAYLOR. Well, I am very much interested in the dates not only of the original plan but the modified plan.

Secretary UDALL. I shall be happy to supply the Congressman with the precise dates.

Mr. SAYLOR. I would ask unanimous consent that this information be furnished and be made a part of the record at this point.

Mr. ASPINALL (presiding). Without objection, it is so ordered.

(The information requested is as follows:)

REFERRAL OF PACIFIC SOUTHWEST WATER PLAN AND LOWER COLORADO RIVER BASIN PROJECT TO BUREAU OF THE BUDGET

By letter of February 14, 1964, the Department of the Interior's January 1964 report on the Pacific Southwest water plan, together with supplemental information reports, was formally transmitted to the President through the Bureau of the Budget.

On February 16, 1965, we transmitted to the Bureau of the Budget our proposed report on Lower Colorado River Basin project legislation. During the period March through May of 1965 several conferences were held by representatives of the Bureau of the Budget and the Department of the Interior concerning the Lower Colorado River Basin project as contained in H.R. 4671 and companion bills.

On May 17, 1965, our report on H.R. 4671 and companion bills reflecting the views of the administration was sent to the chairman of the Interior and Insular Affairs Committee of the House.

Mr. SAYLOR. The reason I ask those questions of you, Mr. Secretary, is that it has come to my attention that the Bureau of Reclamation, through the Commissioner, after the Bureau of the Budget has turned down the original plan and told you to revise it, decided to enter into a contract and spend about $31,292 to contract with the Hughes Aircraft Co. to make a survey and to determine whether or not Bridge Canyon should be kept and Marble Canyon should be kept in this bill. It seems to me, Mr. Secretary, that if people under your jurisdiction pay no more attention to reports of the Bureau of the Budget, we had better do one of two things: We had better abolish the Bureau of the Budget and its recommendations which it makes to the President and the Congress, or we should abolish the people who ignore it.

When I discovered this, I wrote a letter to the Commissioner of Reclamation and asked him whether or not this information is correct that he had entered into a contract for these feasibility studies. Under date of August 23, 1965, he furnished not only to me but to all of the members of the committee—many of them, I understand, got the letter before I did—a report stating that they had entered into this contract and submitted a copy of the report.

Mr. Chairman, for the record, I would ask that my letter, together with the letter of the Commissioner, be placed in the record and that the contract with the Hughes Aircraft Co., together with a report, be made a part of the file.

Mr. ASPINALL. Without objection, the several requests will be granted.

(The documents referred to follow:)

CONGRESS OF THE UNITED STATES,
HOUSE OF REPRESENTATIVES,
Washington, D.C., August 18, 1965.

Mr. FLOYD E. DOMINY,
Commissioner of Reclamation, Bureau of Reclamation,
U.S. Department of the Interior, Washington, D.C.

DEAR MR. COMMISSIONER: It has come to my attention that the Bureau of Reclamation awarded a contract to the Howard Hughes Corp. to provide a feasibility study of the Lower Colorado River Basin project and how it will contribute to the economy of the Pacific Southwest.

I would like a copy of this contract, a memorandum as to the authority for authorizing the same, when it was authorized, and a copy of the Hughes Corp. report to the Bureau of Reclamation.

The hearings on this project are to begin on Monday, the 23d of August, and the above information should be in my office prior to that time.

Sincerely,

JOHN P. SAYLOR,
Member of Congress.

U.S. DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
Washington, D.C., August 23, 1965.

Hon. JOHN P. SAYLOR.
House of Representatives,
Washington, D.C.

DEAR MR. SAYLOR: Your letter of August 18, 1965, requested information on our contract with Hughes Aircraft Co. covering a study of the economic impact of the proposed Lower Colorado River Basin project. Enclosed is a copy of Bureau of Reclamation contract No. 14-06-D-5477 which was awarded to Hughes Aircraft Co. on March 23, 1965, in the amount of $31,292. A copy of the Hughes report to the Bureau is also enclosed as requested.

Funds for this study were available under the Bureau's fiscal year 1965 investigations program for the central Arizona project. It was desired to obtain a report as to the comparative assessments of benefits and impacts of Bridge Canyon and Marble Canyon Dams from a capable outside firm. The Hughes Aircraft Co. had the personnel and equipment to perform the required studies and the prices quoted were reasonable. Accordingly, the contract was negotiated and awarded to Hughes Aircraft Co. in accordance with provisions of the Federal Property and Administrative Services Act of 1949, as amended (41 U.S.C. sec. 252 (c) (10)) and applicable regulations (41 C.F.R. 1.3.210(a) (8)).

Sincerely yours,

FLOYD E. DOMINY, *Commissioner.*

Mr. SAYLOR. Mr. Secretary, the entire program which has been presented here is very nebulous in spite of the fact that it is very voluminous. It is nebulous in that the more you try to read the report and the supplemental information, the more you find that it is based upon suppositions such as the importation of water into the area to make sure that this project is feasible, and based upon assumptions of things that the Bureau anticipates will occur in the year 2000 and later.

Now, I would like to know what crystal ball they have down there that enables the people in the Bureau to tell what Congress is going to do, what plans they are making, or how we are going to implement this

water supply in the Colorado River until your own departments have made some studies. The reason I ask these questions is that I have sat here and listened to the questions and answers between other members of this committee and yourself and the Commissioner of Reclamation. It is very evident that you now are on record as saying that you have never made any study. If you have never made any study, and I expect that you will stand on that statement, how can you come here and ask this committee to spend a billion dollars on this project and untold billions to import water from some other area?

Secretary UDALL. Congressman, I can give you two answers on that to your question. The first is that as far as this project, standing on its own feet, is concerned, its economic feasibility does not rest on the import program.

The second answer is, of course, in terms of the future and of different alternative sources to augment the deficiency in the Colorado River Basin, the entire river basin, that we feel we do not have answers and we seek studies to get those answers.

Mr. SAYLOR. Well, then, why did you not come up here before this time, right after the chairman of this committee, Mr. Aspinall, wrote to you and asked you to tell us what was to be done? Why did you not 2 years ago say that there are certain studies that we would like to be made, we would like to have the support of your committee, and ask Congress to authorize these studies?

Secretary UDALL. The truth of the matter is that the study that we initially undertook, which became the Pacific Southwest plan, was an updating of the old central Arizona project. It was our initial, basic judgment that this plan ought to be broadened into a regional plan, that we ought to follow the pattern of the upper basin and have regional planning and create a basin act.

The next big thing that emerged was the fact that the entire river was in trouble, that both upper basin and lower basin confronted future shortages, and that, therefore, this other problem of augmenting the supplies in the basin deserved further study. This is what we propose at this time.

Mr. SAYLOR. Might not it have been in the back of your mind, the people down there, that you had to get Congress to commit itself to this project, that you would be so involved that you would come in here a little later on and say you have spent all this money, now you will have to give us the money to go through with the program? How about that as a real good reason as to why it was done in this manner?

Secretary UDALL. I think that the best, the most revealing thing in terms of what was on our mind was our answer to Chairman Aspinall's letter of January 18, 1963, which is 2½ years ago, in which we indicated to him and to the committee or those who were interested at that time what our general approach was to the water planning problem that we confronted. I do think, and this has been, if I may say so, Congressman, reinforced by my experience in the eastern part of the United States in the last 5 or 6 weeks, that the more long-range planning that is done and the bolder the planning, the better in terms of the whole future of our country, east and west, where water is concerned.

Mr. SAYLOR. Now, on page 7 of your statement, you refer to establishing a bank account to finance the facilities to be required in the future.

Now, I am one who seems to have been connected with the banking business all my life. I am fascinated by banking facilities which are proposed in this bill. I would like to tell you, Mr. Secretary, that if the House should buy the provisions that have been approved in this bill, all the control that they now have over the expenditure of funds will be completely gone. Now, is this what you want? Is this what the people downtown in your agency desire?

Secretary UDALL. No; I think, Congressman, that what we envision under this legislation is the same type of control that Congress wisely wrote into the upper basin project. I think that this is what we would envision the committee would want, something similar to this, in this legislation. If we have not complied fully with the planning standards and the controls that this commitee thinks are proper, I am sure the committee would express its own judgment on that matter in writing the legislation.

Mr. SAYLOR. All I can say is that the proposals here in these bills are not the same as the upper basin. I wanted to know whether or not you intended to come to that purpose—on page 4 of the statement submitted by the Bureau of Reclamation, with regard to this fund, you say revenues credited to the fund would be available without further appropriation for project operation, maintenance, replacement costs, and emergency expenditures.

This is just like writing a blank check or giving the power of attorney to somebody and saying, "Here is my money; go ahead and use it."

Is this what you intend?

Secretary UDALL. I am told, Congressman, by my staff, that this precise provision is in the Colorado River Storage Project Act. I would point out, of course, that this concerns operation, maintenance, and replacement. I think this is standard in other basic accounts; in others words, that the operation function must be carried on on a month-to-month and year-to-year basis out of the fund.

Mr. SAYLOR. Then do you mean that if there is any money in this fund, you or the people of the Department of the Interior will come before the Appropriations Committees of the Congress and tell them how they expect to use that money that is in that fund for expenditures in the upper basin?

Secretary UDALL. I would break this down into two parts: In terms of authorization of any new projects, Congress would have the full say on that. But with regard to operation and maintenance, we would follow what I believe to be the pattern in at least the upper Colorado project, that this would be done annually out of the fund without special authorization.

Mr. SAYLOR. Now, Mr. Secretary, you have certain requests on file, either on your desk or in another agency of your Department, for withdrawals from the river for various purposes. It is my understanding that before these reservoirs were completed, if anybody desired to ask any State in the basin for an allocation of water from the Colorado River to which that State was entitled, they proceeded by requesting the proper authorities in the State concerned for authori-

zation, and if that authorization was granted, they could proceed to withdraw water from the river; is that correct?

Secretary UDALL. Are you referring to the upper basin or the lower basin?

Mr. SAYLOR. I am referring to the entire river.

Secretary UDALL. I think in terms of the use of waters within a given State, what we have tried to do and I think done quite successfully in this river basin is to closely integrate the Federal plan with the State's desires with regard to use of water. With regard to the water that is stored, for example, we face decisions right now with regard to use of some of the water stored in Lake Powell. This presents another special problem. In fact, we are trying to determine right at the very moment how much to charge electric power production units, how much we would charge for the use of water that is in storage as a result of the Glen Canyon project, for example.

Mr. SAYLOR. In other words, it is your contention that once the water is stored in a reservoir, even though it belongs to an allocation that is a State's water, any person who desires to use any of that water must come to you and get your permission for the use of that water?

Secretary UDALL. No, I am not saying that, Congressman. The general procedure in the Western States and under Western water rights laws is that a project is laid out for the use of particular water. There are, in most instances on the Colorado, different ground rules as the result of legislation. There are repayment contracts and water contracts which are signed. But this is done not at the whim of a Secretary; it is done in accordance with a plan laid out and agreed upon and normally on the recommendation of the State water officials.

Mr. SAYLOR. Now, Mr. Secretary, this is completely contrary to certain information that has been furnished to me by State officials. I would hope that this matter would be straightened out by you, because there is on your desk or in the Indian Bureau application for the construction of powerplants to produce between 16,000 and 18,000 megawatts of power at prices below what you will be able to sell your power produced at Glen Canyon for and certain of the other upper basin and lower basin hydroplants, and that the Indian Bureau has not been able to get the authorization to allow the construction of these plants, use of their coal lands, the sale of coal revenue to the Indian tribes, because they cannot get a clearance from you and the Bureau of Reclamation for the use of waters of the Colorado River, which practically belong to the States.

Secretary UDALL. Congressman, these are pending matters. In fact, we had an hour's session on this general problem in my office only on Monday. In this instance, the decisions that I must make are in the main with respect to my trust responsibility to the Indians, not with regard to any overriding responsibility on water matters. I think we are very near some decisions. I think we shall make decisions that provide for the development of Indian resources and decisions that are proper in terms of the water use patterns in the region. But we are not ducking the issue, we are getting ready to make these decisions and will make them shortly.

Mr. SAYLOR. Well, is the information that the Indian Bureau has furnished me correct, that the applications are pending and they have been there, some of them, for a long period of time?

(The following letter to Hon. John P. Saylor referring to information furnished by the Indian Bureau is inserted pursuant to permission granted by the chairman on p. 342.)

DEPARTMENT OF THE INTERIOR,
BUREAU OF INDIAN AFFAIRS,
Washington, D.C., August 20, 1965.

Hon. JOHN P. SAYLOR,
House of Representatives,
Washington, D.C.

DEAR MR. SAYLOR: We have your letter of August 17, 1965, in which you requested certain information on coal mining leases and thermal electric power plants on Indian lands.

The term of all coal mining leases on Indian lands is for 10 years and so long thereafter as coal is produced in paying quantities. The following is a list of all coal mining leases on Indian lands where it is clearly indicated that the coal will be used for fuel in such electric power generating plants:

1. Utah Construction & Mining Co. lease approved October 21, 1957, on approximately 24,870 acres of Navajo tribal land near Farmington, N. Mex. Royalty rate 15 cents per ton. Negotiations are underway to increase the leased acreage by about 6,500 acres. The royalty rate on the added acreage will be higher than the 15-cent rate under the base lease.

The coal is sold to and consumed by the Four Corners Powerplant of the Arizona Public Service Co. located near the mine. Production this year is expected to reach 2,500,000 tons.

The Utah Construction & Mining Co. diverts 51,000 acre-feet from the San Juan River for this project under a permit from the State of New Mexico. Utah Construction & Mining has executed a long-term contract with the U.S. Bureau of Reclamation, providing for 30,000 acre-feet of Navajo Reservoir water annually during 1972–81, with right of renewal until 2005.

The present Four Corners Powerplant is of 575-megawatt capacity. We understand it is proposed to expand this plant by two units totaling 1,500 megawatts. The expansion will be made by a group composed of Southern California Edison Co. (48 percent), Arizona Public Service Co. (15 percent), Public Service Co. of New Mexico (13 percent), Salt River Project (10 percent), El Paso Electric (7 percent), and Tucson Gas & Electric (7 percent). Another 1,500-megawatt plant is proposed in this vicinity. Utah Construction & Mining Co. will supply the coal and water for these plants. Once they are in operation coal production from the mine is expected to reach 9 million tons annually. The present work force at the mine is 136 men of which 86 are Navajo Indians.

2. Peabody Coal Co. lease on 24,850 acres of Navajo land in Arizona, approved February 6, 1962. It is estimated that the leased acreage contains 200 million tons of coal. The royalty rates for coal mined under this lease are 25 cents per ton for coal used off the Navajo Reservation and 20 cents for coal consumed on the reservation when the gross realization in less than $4 per ton. When the gross realization is between $4 and $4.99 those rates increase to 30 cents and 24 cents and when it exceeds $5 the rates increase to 37½ and 30 cents respectively. Annual production is estimated up to 6 million tons. The Southern California Edison Co. proposes to construct a two-unit powerplant of 1,500-megawatt capacity in Nevada near Davis Dam on the Colorado River. This plant will not be on Indian land. Southern California Edison is negotiating a contract with the Secretary of the Interior for 30,000 acre-feet of water allocated to the State of Nevada. Coal from the Peabody lease as well as other coal sources, Indian or non-Indian, may be used in this plant. The plant will be financed by a group composed of Southern California Edison (50 percent), Nevada Power Group (16.7 percent), San Diego Gas & Electric (16.7 percent), Salt River Project (10 percent), and Imperial Valley Irrigation (6.6 percent).

Peabody has ascertained that there is a market for an additional 2,000 megawatts of power by 1973. To meet that demand they have requested 40,000 acre-feet of Arizona's upper basin apportionment of Colorado River water that will be needed for cooling plants of that capacity. The proposed plant would be located either on the south bank of the San Juan River in Utah or in the vicinity of Page, Ariz. Both locations are within the Navajo Reservation. The Arizona site appears to be most likely. Peabody proposes to supply the coal for such a plant from this lease or other leases under consideration.

3. The Peabody Coal Co. holds a coal exploration permit covering 58,270 acres of land owned and used jointly by the Navajo and Hopi Tribes in Arizona. The

permit was approved in October 1964. This land is adjacent to the leased area covered in paragraph 2 above. The permit provides for an option to lease an area containing 200 million tons of coal. The royalty rate on a lease will amount to 6.67 percent of the monthly gross realization but not less than 25 cents per ton for coal consumed off the joint-use area. For coal used on the joint-use area the rates would be 5.33 percent, but not less than 20 cents per ton. All coal mining operations under a lease taken under this permit would be carried on in conjunction with the lease described above in paragraph 2.

4. The Peabody Coal Co. holds a coal exploration permit covering 98,250 acres of Southern Ute tribal lands in southwestern Colorado. The permit was approved in November 1964. The permit contains an option to lease an area containing 200 million tons of coal. The royalty rate will be 6 percent of the gross realization for coal consumed off the reservation and 5 percent if the coal is used on the reservation. There is a minimum of 17½ cents per ton.

5. The Peabody Coal Co. has applied for a coal exploration permit covering 40,829 acres of Navajo tribal land near Moencopi, Ariz. The permit contains an option to lease an area containing up to 100 million tons of coal. The application is under consideration.

6. The Pittsburg & Midway Coal Mining Co. holds a coal mining lease on the Navajo Reservation in New Mexico covering 11,150 acres. The lease was approved in May 1964.

It is estimated that the leased area contains 74 million tons of coal. The royalty rates of 25 cents per ton for coal selling for $3.99 or less, 30 cents per ton for coal selling for $4 to $4.99, and 37½ cents for coal selling for $5 or more. A 5-cent credit is allowed on those rates if the coal is consumed on the Navajo Reservation. We have no specific information on where the coal will be consumed, but it is possible that some of it may be consumed at the Arizona Public Service Co. 125-megawatt plant near Joseph City, Ariz. That plant is not on Indian land and Pittsburg & Midway is presently supplying it with coal from a non-Indian lease.

7. The Pittsburg & Midway Coal Mining Co. has applied for a coal exploration permit covering the entire pueblo of Acoma in New Mexico. The permit grants an option to lease up to 46,000 acres. We have no information as to the amount of coal that may be found there. The royalty rates are still under negotiation but they will be similar to the ones contained in the Pittsburg & Midway lease described in paragraph 6. We have no knowledge at this time about where Pittsburg & Midway will sell the coal.

Aside from a few small wagon coal mines, mostly in the Navajo country, there is only one other coal lease on Indian lands. The El Paso Natural Gas Co. holds a coal mining lease covering 8,760 acres on Navajo tribal lands. The lease, which was approved in July 1962, was taken under an option in an exploration permit which originally covered 85,760 acres. The option is still open to lease an additional 13,880 acres. The royalty rate is 15 cents per ton. The lease specifically provides that the coal will be used for gas manufacturing and liquid components for motor fuel.

Indian employment is, of course, of major concern to us and these leases or proposed leases provide for preference in employment of Indians in all positions for which they are qualified.

Our estimates of the employment which might be expected to be generated by the operations entailed in the Peabody lease described in paragraph 2 above point to jobs for approximately 2,900 persons, with annual wages of about $20 million and indirect jobs created for an additional 1,900 persons, with wages of over $9 million. These jobs would be created in the construction of powerplant, railroad, and other transportation and transmission facilities. This is, of course, of relatively short-term duration. Thereafter, the operation of the powerplant and related facilities should provide direct employment for about 570 persons and indirect employment for 370 persons, with wages aggregating about $5.5 million.

Employment potential for the other pending proposals has not been analyzed.

The total of installed and proposed capacity of powerplants directly related to the use of coal from Indian lands, listed above, is 5,575 megawatts.

Peabody's application for 40,000 acre-feet of upper basin water, mentioned in item 2 above, is the only water involved in the foregoing which may be regarded as an Indian water right.

We trust this information will be of assistance to you.

Sincerely yours,

E. REESEMAN FRYER,
Assistant Commissioner.

Secretary UDALL. The one application with regard to Kaiparowits plan in Utah, I think, has been in Washington from the field a month or so—not much longer than a month to 6 weeks—and it has been thoroughly evaluated. It is near decision. The other one, I do not think, is presently in the Department with a field recommendation and analysis, ready for decision. But we are going to make decisions on them. We are not holding them up. I think one of the highest responsibilities I have, waterwise, is to protect Indian rights such as they are.

Mr. SAYLOR. Now, Mr. Secretary, if examination of the applications in the Indian Bureau for powerplants which would produce this amount of power, which far exceeds anything that is suggested from the Pacific Southwest water plan, is anticipated to sell that power at rates well below what the Bureau of Reclamation has included in its cost of water in these projects, do you not think you had better take these plans back to the Bureau and ask them to take another look at it to determine whether or not, in the way of finding a bank account, there might be some other methods of financing this matter?

Secretary UDALL. Congressman, you are quite correct in that there are proposals for coal-fired steam-electric plants along Lake Powell, in the Colorado region because there are great resources of high-quality coal—this should be developed. Some of the coal is on Indian land. The WEST group, which is a group of public and private power agencies, and we are rapidly becoming a nominal party to the WEST organization, is considering the building of some of the largest and most modern steam electric power installations in the whole country—very large units, larger than have even been built before. These will produce very low-cost power; there is no question about it.

The thing that we are convinced of is that the Federal hydroelectric power will be primarily useful in the region 10 or 15 years from now as peaking power. It will command a premium price as peaking power. Because of the integration that we see between the public and private power linking together their transmission systems and their production systems, this peaking power will command a premium price and we can pay out both projects by using it for peaking purposes. But as baseload power, it will not compete with steam power.

Mr. SAYLOR. Well, now, Mr. Secretary, do not start building these dams that have not been authorized. And even if they were authorized, they would not be built for some period of years. So I think that you have some housekeeping to do down there among the agencies of your own Department which would cause you to take another look at what is going on.

Mr. ASPINALL. Will the gentleman yield?

Mr. SAYLOR. I shall be happy to.

Mr. ASPINALL. Has any attention been paid, Mr. Secretary, or Mr. Dominy, to the amounts of water that will be necessary if these thermal plants are finally constructed, and if so, where is it proposed to get those amounts of water?

Secretary UDALL. This is one of the main questions, Mr. Chairman, that is before the Department. In the case of the Kaiparowits plant, for example, it is envisioned, and I have Governor Rampton's recommendation which represents an agreement with the State of Utah and the Indians in Utah, for the annual use of 102,000 acre-feet. This would be from Lake Powell.

The Mojave plant near Nevada——

Mr. ASPINALL. Mr. Secretary, are you sure that Utah's entitlement under the Upper Colorado River Commission compact satisfied that amount of water under the water availability figures which they are generally using at the present time?

Secretary UDALL. This is one of the decisions, Mr. Chairman, that Utah had to face in terms of the ultimate phase of the central Utah project. Where did they want to use the water?

Mr. ASPINALL. Of course it is. When they began to make projections upon these kinds of uses without the determinations and decisions of the State involved, then of course, we just do not have any actual facts upon which to give consideration to the projects such as we are proposing. That is essentially the question Mr. Saylor is asking.

Secretary UDALL. Of course, I quite agree, and the thing we have been waiting for, and this has been going on for 9 months or so, was a recommendation from the State of Utah with regard to what Utah wanted to do. They had the alternative available to reserve this water for the ultimate phase of the central Utah project for irrigation.

Mr. ASPINALL. The thing I want to know is this: The State of New Mexico has already gotten its authorizations for using all its entitlement to upper basin water. Under any way you can figure it, the State of Utah is awfully close to it. If Utah is willing to make a decision such as has been suggested by you to go this way, although it has an authorization for the central Utah project already by statute, then what this means, if we are not careful, is that the contribution of water that would be made to the central Arizona project is going to be a contribution of the waters to which the States of Wyoming and Colorado are entitled. I just want it understood that these are basic matters to any decision made upon the use of the water of the Colorado River.

Secretary UDALL. The chairman is entirely correct. The central Utah initial phase has been authorized, the final phase awaits subsequent authorization. What Utah is doing is, in effect, saying that it is going to use some of that final phase water now for electric power generation purposes.

Of course, there are two aspects to this. One is that in terms of the price that we propose to charge—we have not announced our decision on this for water—this will help the Upper Colorado Basin fund in terms of realizing immediate revenues that otherwise would not be available.

On the other hand, Utah may find if it makes further commitments of this water to power, that the ultimate phase of central Utah will either have to be restricted or not built at all. We have asked the State to wrestle with this problem and to make its recommendations to us so that it would understand and everyone would understand just what is emerging.

Mr. SAYLOR. I thank the chairman, because these are some of the things that have come to my attention in my studies of these problems and I have not been able to get very satisfactory answers up until now. I think before this committee makes any decision on a matter as broad as this, we must have the answers.

Mr. UDALL. Will the gentleman yield?

Mr. SAYLOR. Happy to.

Mr. UDALL. We are told by many people in many letters to my office, "Don't build these dams, you can get the electric power much quicker from thermal plants." It is a strange fact that many of these people who write the letters do not understand that when you build a thermal plant, you use huge quantities of water and it will be gone for the production of electric power in a thermal plant.

Mr. REINECKE. Will the gentleman yield?

Mr. UDALL. The time is Mr. Saylor's.

Mr. SAYLOR. I yield.

Mr. REINECKE. On that same score, perhaps Mr. Dominy can advise us as to what the anticipated evaporation would be from Marble and Bridge?

Mr. DOMINY. The evaporation from these two reservoirs, by comparison to Hoover and Glen Canyon, Lake Powell, would be very small. These reservoirs are contained within canyon walls. They do not get the wind and the direct sun for as many days, and so on, as many hours of the day, and the evaporation for the two would be about a hundred thousand acre-feet a year.

Mr. REINECKE. We are talking about 102 for the Kaiparowits operation, which will produce 5 million kilowatts instead of the 2.1 that these two dams together will produce. So you count the evaporation against the consumptive use by the steam powerplants.

Mr. SAYLOR. Mr. Dominy, I am glad to see that you are before the committee. I do not want to go too far, I just want to welcome you back.

Mr. DOMINY. I am always happy to be here. This is a very industrious committee and does a good job of defending the Nation's interest.

Mr. SAYLOR. It is gratifying to know you are glad to be here, because certain days when you should have been, you were not.

Mr. Dominy, you made a statement in response to a question by one of the other members that when the upper Colorado River project was before the Congress, certain matters with regard to the lower basin were basically considered. The chairman has asked you to furnish that information.

Now, in the meantime, I would like to have you tell us just briefly what some of those things were, because those of us who were here at the time tried to get some information along that line and were told there had been no such studies.

Mr. DOMINY. I am not quite sure that I understand specifically what the Congressman from Pennsylvania has asked me. Certainly, at the time we planned and constructed and got authorized and put into construction the Colorado storage project, we were well aware of the compact commitments to the lower basin and the entire plan was based upon full compliance with the compact commitments. We were also well aware, because the Central Arizona project had already been studied, had already been recommended to the Congress by previous Secretaries of the Interior and had even passed the Senate on two occasions, that there was a dire need for additional development in the lower basin. So I think a statement that we were aware of these things and had them in mind and that the two proposals were compatible is a true statement, sir.

Mr. SAYLOR. You will furnish that information in response to the request of the chairman of the full committee?

Mr. DOMINY. Certainly, sir.

Mr. SAYLOR. Now, on page 1 of your statement, you have this:

> Ten years from now, assuming that in the interim the yield of the river will equal its long-term average, the main storage reservoirs will be essentially full.

Now, Mr. Dominy, you just told us in your statement that history repeats itself and you can count on it every 10 years. Now, will or will not the reservoirs be full?

Mr. DOMINY. Of course, no man using any degree or modicum of judgment would attempt to forecast precisely the annual fluctuations of the Colorado River in the future. We can say that all hydrologists rely upon the longest period of record of actual measurement that they can get in arriving at judgment factors. We did put gaging stations in on the Colorado River at Yuma as early as 1903 and other gaging stations went on the river subsequently. We do have a very good historical record of what nature has given us in the way of runoff. We have every reason to believe that history will repeat itself and that we can rely on an average annual supply in the magnitude of 15 million acre-feet plus, and that we will get periods of years when we will have well above average runoff in the Colorado River, as we have had in the past.

Mr. SAYLOR. Mr. Dominy, it is always interesting to those of us who sit on this committee to listen to you come up and rely upon old figures. But somehow or other, it is only from about 1920, when we really began to have a measuring system on these rivers, that we have any accurate figures, and those figures invariably indicated the flows of the river lower than they were in the past. Now, these are your own figures once again?

Mr. DOMINY. Starting in the early 1930's, we have had a downward trend in the average conditions; yes, sir.

Mr. SAYLOR. Because in the 1930's, you began to have modern methods of studying the flow of the river, and surveys of the river. Then you begin to have a realistic approach and instead of 15-plus million acre-feet, your figures from about 1934 down to date indicate that you have about 13.2 million acre-feet as the average flow of the river.

Mr. DOMINY. Actually, Mr. Saylor, the Geological Survey put the gaging station in at Yuma in 1903.

Mr. SAYLOR. Yes, and if you will go back and ask some of the people how often they read it, they will tell you that they do not know.

Mr. DOMINY. There have been very accurate measurements since 1921. All hydrologists will agree that there is no dispute at all about the accuracy of the measurements since then. In general, we are in pretty full agreement that you can go back as far as 1896 with a reliability accurate enough for projection purposes.

Mr. SAYLOR. Of course, if you want to go back far enough, you can go back and start cutting some trees down in Arizona and you will find that there were periods of drought in that area that were so severe that the entire Indian population that had developed the country left.

Now, if history repeats itself, do you want to go back and take those, too, or do you just want to go back and take the ones that are favorable to you?

Mr. DOMINY. As a matter of fact, I commented yesterday in response to a question from the chairman that in my own judgment, the tree

ring studies obviously are made in such limited areas when considering the wide area of the Colorado River Basin that I certainly would not want to predict the future solely on the basis of those types of studies. It is interesting to note that a collation of those studies we have had the opportunity to review indicates pretty largely the general trend of ups and downs over a 60-year period that we have actually recorded in our more modern and accurate measurements. So the tree ring studies of antiquity do not give me, sir, cause for additional concern as to the future contemporary runoff potential on the Colorado River.

Mr. SAYLOR. Now, what do you mean by this term, "essentially full"?

Mr. DOMINY. We do not mean that all of the reservoirs would be spilling, but we mean that they will be well up toward the maximum of the conservation pool—about 90 percent overall for the system is our projection.

Mr. ASPINALL. If my colleague will yield?

Mr. SAYLOR. Yes, I shall be happy to.

Mr. ASPINALL. I think what my colleague has in mind is, Who is the one who determines in the upper basin whether or not a reservoir is filled to its capacity as of that particular time? Is this to be a determination by the Secretary's Office, or is this to be a determination by those in charge of the upper basin entitlement, the Upper Colorado River Commission? I think that is what he has in mind.

Mr. DOMINY. I think the manner in which we went into the filling criteria, for example, demonstrates how we in the Interior Department want to operate. We consulted with both the lower basin States and the upper basin States as to the very best possible procedures that would minimize the effect between the upper and lower basin in the critical time of attempting to fill Glen Canyon Reservoir, particularly when we had a low runoff year. When we finished all of our debates, no one was completely satisfied with the decisions we made, but they certainly were made with full advice and counsel, and then we had to take the responsibility for a decision. This is certainly the manner in which I would think we would operate as these projects unfold.

We have the dual responsibility, of course, of protecting the basin account for the upper basin, as well as protecting the existing uses to the maximum extent possible in the lower basin.

Mr. SAYLOR. Now, in the 83d Congress, there was submitted by the Assistant Secretary of the Interior a report which has been known as House Document 364, 2d session of the 83d Congress, the Colorado River storage project and participating projects, providing for the development and utilization of water and related resources of the Upper Colorado River Basin pursuant to the Federal reclamation law, and a portion of that report had in it a schedule of construction, particularly of the storage reservoirs. Now, one in particular I would like to call to your attention. It is marked "Glen Canyon."

They expected to have an installed capacity of 800,000 kilowatts, and they expected to have it in full production, producing 800,000 kilowatts, all the turbines turning, by fiscal 1964. Now, is the Glen Canyon Reservoir filled sufficiently to produce the 800,000-kilowatt installed capacity?

Mr. DOMINY. No, sir; nor do we have all of the units in. We had a long strike during construction on that job, for one thing. But we

do have five units in and spinning, and the others are progressing and will come in on schedule about every 30 days until the entire nine are in place. The water supply is well above the minimum operating level of 3,490. We peaked the reservoir out at 3,535, and we are generating power. It is on the line. We will sign this afternoon a sizable contract with the Salt River Water Users Association, moving a large block of Glen Canyon power down into that territory. Other contracts are being signed in the upper basin.

Mr. SAYLOR. How long are these contracts for?

Mr. DOMINY. For the power from Flaming Gorge and from Glen Canyon.

Mr. SAYLOR. How long are the contracts for?

Mr. DOMINY. For 20-year contracts, sir.

Mr. SAYLOR. Well, here again, you have people signing contracts for 20 years when you have in another agency of your Department down there, Mr. Secretary, applications to build plants that will produce power at a lower cost, and your so-called peaking power 10 years down the line is gone for 20 years. Now, you had better have somebody down there take a good look at what is going on in your own agency, rather than just try to sell everything off the shelves at the present time. If you do not, you might find out this dream of high sale peaking power is something that will never happen.

Secretary UDALL. We are trying to put this together, Congressman, because the economic realities compel it. Of course, contracts of the kind we are signing this afternoon can be renegotiated if it proves that it is better to use all the power for peaking power, or the main part of it.

Mr. SAYLOR. Now, then, Mr. Dominy, on page 9, you have a real startling statement:

The immediate construction of the central Arizona unit facilities is essential as a stopgap measure to preserve the virile economy that now exists in central Arizona until such time as a full water supply can be provided for the entire Colorado River Basin.

What do you mean by that?

Mr. DOMINY. There is not any question or shadow of reasonable doubt in anybody's mind familiar with the ground water depletion problems in the Arizona area but that their economy has reached a peak and it has already started the downward slide. There are lands already going out of production. There will be many thousands of acres of additional lands going out of production even during the 10 years that would be required were this project to be authorized now and construction immediately started.

We do not believe such economic retrogression is in the national interest. This area has a 12-month growing season. It can produce the foods and fibers that help make us the healthiest and best fed nation in the world. It supports a thriving economy that, because of the year-round sunshine, is attractive to many people, particularly the elder citizens of our land. As we reach a time of our Nation's history when we have a higher proportion of aged people and a higher proportion of the people who reach retirement age that can afford to live where they want to live, there are many, many more of them moving

into the Southwest, into California, Arizona, southern Nevada, and so on. I think it is in the national interest for us to preserve the economy and offer opportunity for expanding it. This is what this whole project is about.

Mr. SAYLOR. I do not like to find a billion-dollar project referred to as a stopgap measure. I happen to be one of those who thinks that is a good-sized sum of money. Maybe the Bureau of Reclamation does not.

Mr. Chairman, I will reserve the balance of my time. We can always get the Commissioner to come up if he is in town.

Mr. ASPINALL. The chairman would ask unanimous consent that he be permitted to forward to the Secretary and the Commissioner certain questions, and that when the answers are received, the questions, together with the answers, be made a part of the record at this point.

Mr. SAYLOR. Reserving the right to object, Mr. Chairman, if you will make that for all members of the committee and give us a reasonable time in which to submit the questions and get the answers, I think it would be very helpful.

Mr. ASPINALL. I think if you will let the chairman take care of his request at this time we can take care of other requests later and bring the Secretary and the Commissioner back later on, if necessary, because there will be some other questions.

Mr. SAYLOR. All right.

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

(The questions and answers follow:)

Mr. ASPINALL. Mr. Dominy, would you provide the committee with a list of all thermal plants of which you have knowledge that have been proposed for construction in the Colorado River Basin? The information should include the location and size of the plant and the estimated amount of water required.

Mr. DOMINY. The location, contemplated capacity, and annual water requirements of presently planned or proposed fossil-fuel powerplant developments in the Colorado River Basin are as follows:

Thermal-electric powerplant developments under consideration, Colorado River Basin

Sponsor	Plant location	Capacity (megawatts)	Coal source [1]	Estimated annual water requirement (acre-feet)
Southern California Edison with Arizona Public Service Co., Public Service Co. of New Mexico, Salt River project, Tucson Gas & Electric Co., El Paso Electric Co.	Addition to existing plant, Farmington, N. Mex.	1,500	Navajo Indian Reservation coal beds in New Mexico.	30,000 (San Juan River in New Mexico).
Southern California Edison with San Diego Gas & Electric, Nevada power groups, Imperial Valley Irrigation District, Salt River project.	Below Lake Mohave in Nevada	1,500	Possibilities: 1. Black Mesa-Peabody 2. Navajo Indian Reservation (Pittsburg-Midway). 3. Kolab Terrace (Utah Construction & Mining Co.).	30,000 (Colorado River in Nevada).
Peabody Coal Co	South of Lake Powell in Arizona	2,000	Black Mesa, Ariz	40,000 (Lake Powell in Arizona).
Utah Construction & Mining Co	Four Corners area, N. Mex	1,500	Navajo Indian Reservation, N. Mex	Estimated 45,000 (Navajo Reservoir in New Mexico).
Peabody Coal Co	Piute Farms, Utah, now Indian reservation (San Juan arm of Lake Powell).	3,000	Black Mesa, Ariz	60,000 (Lake Powell in Utah).
Resources Co. (joint venture, Arizona Public Service Co., Southern California Edison, and San Diego Gas & Electric).	Warm Creek or Sit Down Bench (north of Lake Powell).	5,000	Kaiparowits Plateau	102,000 (Lake Powell in Utah).
El Paso Natural Gas Co	Four Corners area, N. Mex	1,500	Navajo Indian Reservation, N. Mex	30,000 (Navajo Reservoir in New Mexico).

[1] Coal sources are on Indian lands except for Kaiparowits Plateau and Kolab Terrace in Utah.

Mr. ASPINALL. Mr. Dominy, this information may be included in some of the material which has been presented to the committee, but in order to have it available at one place in the record, I would like for you to furnish detailed information showing the Bureau's estimate of the depletions in the upper basin. The information should include all projects and other consumptive uses, the amounts of water involved, and estimated dates used in your projections.

Mr. DOMINY. The estimated depletions by the upper basin that have been used by the Bureau of Reclamation as the basis of its forecast of Colorado River water supply available to the lower basin are contained in the following tabulation. These estimated depletions are projected on the basis of a limited Colorado River water supply; that is, without augmentation by imports. Should the water supply of the Colorado River be augmented we would expect that future upper basin depletions would be substantially greater than shown in the tabulation.

Upper Colorado River water uses with projected depletions at Lee Ferry (without Colorado River imports)

[In thousands of acre-feet]

	Present	1975	1990	2000	2030
Colorado:					
Present [1]	1,782	1,782	1,782	1,782	1,782
Silt		6	6	6	6
Fryingpan-Arkansas		70	70	70	70
Bostwick Park		3	3	3	3
Fruitland Mesa		13	28	28	28
Savery-Pot Hook		13	26	26	26
Denver expansion		60	135	170	215
Colorado Springs expansion		6	6	6	6
Homestake		25	58	74	74
Englewood		10	10	10	10
Pueblo		3	3	3	3
M. & I. Green Mountain		12	12	12	12
Hayden steamplant	4	8	12	16	16
Colorado	1,786	2,011	2,151	2,206	2,251
New Mexico:					
Present [2]	90	90	90	95	95
Navajo Reservoir evaporation	20	35	30	30	30
Hammond	5	10	10	10	10
San Juan-Chama		65	110	110	110
Navajo Indian		80	170	200	250
Expansion hogback	10	20	20	20	20
Utah construction	15	40	40	40	40
M. & I. Navajo Reservoir		30	60	60	0
New Mexico	140	370	530	565	555
Utah:					
Present [3]	579	581	581	581	581
Bonneville		70	150	166	166
Upalco		20	20	20	20
Jensen		10	10	10	10
Emery		17	17	17	17
Utah	579	698	778	794	794
Wyoming:					
Present [4]	267	267	267	267	267
Seedskadee		65	145	165	165
Lyman		10	10	10	10
Westvaco and other M. & I.	5	41	41	41	41
Savery-Pot Hook		7	12	12	12
Wyoming	272	390	475	495	495
Arizona, existing	11	11	11	11	11
Evaporation storage units	100	660	660	660	660
Total committed at sites of use	2,888	4,140	4,605	4,731	4,766
Less salvage [5]	−101	−139	−157	−162	−164
Depletion at Lee Ferry by present committed uses	2,787	4,001	4,448	4,569	4,602

See footnotes at end of table, p. 230.

Upper Colorado River water uses with projected depletions at Lee Ferry (without Colorado River imports)—Continued

[In thousands of acre-feet]

	Percent	1975	1990	2000	2030
Current proposals:					
4 county, Colorado		10	33	40	40
Uintah Unit, Utah				25	45
Resources, Inc, Utah		50	102	102	102
Cheyenne, Wyo			26	31	31
M. & I. in Arizona		39	39	39	39
M. & I. from Ruedi Reservoir		20	33	40	40
Animas-La Plata, Colo.-N. Mex			71	110	127
Dolores, Colo			69	87	87
Dallas Creek, Colo			29	37	37
Subtotal, proposals		119	402	511	548
Other, net uncommitted [6]		100	250	350	650
Total depletion at Lee Ferry	2,787	4,220	5,100	5,430	5,800

[1] Includes Collbran, Paonia, Smith Fork, and Florida projects.
[2] Includes additional water for Farmington starting in year 2000.
[3] Includes Vernal unit of central Utah project.
[4] Includes Eden project and Boulder Lake (SCS).
[5] Estimated to be 4 percent of uses by projects.
[6] Specific projects not identified represent net depletion at Lee Ferry.

Mr. ASPINALL. Mr. Secretary, have all decisions of the Department relating to use, in the lower basin on a temporary basis, of water apportioned to the upper basin States been based upon the terms of the Colorado River compact and consistent with it?

Mr. UDALL. All Colorado River water made available by the Department for use in the lower basin is based upon the terms of the Colorado River compact and is made available consistently therewith. Each of the lower basin water contracts with the United States provides that deliveries thereunder are subject to the availability of water under the provisions of the Colorado River compact and the Boulder Canyon Project Act. Moreover, each of the contracts is made upon the express condition and with the express covenant that all rights of the contractor thereunder shall be subject to and controlled by the Colorado River compact. Such an express condition and covenant is required by sections 8(a) and 13(c) of the Boulder Canyon Project Act.

Mr. ASPINALL. Mr. Secretary, do you consider the agreement between lower basin States, with respect to the priority of use of main stream water, which is embodied in this legislation to be of equal standing with the agreement among upper basin States that is set out in the Upper Colorado River Basin compact?

Mr. UDALL. The agreement to which you refer is reflected by the provisions of sections 304 (a) and (b) of the bills being considered by the committee. This agreement does not take the form of legislative ratification by each of the States involved, as is the case with the Upper Colorado River Basin compact. However, if enacted by the Congress it would represent an exercise by the Congress of its authority to lay down rules controlling the action of the Secretary of the Interior in apportioning main stream lower Colorado River water in the event of shortage.

You will recall, Mr. Chairman, that in its opinion in *Arizona* v. *California* (373 U.S. 546 at pp. 592–594), the Court dealt with the question of apportionment in time of shortage. The Court expressly stated that "Congress can undoubtedly reduce or enlarge the Secre-

tary's power—to allocate water in times of shortage—if it wishes." I have quoted from page 594 of the Court's opinion. Should the Congress enact the provisions with respect to the priority of use of main stream water which we are discussing, its enactment would be fully binding and controlling as against the Secretary of the Interior, the water users, and the States.

Thus, while the agreement on priorities embodied in the legislation proceeds on a different basis than the agreement on priorities set out in the Upper Colorado River Basin compact, should Congress adopt the legislation, it would be of equal standing with the Upper Colorado River Basin compact provisions.

Mr. ASPINALL. Mr. Dominy, it is my understanding that the repayment of Hoover Dam and powerplant is about half completed. Do you expect full repayment by 1987 as contemplated? Will repayment be accomplished as contemplated under expected water conditions if the upper basin fills its reservoirs and depletes the flow to meet its needs in accordance with the Colorado River compact?

Mr. DOMINY. Your understanding is substantially correct in that the time period for repayment of Hoover Dam and powerplant is about half over. Over 75 percent of net revenues to date have been applied to interest costs and the remainder have repaid approximately 20 percent of the repayment obligation. Interest will rapidly diminish in the future and greater revenues will apply to repayment. Repayment is generally on schedule. The authorizing laws on Hoover are somewhat similar to those enacted today. The 50-year payout period is applicable to each unit. The majority of these units were installed at such times as to require repayment by May 31, 1987. Part of the investment in units N–7 and N–8 would remain for repayment after that date. The law requires that repayment of each advance of funds be accomplished within a 50-year period. This is assured under the regulations by adjusting generating and energy charges annually to cover new estimates of operation and maintenance costs. Changes required to recognize new estimates of generating capability are made at 5-year intervals.

The only uncertainty lies in estimating the amount of secondary energy that may be generated in the future. The original payout studies assumed generation and sales of 40 billion kilowatt-hours of secondary energy at a rate of about one-third mill per kilowatt-hour. The currently determined rate for secondary energy is about one-half mill per kilowatt-hour. About 17 billion kilowatt-hours of secondary energy have been generated to date. If the remaining secondary energy, approximately 23 million kilowatt-hours, should appear to be unattainable in the future, the recourse is to adjust the energy charge for firm energy.

The filling of upper basin reservoirs and upper basin depletions will not preclude full repayment as planned and provided for in the Boulder Canyon project regulations.

Mr. ASPINALL. Mr. Secretary, is there any more urgency in connection with authorizing the central Arizona project than in authorizing the Animas-La Plata and Dolores projects in the upper basin?

Secretary UDALL. The urgencies in each case are of a different nature and not directly comparable. In the central Arizona area ground-water reserves are being rapidly depleted, ground-water costs

are rising, and irrigated land is going out of production. Each year that relief or partial relief is delayed, the ground-water situation will continue to deteriorate and this deterioration will be reflected indefinitely into the future.

Animas-La Plata and the Dolores projects involve service to both presently irrigated lands and to potential new irrigable lands. Insofar as irrigation service to new lands is concerned (Animas-La Plata project, 58,900 acres out of a total of 84,500 acres; and Dolores project, 32,340 acres out of a total of 61,000 acres), I do not believe the urgency can be considered as acute as in the central Arizona area where the irrigation of new lands is not involved but rather the maintenance of presently irrigated lands in production is a primary objective. Insofar as presently irrigated lands in the Animas-La Plata and Dolores areas are concerned the provision of a dependable supply is an urgent need. Because of the great seasonal and yearly fluctuations in river-flow, irrigation operations are uncertain and the acreage irrigated varies from year to year. While the need for stabilization is pressing, the situation is not deteriorating.

The city of Durango, which would receive municipal and industrial water from the Animas-La Plata project, is presently faced with a serious water deficiency. In hot summer months water rationing is necessary and there is apprehension that the available supply might not be adequate for emergency firefighting purposes. The city's rapidly expanding population adds to the crisis. In respect to Durango, the urgency for new water supplies is probably greater than in the central Arizona area.

We have completed feasibility reports on the Animas-La Plata and Dolores projects and expect to be able to transmit them to the Congress in the near future.

Mr. ASPINALL. Mr. Secretary, as you know, it has been proposed that the first 1½ million acre-feet of exported water be used to service the Mexican treaty and that the cost of providing this water be nonreimbursable. Assuming the acceptance of this proposal, would you agree with me that the appropriations for the cost of this part of the project should be justified by the State Department and included in the Foreign Affairs Appropriations Act?

Secretary UDALL. Mr. Chairman, I agree that such appropriations properly could be justified by the State Department and included in the Foreign Affairs Appropriations Act. However, in the event that imports are developed to augment the supply of the Colorado River, it is unlikely that they would be limited to 1½ million acre-feet. I would expect, rather, that the 1½ million acre-feet would be but a part of a larger overall import plan. To divide the funding of a single plan of development between two different appropriation acts, involving two separate appropriation committees, could raise difficult problems. From the standpoint of administering an import construction program it would be much simpler and more straightforward to have the funding accomplished by one appropriation action.

Mr. ASPINALL. Mr. Dominy, as I recall, you made the statement that all the electric energy that could be generated at both Marble Canyon and Bridge Canyon could be marketed at around 6 mills. Would you furnish for the record the proposed rate schedule which

would return an average of 6 mills and a more detailed statement supporting your contention that all energy can be marketed?

Mr. DOMINY. The rate components used to study repayment of both Bridge Canyon and Marble Canyon was $10 per kilowatt per year and 3 mills per kilowatt-hour. This type of rate structure at approximately 38 percent load factor is equivalent to 6 mills per kilowatt-hour. We do not yet consider this to be a rate schedule. It is our estimate of the average return per kilowatt-hour required to meet payout. The actual rate schedule will not be established until construction is well along and costs are better known. We would expect that initially the peaking capacity would have a value greater than $10 and 3 mills. It is likely also that in the distant future its value may be less than that due to technological improvements in competitive means of producing peaking power. My contention that all of the power can be marketed is best supported by the testimony given by Mr. A. H. Foreman, vice president of the Arizona Public Service Co., and the assurance that the Salt River project would be willing to purchase this power. In further support, there is attached a table showing estimated total future loads on the broad market area as compared to known planned supply. You will note this shows a deficiency by 1975 of nearly 2,000 megawatts and by 1980 of more than 12,000 megawatts.

Colorado River Basin including southern California—Summer peakloads—Megawatts

	Years					
	1967	1968	1969	1970	1975	1980
Firm peakload [1]	14,500	15,600	16,800	18,100	25,600	35,300
Do [2]	1,471	1,545	1,623	1,696	2,297	2,979
Total	15,971	17,145	18,423	19,796	27,897	38,279
Peak resources [1 3]	15,300	16,400	[4] 16,500	[4] 17,600	[5] 18,200	[5] 18,200
Do [2 3]	1,889	2,147	2,291	2,586	2,576	2,707
Subtotal	17,189	18,547	18,791	20,186	20,776	20,907
Pacific Northwest-Southwest intertie (maximum capacity) [6]		1,000	2,300	3,300	4,600	4,600
Marble (at plant)					600	600
Total	17,189	19,547	21,091	23,486	25,976	26,107
Comparison peak resources with load:						
Surplus	1,218	2,402	2,668	3,690		
Deficit					1,921	12,172

[1] Lower Colorado River Basin including southern California.
[2] Upper Colorado River Basin.
[3] Including those scheduled for construction (Bridge and Kaiparowits not scheduled, and not included).
[4] Four corners 1969, 750 megawatts; 1970-80, 1,500 megawatts.
[5] Mohave, 1975, 1,500 megawatts; 1980, 1,500 megawatts.
[6] This is maximum capacity of intertie; all this is not scheduled for use.

Mr. ASPINALL. Mr. Dominy, your statement indicates that the central Arizona project water supply will be gradually reduced as the upper basin increases its depletions starting around the year 1985 or 1990. Would you provide a detailed statement on this matter showing year-by-year reductions in CAP water supply and the corresponding upper basin depletions by projected use and year which make the reductions necessary?

Mr. DOMINY. Mr. Chairman, we estimate that through the year 1990 the central Arizona unit would have a full divertible water supply

from the Colorado River of 1,200,000 acre-feet per year. After that year, as the upper basin depletions increase, the water supply from the Colorado River available to the lower basin States will decrease accordingly. Because of the priority that would be granted to California for the use of 4,400,000 acre-feet and to other water users in Arizona and Nevada holding present contracts for Colorado River water, the shortage would have to be absorbed primarily by the central Arizona unit. The estimated upper basin depletions compared with projected central Arizona unit water supplies are as follows:

Item	1,000 acre-feet			
	1975	1990	2000	2030
Upper basin depletion	4,220	5,100	5,430	5,800
Central Arizona unit:				
Average annual supply	1,200	1,200	900	580
Minimum year supply	1,200	1,200	780	380

Mr. ASPINALL. Mr. Dominy, the committee needs a complete financial analysis of the projects and works authorized in these bills with the exception of the southern Nevada project. In other words, a financial analysis that will include Bridge Canyon. We need this in order to determine the effect of taking out Bridge Canyon as recommended by the Bureau of the Budget and the Department of the Interior.

Mr. DOMINY. Mr. Chairman, the economic and financial analysis of the Lower Colorado River Basin project including the Bridge Canyon unit is presented in the following summary tabulations:

LOWER COLORADO RIVER BASIN PROJECT

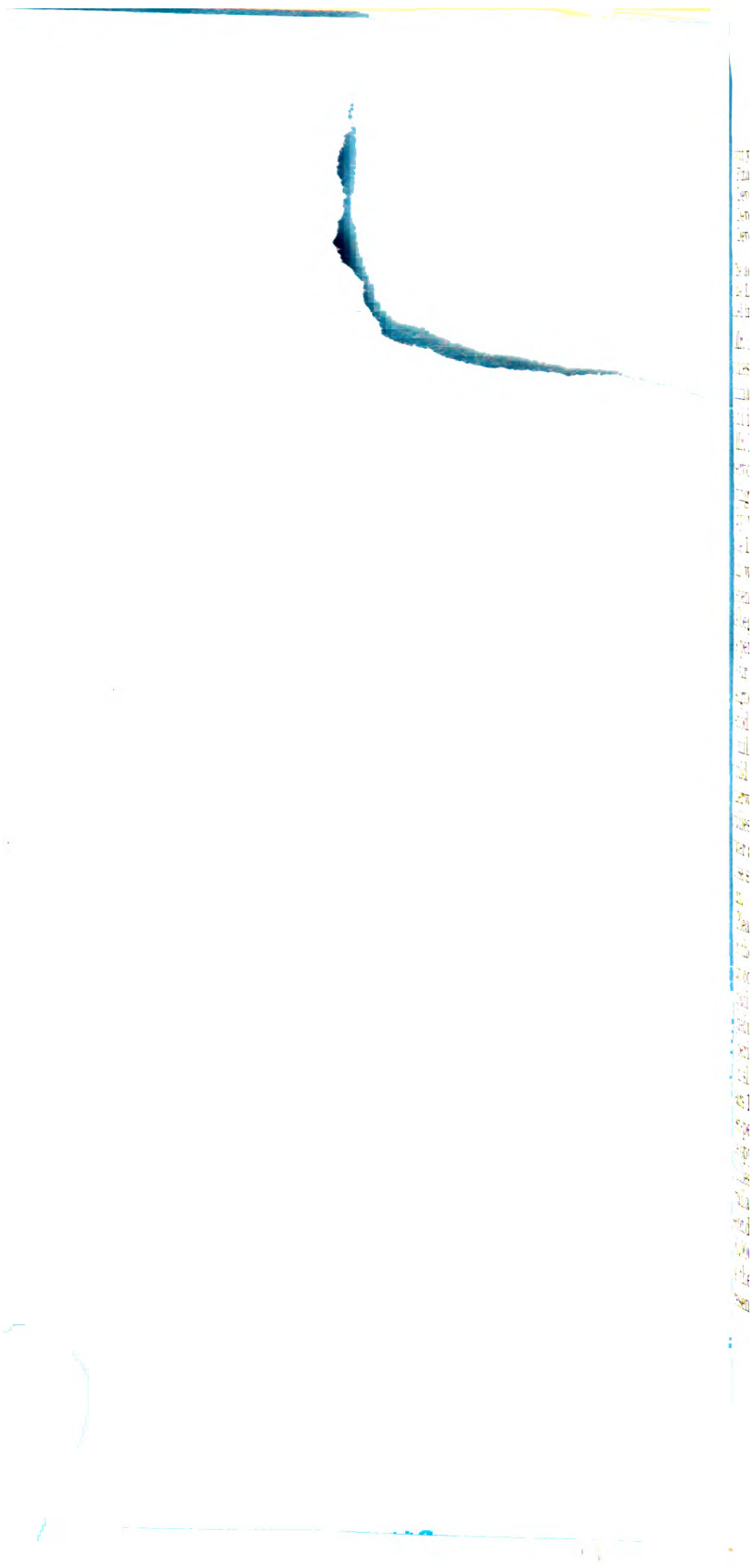
(Including Bridge Canyon Unit)

COST OF FEATURES

	LCRBP
Bridge Canyon project	$511,000,000
Marble Canyon project	239,000,000
Water salvage and recovery	42,000,000
Central Arizona project	526,000,000
Fish and wildlife	5,000,000
Total Federal cost	1,323,000,000

ECONOMIC ANALYSIS

Allocation of construction costs:	
Irrigation	341,000,000
Municipal and industrial water supply	191,000,000
Commercial power	631,000,000
Flood control	11,000,000
Water salvage	42,000,000
Recreation and fish and wildlife	85,000,000
Reimbursable	(2,000,000)
Nonreimbursable	(83,000,000)
Indian projects and distribution systems	20,000,000
Investigation costs paid from other sources	2,000,000
Total	1,323,000,000
Benefit-cost ratios:	
100-year period	2.1 to 1
50-year period	1.9 to 1



FINANCIAL ANALYSIS

Payout year:	*Year 2025*
Financial assistance to irrigation	$184,000,000
Development fund surplus in 2025	917,000,000
Development fund surplus in 2030	1,214,000,000
Development fund surplus in 2047	2,219,000,000

The accompanying payout schedule shows the details of the financial analysis of the Lower Colorado River Basin project in a form comparable to that contained in attachment No. 3 of Commissioner Dominy's statement.

Mr. ASPINALL. Mr. Dominy, the committee also needs the backup studies to support your statements on the availability of water. A summarized operations study, I believe, is what is needed. As I understand it, the committee staff has discussed this with Mr. Riter.

Mr. DOMINY. Mr. Chairman, a summary of Bureau of Reclamation reservoir operation and water supply studies is contained in the following table.

By way of explanation, the water supply studies summarized on table 16A of the January 1964 report on the Pacific Southwest water plan were based on a reservoir operation that produced the greatest "dependable yield"; that is, the reservoirs were assumed to be full at the beginning of the 1931–64 dry period and were drawn down over the period in a manner to produce the greatest dependable yield.

Our current studies were modified by adopting a reservoir operation designed to produce the greatest average annual yield over the entire period 1906–65. Under this operation the top storage in Lake Mead (5 million acre-feet in 1975 decreasing to 2 million acre-feet in 2030) would be used to regulate part of the Colorado River flows that would otherwise spill in a series of years of high runoff. The results of these studies are the ones shown on the table. The resultant estimates of water available for use in the United States, are, of course, higher than those shown on table 16A of the report on the Pacific Southwest water plan.

Please note in the table that the amount of water shown available for the central Arizona unit is uniformly greater than the amount that could be diverted by an aqueduct of 1,800-cubic-feet-per-second capacity (1,200,000 acre-feet per year). This is so because a larger aqueduct would be required to take full advantage of water available in periods of high runoff. However, by modifying the reservoir operation slightly, greater amounts of water could be made available in the years 1990, 2000, and 2030 for diversion by an aqueduct of 1,800-cubic-feet-per-second capacity. Due to time limitations we did not have the opportunity to run such modified studies in detail. However, check studies indicated that under such modified operation the water supply available to the central Arizona unit with a 1,800-cubic-feet-per-second aqueduct would be 1,200,000 in 1990 and somewhat higher than 900,000 and 580,000 acre-feet in the years 2000 and 2030, respectively. As these figures were considered conservative they were used in our presentation of water supply projections for the central Arizona unit.

LOWER COLORADO RIVER BASIN PROJECT

Summary of Bureau of Reclamation reservoir operation and water supply studies

[Averages for 60-year period 1906–65, inclusive, in thousands of acre-feet]

Item	Year 1975	Year 1990	Year 2000	Year 2030
Virgin flow—Lee Ferry	15,063	15,063	15,063	15,063
Upper basin depletion	4,220	5,100	5,430	5,800
Upper Basin end-of-year storage:				
Maximum	36,125	34,476	33,329	30,386
Minimum	15,769	14,280	9,186	6,888
Net storage change	0	0	0	0
Lee Ferry regulated delivery	9,570	8,770	8,600	8,250
Upper basin spills	1,273	1,193	1,033	1,013
Net gain, Lee Ferry to Hoover	772	753	732	704
Lake Mead:				
Inflow	11,615	10,716	10,365	9,967
Evaporation	898	872	835	853
Spills	653	269	148	158
Regulated release	10,064	9,575	9,382	8,956
Maximum end-of-year storage	25,900	25,900	25,900	24,900
Minimum end-of-year storage	13,370	13,000	11,800	11,090
Net storage change	0	0	0	0
Bill Williams River	50	50	50	50
Net losses, Hoover to Mexico (after salvage)	590	590	590	590
Delivery to Mexico	1,500	1,500	1,500	1,500
Available for use in United States	8,024	7,535	7,342	6,916
California	4,762	4,687	4,654	4,564
Nevada	100	150	200	300
Arizona	3,162	2,698	2,488	2,052
Other than central Arizona unit	1,020	1,160	1,230	1,230
Central Arizona unit:				
Available	2,142	1,538	1,258	822
Limited by 1800 cubic feet per second aqueduct	1,200	1,102	899	571
Water supply for central Arizona unit used in Lower Colorado River Basin project analysis	1,200	1,200	900	580
Maximum year	1,200	1,200	1,200	1,200
Minimum year	1,200	1,200	780	380

Mr. ASPINALL. Thank you very much, Mr. Udall and Mr. Dominy.
Secretary UDALL. Thank you, Mr. Chairman.

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

TUESDAY, AUGUST 24, 1965

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

The subcommittee met, pursuant to call, at 9:45 a.m., in room 1324, Longworth House Office Building, Hon. Walter Rogers of Texas (chairman of the subcommittee) presiding.

Mr. ROGERS. The subcommittee will come to order.

For consideration, first, of pending business, the Chair recognizes the gentleman from California, Mr. Tunney.

Mr. TUNNEY. Mr. Chairman, I ask unanimous consent to introduce Congressman Ken W. Dyal's statement into the record and ask that it be placed after the statements of the Congressmen that were introduced yesterday.

Mr. ROGERS. Without objection the unanimous-consent request will be granted.

Our first witness scheduled this morning is the Honorable Sam Goddard, Governor of Arizona. Governor, we are glad to have you before the subcommittee. If you have any aids you desire to come with you, you may feel free to bring them.

Mr. UDALL. For the record, I would like to identify the people who are accompanying the Governor.

Next to the Governor is Mr. William Gookin, who is our State water engineer.

Immediately behind the Governor is Dean Harold E. Myers, of the College of Agriculture, University of Arizona.

The other gentleman in the light suit is Les Alexander, a consultant in the Salt River project in Phoenix, assisting the Governor on some of these problems.

Mr. ROGERS. You may proceed, Governor

STATEMENT OF HON. SAM GODDARD, GOVERNOR OF THE STATE OF ARIZONA

Governor GODDARD. Thank you, Mr. Chairman.

This subcommittee has heard much detailed and specific testimony along technical lines and it has a great deal more of the same in prospect.

As a layman I can add but very little in this direction. Furthermore, I approve and commend to you the statements of our congressional delegation as being in accord with my own views as Governor of Arizona. Since further statements concerning matters of technical nature have been, or will be given to the subcommittee by expert witnesses, I would respectfully request that the subcommittee accept my prepared statement which perhaps would reflect similar details that have been, or will be again, covered by experts and permits me to address my short remarks to those underlying factors which seem to be to present a startlingly new and challenging direction in an old and controversial field.

I feel these directions and this new start are of equal importance to the sometimes conflicting prognostications and statistics of hydrology and the estimates of hydrological engineers.

Mr. ROGERS. Governor, without objection your prepared statement will be included in the record.

Mr. ASPINALL. Mr. Chairman——

Mr. ROGERS. The gentleman from Colorado reserves the right to object.

Mr. ASPINALL. I wish to know and understand whether the Governor is expecting to include the material attached to his statement under the heading of "Subsidence in the Eloy-Picacho Area" and together with certain graphs that he has; together with certain pictures that are present in that statement, and together with excerpts from the Geological Survey research under date of 1965—if so I will have to object.

If he is willing to have these placed in the file for such use as the subcommittee will make of them, then I shall of course withdraw by objection.

Mr. ROGERS. Governor, do you intend to include this attached matter in your statement, or do you desire to have it placed in the file?

Governor GODDARD. Mr. Chairman, I desire that it be placed in the file and I will refer to this matter of subsidence.

Mr. ROGERS. Without objection, the statement of the Governor of Arizona will be accepted for the record and the attached data will be accepted for the file with proper reference being made to it in the record.

(The statement, excluding the attached data, referred to follows:)

STATEMENT BY SAMUEL P. GODDARD, GOVERNOR OF THE STATE OF ARIZONA

Mr. Chairman and members of the committee, I have observed the development of Arizona as a proud citizen, an attorney and businessman, and as Governor with a large measure of responsibility for State government policies and actions to assure a sound social and economic future for all of Arizona's people.

My long observation of the many public problems that face my growing State convinces me that the development of a firm and adequate water supply is a first order of business for government at both the State and Federal levels. I know that you gentlemen, being hard working members of this particular committee, are well aware of our water problem in Arizona and of the need to solve it as expeditiously as possible in both Arizona's and the Nation's interest.

The feud between Arizona and California over the use of Colorado River water is ended, and I am glad to say that I am the first Governor of Arizona who can stand beside a Governor of California on the same water platform without being joined in mortal combat. Governor Brown and I are in full agreement concerning the need for water in our two States and about the most feasible

means of satisfying that need. A little later this week Governor Sawyer of Nevada will round out the solidarity of the lower basin States in this matter by a statement before you gentlemen.

My statement to this committee concerns primarily the central Arizona unit of the Lower Colorado River Basin project because Arizona's need is so urgent, but our interest in the broader aspects of the whole project and the whole Colorado River Basin is very real, as I shall indicate at a later point.

The extent and urgency of Arizona's need for additional water was presented to members of this committee in field hearings in Arizona last November. I can add little to what was said by many of our citizens at that time, except that the urgency increases with each passing day.

The U.S. Geological Survey tells us that approximately three-fourths of the water supply for Arizona is produced by pumping ground water, and that the amount of natural recharge of the ground-water basins is much less than the withdrawals. In 1963, as in 1962, total pumping was 4.5 million acre-feet. The areas of greatest withdrawal are in the Salt River Valley and the lower Santa Cruz Basin. It is in these valleys where a very large part of our people and industry are also concentrated. It is in this economically strategic area that the rate of ground-water level decline is greatest.

From the spring of 1959 to the spring of 1964, ground-water levels fell as much as 30 feet in some parts of the lower Santa Cruz Basin. In some parts of the lower Santa Cruz Basin. In some parts of the Salt River Valley a decline of as much as 10 feet was reported by the Geological Survey in the 1-year period of 1963–64.

This alarming depletion of Arizona's major source of water supply has continued for a number of years, and cannot be continued for long without very seriously impairing both our existing economy and our potential for growth. Quite aside from the shortage of water, the effects of overpumping are reflected in the sagging of the earth.

Gentlemen, attached are two significant reports[1] showing the beginning effects of excessive overpumping of ground water basins in Arizona. These reports and the accompanying photographs give ample evidence of our need to reduce underground pumping. A decided widening and deepening of the subsidence areas has occurred in the last few years.

I have here enlarged photographs which show subsidence in an agricultural area and as it is affecting Arizona's State highway system.

Gentlemen, we do indeed need, most urgently, to put the remainder of Arizona's share of Colorado River water to beneficial use.

We need it to maintain, not to expand, our irrigated farmlands. These lands are richly productive and vital to our economy though they amount to only a little more than 1 million acres.

We need the new water to serve our ever-growing cities and our industries. Tucson, by way of illustration, is probably the largest city in the United States depending solely upon pumped ground water to meet the needs of 250,000 people. It needs Colorado River water now, and in the not too distant future could need 200,000 or more acre-feet annually from that source.

Phoenix, though it has surface water available from Salt River project lands that have been urbanized out of crop production, will eventually require very substantial amounts of dependable surface water from the central Arizona project to replace present ground water pumpage.

From border to border of Arizona water supplies for cities and towns are inadequate now or will be in the foreseeable future. Water use exchanges made possible by the central Arizona project unit of the Lower Colorado River Basin project, are the best hope of resolving these widespread municipal water supply problems.

Members of this committee probably don't want to hear any more evidence of Arizona's need—but it's so close to us we have had to ask your indulgence while we make our case for the Lower Colorado River Basin project and the central Arizona unit.

The supply of water to meet this need has been the subject of much controversy. It was therefore with real gratification that I joined Governors Brown and Sawyer in presenting to this committee a joint statement of the position of

[1] "Subsidence in the Eloy-Picacho Area," by Carl C. Winikka, University of Arizona, Tucson, Ariz., May 16, 1964.
"Earth Cracks—A Cause of Gullying," by William Kam, U.S. Geological Survey—Paper 525-B, 1965.

our respective States on the water supply available for the central Arizona project. Our three Congressmen have fully briefed you on the conclusions of that statement.

Additionally, all of the States of the Colorado River Basin have gone a long way toward settling the differences that have existed between us. It is my hope and my belief that the great need for additional water in the basin will bring us all together in the next few days on a common program for our mutual benefit. Arizona will cooperate to the fullest in seeing that a unified approach to the problem is forthcoming.

The statements made to this committee by the members of Arizona's congressional delegation draw attention to the fact that our State has planned and hoped for the diversion of Colorado River water into central Arizona for many years, and has in fact maintained and developed its economy through the years only by exploiting its ground waters and increasing the efficiency of its uses.

Our congressional delegation has mentioned Arizona's unique ability to make use of the fluctuating flows of the Colorado. By calling on our surface waters and CAP waters in times of plenty, we can reduce the overdraft on underground pumping. But temporarily we can return to pumping in a low year on the Colorado or the Gila and its tributaries. We will be prepared to have testimony given in this hearing, if called for, which will show the economic feasibility of constructing the central Arizona project if no import or augmentation program for additional water is subsequently carried out. We agree, however, that additional water in the basin is a necessity for all seven of the basin States and are actively supporting such a program. In this connection, it does not seem to me to make economic sense to delay the construction of Bridge Canyon and hydroelectric plant. It will be in the broad national interest to proceed with this construction so that the development fund may be enhanced to the fullest possible extent. Any augmentation program will be extremely expensive and ideally it should be paid for with the development fund. A distinguished and capable citizen of our State, Mr. Hennen Forman, executive vice president of the Arizona Public Service Co., will come before this committee to justify his conclusion that "—peaking power contemplated for Bridge Canyon Dam and Marble Canyon Dam can be marketed at the price presently estimated."

I am informed that the latest studies of the Bureau of Reclamation show a very favorable benefit-cost ratio for our project. We are fully in accord with such a conclusion.

While the purpose of the central Arizona project always has been, and is now, to provide supplemental water required to maintain our existing economic uses in areas that have already been developed, we are not unmindful of our responsibility to consider other potential values resulting from the control and delivery of water as proposed in the project.

The Arizona Game and Fish Department has been very active in the planning and development of the State's limited fishing waters. In the very few areas where unclaimed surface water was available small recreation lakes have been created to conserve the resource.

As our population continues to increase so do the pressures of recreational use upon existing bodies of water. Our fish and game department has a long-range plan for developing some additional impoundments at the higher elevations in the State. The water supply for these facilities could be acquired by exchange when the central Arizona project is built. The amount of water involved in this planning would be relatively small and, in the opinion of fish and game department officials, would very likely conserve rather than consume water produced from high elevation watersheds because of lower rates of evaporation. It is assumed that this long-range program is in the public interest, and that as it develops the use of water can be negotiated by exchange and by contract with the Secretary of the Interior.

Gentlemen, testimony before this committee, as it has been, and will be developed makes a clear justification for immediate authorization of the Lower Colorado River Basin project. The need is desperate, financial feasibility is soundly based, marketability of the water and power to be produced is unquestioned, and cooperation among those most closely affected is at an alltime high. I therefore urge your favorable consideration of the bills before you. Thank you.

Mr. ROGERS. Governor, you may proceed.

Governor GODDARD. I would like to add my personal appreciation for the careful and patient consideration given our case by the sub-

committee and to add my enthusiastic second to the pride I feel in being present with such distinguished former members of this committee as Congressman Murdock who was present yesterday and has been a pioneer in the field, and our former Governor and former Senator, MacFarland; both of whom have long served and have done yeoman service for their State and for their country, and especially in this field of water.

Mr. Chairman and members of the committee, I am sure that each of you is proud of your home State. So am I. And in my case is added the zeal of an adult convert; for it was only after World War II that I came to Arizona directly from the South Pacific.

Since 1946 I have participated in the phenomenon of Arizona which is also the story of the exploding development of the great American West. In our land—in the deserts, in mountains, and forests and vast open spaces we have participated in one of America's great creative miracles.

We have overcome two of the enemies of mankind that have persisted over the ages—heat and the thorny expanse of the wilderness—to the extent that now the bright desert sun is thought of as a healer and not a destroyer, a great asset and not a detriment to man's normal pursuits.

Arizona has grown 100.9 percent in a little less than 14 years. Phoenix, it is reliably predicted, will be as large as the population of our State is today by 1980.

Congressman Rhodes and I both have adopted this State as a member of the new population which now forms the majority of Arizona's people. We are from all parts of this great Nation. We are a melting pot within a melting pot. We are new people who have cast our lot in the West seeking health or a broader horizon, people who have sought as Americans always have sought to overcome obstacles and to build a new element of strength for our Nation.

You gentlemen are especially conscious of this new element in our West, and as conscientious members of this hard-working committee you know that our treasure, indeed our very existence, is chained to the ground by steel-blue ribbons of water.

I know very little of the feuding, of the long and bitter wrangle over our mutual lifeline, the Colorado River. I do know that Governor Brown of California and I are in full agreement as to our States' desperate need for water and as to the support we have to the regional approach to the solution of this problem.

Governor Sawyer, of Nevada, has joined me and Governor Brown in a unified basin approach. Now, we have the encouraging prospect of a general consensus among all the seven Colorado River States respecting the most pernicious of our former arenas of dispute.

In the early days of the American West water disputes were settled by shooting. States, like people, have to learn that differences can be settled by cooperation and good faith. Now that the Nation is finding from border to border the immense, the essential value of water and finding it the hard way I feel that this drawing together of former belligerents can be of immense use in helping other parts of our country recognize and conserve what must ultimately be regarded as a national asset.

My primary responsibility is, of course, to the people of Arizona but we do not regard our problem of shortage unique. A solution should not be found for ourselves alone. Even if it were possible, it is not enough. The solution must protect and benefit all of those who share the lifeline of the Colorado and equally important it must not injure or hinder the development of any State with whom we share the blessings of a God-given abundance of water.

This is, as I understand it, the driving thrust of the Lower Colorado River Basin project and the entire regional concept which has been enunciated so well by the Secretary of the Interior.

We, in Arizona, seek no new bonanza of agricultural development. We seek to repair the ravages of a disappearing water table, to shore up the subsidence of the land in our water-short areas, to stop the retreat of production already begun.

The central Arizona project will not replace our overdraft on our underground resources. It will not make us whole but it will allow a period of reduced drawdown to take place. Then, with full reservoirs, we can husband our water, our water assets which belong jointly to all of us, carefully and prepare for the calamity of drought and, if necessary, meet our obligations.

We can have recourse to a partially replenished underground supply. The extent and urgency of Arizona's need for additional water was presented to members of this committee in field hearings in Arizona last November.

This was prior to my election and I find it one of the great disappointments that I was unable to be with you at that time. I was required to be with the Governor of Sonora, in Mexico, although this should not diminish in any sense the precedence which this matter takes in the eyes and minds of Arizona people and of our officials.

I can add little to what was said by many of our citizens at that time, except that the urgency increases in every passing day. The U.S. Geological Survey tells us that approximately three-fourths of the water supply for Arizona is produced by pumping ground water.

The areas of greatest withdrawal are in the Salt River Valley and the Lower Santa Cruz Basin. It is in these valleys where a very large part of our people and industry are also concentrated.

From the spring of 1959 to the spring of 1964, groundwater levels fell as much as 30 feet in some parts of the Lower Santa Cruz Basin. In some parts of the Salt River Valley a decline of as much as 10 feet was reported by the Geological Survey in the 1-year period of 1963 to 1964.

I do emphasize these matters, not to be redundant in bringing them again before the committee because you have heard testimony and will again hear testimony, as an individual who lives in Arizona and one who is interested in the region, and one who is raising his family.

I speak for those others of us who are making their future in our State—we cannot help but be gratefully impressed by the imminency of our disastrous water problem.

I would like to show you some pictures which we have brought to the hearing room and which are enlarged—I believe you can see them—and which will show some of the subsidence problems which we have in rural areas. These problems are multiplying.

You can see from the photograph the various cracks in the terrain which has, to the best of our expert testimony, been created by the compaction of water-bearing sands, or subsidence of overburdened material caused by rains after the subsidence of lands.

Of course, in our area these are extremely important and we find all too prevalent.

We have many photographs of similar import in various areas of water shortage in the State. We have done some things in this respect. We have at the present time some 3,884,000 acres of agricultural land in Arizona where we have declared a critical groundwater area, where further well-drilling has been terminated.

We feel that this problem is not only urgent but with each day the urgency is multiplied.

Now, we know that in Arizona we have been blessed with many of our country's most magnificent natural wonders. Our pride in this trust is reflected by being known as the Grand Canyon State.

At the end of this week I have called a meeting in Phoenix on Arizona beauty. This call has been met with widespread enthusiasm and we expect a large attendance and much constructive thought to be applied to this problem. We will be concerned with the protection and enhancement of our great works of nature. These works which might possibly be marred by encroachments are our principal concern.

They are of grave concern to us and in recommending to you the construction of the dams associated with this project we have had to satisfy ourselves that the Grand Canyon will not be damaged in any part of its immense and awesome wonder.

We are just as interested as everyone in this country—and perhaps more so because this is our treasure—that our children and your children and their children can still pause and enjoy the vastness of what remains of our wilderness.

Since the historic day right after the last inauguration of our President when the congressional delegation and the Governors of Arizona and California sat down here in Washington and agreed that we should no longer waste our strength and our efforts and our resources in futile disputations but that we should work together for the common development of our regional resources, many good results have accrued.

One of the most promising was created at the recent meeting of the western governors in conference at Portland, Oreg., just this spring. There it was unanimously agreed that the first permanent representative council jointly financed and staffed be created as a permanent adjunct to the Governors' conference. It was denominated the Western States Water Council and the agreements on procedures looked toward the beneficial solution to our age-old quarrels over the uneven distribution of the West's water resources.

We hope that this new instrument will be effective throughout the West in bringing together in accord the various elements of the West from the far north to the farthest of our Southern States. This surely is tangible evidence of the new force in what our host at the conference, Gov. Mark Hatfield of Oregon, called water statesmanship—a nonpartisan, nonparochial, and nonprejudiced new look at a very old problem.

I would like to commend to the committee the testimony that has been received from the Department of the Interior, Bureau of Reclama-

tion. I would like to ask your patient examination of the underlying factors in this case. I have stated the desperate concern of Arizona which, of course, is our concern but I would like to emphasize again that we feel that this is a matter which concerns all of the States of the Colorado and perhaps a precedence can be set of new action and new policy across the Nation which is now acutely conscious of the water shortage.

I feel that—as a final word—that this committee representing as it does a continuation of the tradition of conservation and reclamation established in America—perhaps one of our unique traditions—one which has been widely imitated in other countries after the fact.

Because of the tradition and reputation of American conservationists and reclamation people we have acted in time to preserve, to save, to conserve, and we are proficient in the art of which you are the center—the art of conserving and reclaiming our precious natural resources so that a vigorous and promising part of our country may continue to produce wealth for the Nation in the foreseeable future.

Thank you for giving me a hearing on this matter.

Mr. ROGERS. Governor, thank you for your presentation.

I recognize the gentleman from Colorado, the Honorable Wayne Aspinall.

Mr. ASPINALL. I am glad to meet you and I understand that your first interest is in the State of Arizona, and its welfare, and this interest started immediately after the war, World War II, when you went to Arizona.

Governor GODDARD. That is when I decided to become an adopted son. I have been interested in Arizona for some time but my real familiarity begins at that point.

Mr. ASPINALL. How old were you at the time you went to Arizona?

Governor GODDARD. I believe I was about 27 years old.

Mr. ASPINALL. And what was your native State?

Governor GODDARD. I lived by the long and somewhat overabundant water of the Mississippi—I lived in St. Louis. I was brought up there.

Mr. ASPINALL. The only reason I ask this is so we get off on a common ground. My cousin was Scott Norviel, water commissioner of Arizona during those early days of controversy and he was from Ohio, just like I was—so we are all adopted sons of our States.

What do you consider to be the primary value—the first value of the Colorado River compact to the lower basin States?

Governor GODDARD. Of course the compact is a complex and very——

Mr. ASPINALL. I understand this.

Governor GODDARD. Technical document.

Mr. ASPINALL. What do you consider to be its first value? What was its importance to the lower basin States?

Governor GODDARD. Well, I feel that the compact itself as with any agreement among States regarding jointly shared resources is primarily of value in making an attempt to equitably distribute those resources and prevent insofar as humanly possible recurrence of disputes in the future.

Mr. ASPINALL. Well, that is all right to think about today. That isn't the reason why the compact came into existence as far as the lower basin States are concerned.

It came into existence so that the river could be regulated—that was its value to the lower basin States—so that they could put the water to use instead of having it waste to the sea.

Now what is the value of the compact—the primary value of the compact as far as the upper basin States are concerned? I just want to have a common understanding before asking you some questions—you are sitting there flanked by engineers who are responsible, I suppose, for the answers to a letter that I sent to you.

Governor GODDARD. Mr. Aspinwall, I feel——

Mr. ASPINALL. There is no "w" in my name.

Governor GODDARD. I beg your pardon.

Mr. ASPINALL. There is no "w" in my name.

Governor GODDARD. Aspinall—I am sorry. I have an ancestor named Aspinwall so it is a natural mistake.

Mr. ASPINALL. If we look back far enough, we may find we are cousins. [Laughter.]

Governor GODDARD. I feel quite emphatically that the compact to the upper basin States represents an instrument which was intended to preserve and regulate insofar as possible the rights of the various States in their mutual resource. But I feel even more so that——

Mr. ASPINALL. Let me answer the question. The value to the upper basin States 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.

These were the two great values to the lower basin States and to the upper basin States.

With this in mind—always keeping in mind that as we take these projects through the Congress—we have to think about feasibility measurements, and one of the feasibility measurements is physical feasibility and one of the main factors in physical feasibility is the factor of availability of water.

Now Governor, what do you consider, according to information which you have, as the amount of water presently available to Arizona for new uses under the provisions of the Colorado River compact and taking into consideration the present uses and depletion, illegal and otherwise, in the Colorado River—in the lower basin?

Governor GODDARD. Mr. Aspinall, I feel that this question being one of great technical content could only be accurately and completely and honestly answered by people of far greater technical competence than I am.

I woud like to refer the committee to such testimony.

Mr. ASPINALL. Well, where is the testimony?

Governor GODDARD. The testimony will be presented to the committee along these lines.

Mr. ASPINALL. By whom?

Governor GODDARD. I feel that we will have in the future testimony submitted by various individuals and if there should be any desire on the committee's part for further memorandum on this subject we will produce one and file it with the committee.

Mr. ASPINALL. Governor, I have looked through the list of witnesses this morning and I just didn't find anybody representing Arizona who will be available later on who will try to answer that question.

Governor GODDARD. Mr. Aspinall, we have witnesses—Mr. Maughan and Mr. Steiner.

Mr. HOSMER. Mr. Steiner is from California.

Governor GODDARD. That is correct.

Mr. ASPINALL. I have been advised by a staff member that Mr. Maughan is a member of the California Department of Water Resources and he will take the place of Mr. Steiner. Mr. Maughan will present the conclusions of the lower basin States water availability studies. Is that correct?

Governor GODDARD. This is correct. Governor Brown and Governor Sawyer and I have mutually accepted and forwarded to the committee our joint statistics in this matter and Mr. Maughan will present them to you.

Mr. ASPINALL. And whatever Mr. Maughan's statements—in answer to my questions—may be, will be your statement and you will be willing to stand on it. Is that correct?

Governor GODDARD. As we have written the committee, the three Governors of the three States are willing to stand on this joint, common appraisal.

Mr. ASPINALL. First now, Governor, you haven't even gotten close to what I had in mind, when I wrote to you. There are a lot of people in your State—newspaper publicists and individuals who think that the chairman of the full committee is delaying this matter.

That isn't right. That isn't right at all, because I am just as much interested in the lower Colorado River development as any of you folks are. I have been intimately acquainted with this perhaps longer than you have because I am older than you are—but you cannot answer my question by stating that Mr. Maughan is going to testify to your statement because your statement was not responsible to the question that I asked you in my letter. Now——

Governor GODDARD. Mr. Aspinall, I would like to make it amply clear that there is no reflection of such a condition of mind or such an opinion on the part of the Arizonans that I have been in touch with.

I feel that we tried to answer your questions and I feel that we will offer such testimony as you would like in amplification of those remarks that we sent you.

Mr. ASPINALL. I am giving your staff a chance to answer these questions.

Mr. HOSMER. Will the gentleman yield?

Mr. ASPINALL. Yes; I will yield.

Mr. HOSMER. Is Mr. Gookin the State engineer?

Governor GODDARD. That is correct.

Mr. HOSMER. Does he have the answers to Mr. Aspinall's questions?

Governor GODDARD. Mr. Gookin informs me that in the interest of trying to give the committee as thorough and complete and honest an answer as we are capable of he and his associates are trying to produce these facts in an orderly and direct presentation that will be available for the committee, either by testimony or in such form as you would require.

Mr. HOSMER. By that, do you mean that Mr. Gookin has the answer but he wants Mr. Maughan to give it?

Governor GODDARD. I believe the answer would be that we would like to have the entire thing correlated so that it can come to you through the expert testimony of Mr. Maughan.

Mr. HOSMER. And not the expert testimony of Mr. Gookin.

Governor GODDARD. This is correct.

Mr. REINECKE. Have you read Mr. Maughan's statement yet?

Governor GODDARD. No, I have not.

Mr. REINECKE. Is it prepared yet?

Governor GODDARD. The statement that we submitted from the three States, California, Nevada, and Arizona, has been submitted to the committee already.

Mr. ASPINALL. Mr. Chairman, I am going to place in the record at this time certain information on lower basin water use.

Mr. Gookin, Mr. Wills, and Mr. Elson have all been advising some of the members of the other body as to how to proceed with this case. I think it might just as well be realized right now, Governor, and I am speaking to you as a friend, that you better get the facts.

We all recognize the need for this project. Nobody needs to come here to talk to us about the need. There isn't a member on this committee who doesn't recognize the need for providing more water for use in Arizona. But if you are going to be beneficiaries of upper basin water it will have to be known to the world right now so that you can reach some understanding with the upper basin on agreements, not on consensus—not on opinion—but upon agreements by which we can get this project underway.

I shall read to you the usage for 1963 of the Colorado River main stream water in the lower basin, giving the amount of water which was released because of one reason or another in the lower basin.

The releases from Lake Mead were 8,533,000 acre-feet—which is at least 283,000 feet of water over and above the 7,500,000 acre-feet plus 750,000 acre-feet of water for the entitlement of old Mexico. In other words, assuming that inflow between Lee Ferry and Lake Mead will take care of Lake Mead evaporation, there were 283,000 acre-feet of water which was in addition to any agreements called for or anything agreed upon.

Now the consumptive uses for irrigation and municipal purposes by the metropolitan district—1,057,000 acre-feet of water.

For the Colorado Indian Reservation—187,000 acre-feet of water.

For the Palo-Verde Irrigation District—367,000 acre-feet of water.

For the All American Canal system—a part of which is for uses in Arizona—4,593,000 acre-feet of water.

Total use is 6,204,000 acre-feet of water.

For the Mexican treaty, 1,500,000 acre-feet of water.

River losses, uncontrollable flows, change in storage and so forth—829,000 acre-feet of water.

Total releases then—8,533,000 acre-feet of water.

Lake Mead evaporation averages about 730,000 acre-feet annually and the net inflow from Lee Ferry to Lake Mead averages about 800,000 acre-feet annually.

In other words, the total past Lee Ferry was about 8,463,000 acre-feet of water.

The figures that must be kept in mind are 8,533,000 acre-feet of water and 8,463,000 acre-feet of water, showing a deficit in the lower basin at the present time so far as the lower basin's entitlement is concerned.

And what I am trying to get into the record is that the Arizona—the Lower Colorado River project—depends entirely upon the use of upper basin water at the present time. Do you admit that?

THE CAPITOL,
Phoenix, September 10, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Interior and Insular Affairs Committee,
House of Representatives, Washington, D.C.

DEAR MR. ASPINALL: On August 24, 1965, during the hearings before the Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs on H.R. 4671, et al., to authorize the construction, operation, and maintenance of the Lower Colorado River Basin project and for other purposes, you presented certain figures of streamflow and water utilization for the year 1963. It is my understanding that you would like to have Arizona's comments on those figures.

Our engineers advise me these figures demonstrate that for the year 1963, 1,363,000 acre-feet could have been made available for the central Arizona project without increasing the releases from Lake Mead, had the use by California been limited to 4,400,000 acre-feet and had the salvage measures proposed by the Bureau of Reclamation been in effect. They made comparable calculations for the year 1962 and found that in 1962, 1,503,000 acre-feet would have been available. (Details of the engineering calculations for each year are attached as enclosures A and B.)

These amounts could have been made available for a central Arizona project without withdrawals from the lower basin storage reservoirs, with releases from Lee Ferry of 8,463,000 acre-feet and 8,545,000 acre-feet, respectively. Alternatively, had the releases at Lee Ferry been reduced to 8,250,000 acre-feet the amount of water which could have been made available for increased uses in Nevada and Arizona, including the central Arizona project, would have been reduced to 1,150,000 acre-feet in 1963 and 1,208,000 acre-feet in 1962, plus any reregulation which might be accomplished by Hoover Dam, as hereinafter discussed.

As to the next 25 to 30 years, Commissioner Dominy has advised us (1) that the Bureau expects to release about 8,800,000 acre-feet per year during the period 1966–75. After 1975, with the reservoirs substantially full and salvage measures in effect. the Bureau expects to release up to 9,500,000 acre-feet at Lee Ferry for a period of time. By 1985, they estimate releases will again average 8,800,000 acre-feet per year, rather than the 8,463,000 acre-feet and 8,545,000 acre-feet which would have yielded 1,363,000 acre-feet in 1963 and 1,503,000 acre-feet in 1962. It follows that had 8,800,000 acre-feet been released in 1963 and 1962, there would have been water available for a central Arizona project and expanded uses in Arizona and Nevada in the amount of 1,700,000 acre-feet in 1963 and 1,758,000 acre-feet in 1962.

In addition to the releases forecast by Mr. Dominy, there would have occurred spills as indicated in the fourth and fifth paragraphs of Mr. Dominy's letter of August 27, 1965, to Congressman John J. Rhodes, a copy of which is attached, wherein Mr. Dominy further clarifies his statements as to projected releases from Glen Canyon. These spills could be reregulated, at least to some extent, by Hoover Dam so that more water would be available than the foregoing figures would indicate. To the extent that these releases could be augmented by reregulation of spill by Hoover Dam, the amount of water available for a central Arizona project could be increased.

We are most anxious to provide any additional information which will facilitate these hearings.

Sincerely yours,

SAMUEL P. GODDARD, *Governor.*

DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
Washington, D.C., August 27, 1965.

Hon. JOHN J. RHODES,
House of Representatives,
Washington, D.C.

DEAR MR. RHODES: This letter and our letter of August 2, 1965, respond to the question you raised in your letter to me of July 27 as to what minimum release would be required at Glen Canyon to accomplish repayment of the Colorado River storage project and provide sufficient revenue to assure repayment of the irrigation costs of participating projects.

I am sure you realize an answer to your question involves many assumptions of future uses and supply of water from the river system as well as long-range projections of estimated project costs. The key aspect of water releases is the availability of relatively large quantities during early years of the project.

Operating plans for the Colorado River storage project have always taken into account historical high-flow water years as well as low water years and have contemplated large water releases in early years of the project prior to the upper basin attaining further substantial development. This approach has permitted much more rapid development of the participating projects than would otherwise be the case. The release of larger amounts of water in the early project years of operation permits retiring of interest-bearing debt at a rapid rate and, hence, reduces total interest costs.

The operating plans, if followed and utilized, can expect releases averaging about 8.8 million acre-feet during the filling period between 1966 and 1975. This period would be followed by releases running from about 9½ million acre-feet in 1975 and declining to about 9 million acre-feet in 1985. These releases would be further augmented by intermittent spills in high runoff years which could average another million acre-feet. Of these spills, about 700,000 acre-feet average annually could be available for the production of surplus energy.

Between 1985 and 2030, the releases would, on the average, further decline to a minimum of 8¼ million acre-feet plus, of course, whatever spills might occur in the interim.

Because of cost savings on the project due to the use of wheeling contracts rather than construction of portions of the transmission division and, due to the elimination of the protective works at Rainbow Bridge and other changes on the project, there is an expected cushion for repayment of this project. Consequently, even if upper basin depletions increased more rapidly than estimated by the Bureau, repayment would be accomplished provided there are available high releases in the early years. If the expected upper basin depletion rate should occur as early as 1985, as estimated by the State agencies, project repayment is still in sight, again, provided total releases in the magnitude of 180 million acre-feet are available in the first 20 years of the project.

Sincerely yours,

(Signed) FLOYD E. DOMINY, *Commissioner.*

Governor GODDARD. Mr. Aspinall, I would like to——

Mr. ASPINALL. Well, that is all right—you don't have to answer.

Governor GODDARD (continuing). Bring to your attention, however, that you have reminded me quite appropriately that the compact was used to change the appropriation system that the West had developed; to change over the common law procedure of riparian rights and now since the time of the compact we have had experts; hydrologic people, experts in statistics and experts in the various areas of hydrology who have been arguing—we have had literally decades taken in controversial——

Mr. ASPINALL. You don't need to tell me any of this. I have been with it since 1919.

Governor GODDARD. I realize that, Mr. Aspinall. The only thing is that today we have one new element and the new element is this—and that is that we have realized that in order to bring ourselves together we are not going to be able to controvert statistics and esti-

mates—we are going to have to cooperate between our various basins.

We are going to have to build a new edifice which may be as different as the doctrine of riparian rights and prior appropriation.

We are going to have to find a new measure. We are going to have to give you the facts. We want to give you the facts but we want to give you the facts that are recognized not by our State alone but facts which are recognized by all our States.

Mr. ASPINALL. We are not entering into a debate. If you want to change the Colorado River compact there is one way to do it—that is to get all the States of the compact together and then come to the Congress and ask for the change to be approved.

When I ask for facts, Governor, from a witness before my committee I expect that witness to either say he doesn't know, or he does know, because that is the reason he is sitting at that table.

This is just the same as a courtroom as far as this committee is concerned and we determine our decisions upon the information that we receive in our hearings.

Governor GODDARD. Mr. Aspinall, we would like to give you the facts but we would like to give you the facts as they have been agreed upon and the facts that we feel can be substantiated and we would like to do that as a measure of our joint cooperation.

Mr. ASPINALL. I have one more question I wanted to put in the record for your advisers.

Is it possible under existing conditions to make the lower Colorado River project a success without the use of water to which the upper basin is entitled under the provisions of the Colorado River compact?

I do not ask for that answer at the present time.

Now, in the statement of the lower basin on availability of water to which you have given your consent and have so written, and your State water engineer, Mr. Gookin, has signed—you base the availability of water upon the probable future water supply. Will you explain to this subcommittee just what is involved in the probability concept of determining water supply?

Governor GODDARD. I will ask Mr. Gookin to reply to that question, Mr. Aspinall, if it is permissible.

Mr. GOOKIN. Mr. Congressman, the probability theory merely consists in taking these occurrences which have occurred in the historic past, analyzing them and determining as best we can, what the chances are that these occurrences will occur in the future and what the probability of chances are that they will deviate from the historic past and to what extent.

Mr. ASPINALL. Is it your opinion that you can afford to spend and that you can ask the people of the United States to finance projects which are built upon a 50–50 chance or probability of having an adequate water supply?

Mr. GOOKIN. Yes, sir—it certainly is in this case because we have in this case something that is rather unique in that we have a situation where we are trying to salvage the economy which exists. We are not trying to create a new one. We have a situation where we can take a variable water supply, unlike most projects where you need a fairly constant water supply—you can vary the water supply for Arizona very greatly because following completion of the central Arizona proj-

ect we would have three sources of water—ground water, local ground water; the surface water of the streams and the import water.

By shutting down our pumps within the State we could take increasing amounts of import water from the Colorado and during years of shortage we would then have to revert again to our pumping so that we could take a widely fluctuating water supply and in the final analysis if this water supply should become exhausted or be no longer available we would then be no worse off than we are today.

We are not creating a new economy which at some future date might run out of water and then come back to the Congress and say—well, look we have run out of water and you created a new economy and we must salvage the economy which has been created as a result of the new project.

We are merely trying to help ameliorate the problems of our water-short area.

So, I think that the answer to your question, Mr. Congressman, is clearly yes, the people in the United States are justified in spending the money and we can demonstrate that there is ample benefit and ample revenue which would accrue to this project.

We must also remember that while there is a 50–50 chance of 14.9 acre-feet, long-term average, at Lee Ferry measured in terms of virgin flow, there is also a chance that there may be more—we may go as high as 16.5; conceivably we can go higher.

Mr. ASPINALL. Thank you for such a fine answer. I only asked for a short answer. I cannot understand why you would not answer my first question.

Mr. ROGERS. The Chair recognizes the gentleman from Pennsylvania.

Mr. SAYLOR. Governor, I am delighted to meet you and have you before the committee. First, let me correct the statement with reference to the hearings that this committee held in your State. They weren't held prior to your election. They were held after your election.

Second, I am delighted to know that you were with a Governor of Mexico. I happen to be one of those that likes to keep letters. I got a letter from you that told me that you told your good wife, before the elections, win or lose, you were going to take a vacation and that is where you went.

So I think we ought to get this in the record. If he needs it I can furnish the Governor the letter to put in the record.

Now, Governor——

Governor GODDARD. I believe the record should show that I don't believe that this statement that the Congressman has just made is correct. I was in Mexico at the express invitation of the Governor of Mexico prior to my inauguration.

Mr. SAYLOR. Inauguration isn't what I said—you said election.

Governor GODDARD. All right; if I said election I was mistaken but if the Congressman has a letter, or some such information that I was on a vacation, this is totally unreal; it has no basis in fact that I know of——

Mr. SAYLOR. I will ask unanimous consent to put the Governor's letter to me explaining his absence in the committee hearings in the record.

Mr. ROGERS. The Chair doubts the regularity of this sort of thing, but I think if the gentleman from Pennsylvania will submit the letter for consideration by the committee, it will be considered if there is no further objection to it. Otherwise, I think proper reference has been made that the record be cleared.

Mr. HALEY. Will the gentleman from Pennsylvania yield?

Mr. SAYLOR. I yield.

Mr. HALEY. Is this the same matter that the gentleman from Colorado was referring to?

Mr. SAYLOR. No; there is another one.

Now, Governor, 30-odd Congressmen from California——

Mr. HOSMER. Thirty-some Congressmen.

[Laughter.]

Mr. SAYLOR. Mr. Chairman, I insist my original request was 30-odd Congressmen——

[Laughter.]

Mr. ROGERS. Order please.

Mr. SAYLOR (continuing). Introduced a bill, and I understand that all of the members of the Arizona delegation introduced identical bills. These are the bills that you are appearing to testify in support of; is that correct?

Governor GODDARD. Sir?

Mr. SAYLOR. Well, section 304(a) of the bill contains the following:

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 mainstream 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 mainstream for the purposes of 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 mainstream water, and by users of the same character in Arizona and Nevada.

I would like you to explain what you, as the Governor of Arizona, and your water experts feel that section does mean.

Governor GODDARD. Since this is a question that I feel should have a careful, exhaustive, technical answer, I will refer it to Mr. Gookin.

Mr. GOOKIN. My understanding and interpretation of this particular section of the bill is that it provides that in the event there is insufficient water to supply the full seven and a half million acre-feet of consumptive use in the lower basin that the central Arizona project will be reduced before there is any reduction in the amount of water used by the users in the State of California served under existing contracts to the extent of 4.4 or to similar users who have existing rights.

Mr. SAYLOR. Mr. Gookin, this is what I read. I am surprised that the people of Arizona are so naive that they come before Congress; say they support a bill which actually subverts the Colorado River compact, the decision of the Supreme Court in the case of *Arizona* v. *California* and in a sense guarantees to the State of California 4,400,000 acre-feet of main stream water regardless of what happens.

It just seems to me that the decision of the Supreme Court completely controverts just what you are coming before us and asking us

to do. I don't blame the people from California for introducing this bill if they can get you folks in Arizona to go along with it.

I don't blame Governor Brown for saying that we are all in accord because we the people in California got everything we wanted and you in Arizona have nothing.

This is the net result of what this section means and if there isn't enough, California gets it all.

Governor GODDARD. Mr. Saylor, I have with me one of the gentlemen who has been probably more experienced and more skilled in the legal aspects of this problem than any other man we have. I would like to have him address himself to this statement.

Mr. ROGERS. Let the record show the Governor has been joined at the witness table by Mr. Mark Wilmer. And what is his official capacity?

Governor GODDARD. He has been employed for many years as counsel in the affair of the Colorado River dispute and he is at the present time serving as an Arizonan interested in this case, advising me.

Mr. ROGERS. Is he employed by the State of Arizona?

Governor GODDARD. No, sir.

He is not employed now by any of the entities. He appears here as an expert who I have asked to come with me to testify in this case.

Mr. ROGERS. Let me ask this so we can have him properly identified. What is his responsibility with the testimony that is now coming before the subcommittee? Is he an unpaid official of the State of Arizona designated by you, or what?

Governor GODDARD. Mr. Wilmer was employed by our Interstate Stream Commission, as attorney representing us in the case of *Arizona* v. *California.*

Mr. ROGERS. But he is no longer so employed?

Governor GODDARD. He is no longer so employed.

Mr. UDALL. I simply want to say that we had this 12-year lawsuit in California and since Mr. Wilmer is one of our leading lawyers we employed him as chief counsel in that suit. The gentleman from Pennsylvania has raised some good questions about the lawsuit and we anticipated that the Governor would be asked about this and that Mr. Wilmer would probably know more about it. He was asked to be here and help with this kind of testimony. The lawsuit is concluded so he is no longer employed in that capacity. Let me correct this to say that I am now told that he is still retained and paid as a legal consultant by the Arizona Interstate Stream Commission.

Mr. ASPINALL. Mr. Wilmer is appearing here actually as what we would consider as amicus curiae in court. Is that correct?

Governor GODDARD. That is correct, Mr. Aspinall.

Mr. ROGERS. You may proceed.

Mr. WILMER. Sir, I would simply answer your question in this fashion—the Supreme Court decision did not allocate to Arizona any water as such. It authorized the Secretary to contract with users in Arizona for water which is not presently contracted and presently the California people have the contracts and water to put to use.

Arizona is in the position of not having a contract other than for specific, more limited uses. We are in the position at this time that the California people with firm contracts and Arizona with simply a

master contract other than as to limited uses which we decided to implement.

And therefore the argument was made by California and we think with some justification that existing uses should not be imperiled and therefore Arizona has seen fit to accept that well-know principle—that first in time is first in rights—and therefore to the extent that there are presently perfected rights presently using water, to that extent we agree that this new project shall not take water from those projects now using water.

Does that answer your question?

Mr. ASPINALL. Is it your contention, Mr. Wilmer, that under the terms of this decision that the Secretary has any authority to deliver water, to divide water that comes from the upper basin, or that is in the upper basin, for any of the States down below Lee Ferry?

Mr. WILMER. Mr. Aspinall, I will answer that in this fashion. I think the Supreme Court carefully, carefully avoided attempting to pass upon the Colorada compact or its application to the two basins.

It simply said that in the Project Act the Congress authorized in the exercise of its power over commerce its right to control the river, to build a dam, and having built the dam, then it exercised its right to say how that water should be handled.

Mr. ASPINALL. Which dam?

Mr. WILMER. The Hoover Dam.

Mr. ASPINALL. In other words, as soon as the water is released from the upper basin, it flows past Lee Ferry. Then this authority in the Secretary takes effect. Is that correct?

Mr. WILMER. It is my understanding, Mr. Aspinall, that when the water reaches Lake Mead it comes within the jurisdiction of the Secretary; then the commerce clause, the overriding right of the Congress in the exercise of its power in the commerce clause, attaches and that the Congress in enacting the Project Act decided how that water should be divided which it stored but it did not attempt, did not attempt, did not attempt, if I may emphasize that, to interpret the Colorado River compact or place any additional burden upon the upper basin.

Mr. ASPINALL. Who has the right of the distribution of the inflow between Lee Ferry and the headwaters of Lake Mead?

Mr. WILMER. If you will remember, Mr. Aspinall, the master in his special report had attempted to control the river below Lee Ferry and above the head of Lake Mead. The Supreme Court said, "No"—he had no authority to do that. His authority attached when that water reached Lake Mead and therefore the Secretary could not do anything with the water; he could not charge for tributary uses or otherwise interfere with that water until it came within the jurisdiction of the reservoir which Congress had authorized in exercising the commerce clause.

Mr. SAYLOR. On page 15, of the decision of the Supreme Court, is the following:

We have concluded, for reasons to be stated, that Congress in passing the Project Act intended to and did create its own comprehensive scheme for the apportionment among California, Arizona, and Nevada of the mainstream waters of the Colorado River, leaving each State its tributaries.

Congress decided that a fair division of the first 7,500,000 acre-feet of mainstream water would give 4,400,000 acre-feet to California, 2,800,000 to Arizona,

and 300,000 to Nevada; Arizona and California would each get one half of any surplus.

Therefore this bill which has been introduced and to which I have referred guarantees to the State of California 4.4 million acre-feet of water in case of a shortage. Personally I don't blame the Governor of California for agreeing to it because he got everything that Congress said they were supposed to get.

But the State of Arizona by the very terms of this bill will be prejudiced if there is a shortage and not only this project, but every other project.

Mr. UDALL. Let me say that my friend is very wise and often gives us very good advice. He is telling us today that in effect Arizona made an unwise compromise in agreeing with the bill which is before the committee. I think he overlooks a couple of factors here.

We fought in the courts for many years and we ended up 2 years ago with all of our legal rights—we had all the legal rights that we wanted to get out of the lawsuit and these looked fine on paper. Only we didn't have water. We have never had water. We want water.

We are tired of fighting over legal rights and pieces of paper. We simply want to get water. And the gentleman's suggestion that California gave up nothing in this compromise is the truth. They gave much and received much. The truth of the matter is that California is using 5.1, or more, every year and no one has suggested that this water ought to go into the ocean and until we have a ditch to divert our share of the water it is not going in the ocean; it will go to California.

California had the alternative of either seeking to block this legislation, hoping that somehow they could continue to use more water than the Court had given them, or that they could agree that Arizona could pass this legislation. We have only 3 members against their 38.

So what California told Arizona was "you can build your ditch and you can take out water and eventually, we will have to cut back from 5.1 to 4.4"—this was a major concession that California made.

On the other hand, we receive the building of our project at long last—if the bill passes—this is the great benefit we receive, and we were not likely to receive it with the opposition of California and Colorado and Nevada and all the other States.

I think this is in the best tradition of compromise with both States recognizing that regardless of who has legal rights the river is short. California doesn't need 4.4 or 5.1—they need a lot more than that and we want to help them get what they need and we understand that they will help us. This is the heart of this compromise.

Mr. ASPINALL. I wasn't aware that Colorado was opposing this.

Mr. UDALL. I didn't mean to suggest that. I said we felt that if California and the upper basin States want to oppose this, they could and we have seen no indication that they will. I like the constructive attitude of all of the States in the basin. We are your friends and we know you are our friends and we want to work together.

Mr. WILMER. Might I say one further word?

Mr. ROGERS. Go right ahead.

Mr. WILMER. One of the things that Arizona contends most strongly against and one of the things which we lost in the Supreme Court was a proposition that present perfected rights were enjoined—the protec-

tion of present perfected rights was enjoined by the Secretary. He must protect them and give them preference and therefore when it is said that Arizona gave them nothing, Arizona was already by virtue of the Supreme Court decree bound to recognize and respect present perfected rights prior to their usage—that is in the Supreme Court decision.

I must say it was substantially against our wishes in the matter but it is there.

Mr. SAYLOR. Of course, you fared pretty well with regard to giving you all the water in the Gila River. You got a little plus out of this, too, as far as Arizona is concerned.

I just point this out to the Governor and the members of your delegation as some of the things that appear to us who are interested in taking a good look. I might say that as far as your comments are concerned on what you intend to do with the Grand Canyon—I would advise you of what a former President of the United States said when he took a look at it—the late Theodore Roosevelt—he said to leave it alone because all man can do was destroy it. He can either destroy a little bit or a whole lot. The same principle holds true.

Thank you, Mr. Chairman.

Mr. ROGERS. The gentleman from Florida, Mr. Haley.

Mr. HALEY. Mr. Chairman, I think I will reserve my time here and sit here and try to determine who is stealing from whom. [Laughter.]

Mr. ROGERS. The Chair recognizes the gentleman from California, Mr. Hosmer.

Mr. HOSMER. Governor Goddard you brought up this matter of subsidence—subsidence of land and I suppose I can question you about that, can I?

Governor GODDARD. Yes, sir.

Mr. HOSMER. You may refer the questions to Mr. Gookin if you desire.

The first thing I understood from Mr. Gookin's answer was that the project depends upon essentially three sources of water—underground, surface, and imports—in its overall operation; is that correct?

Mr. GOOKIN. Mr. Congressman, I obviously was not clear.

Mr. ROGERS. We need a little order in the chamber so we can hear.

Mr. GOOKIN. Following construction of the central Arizona project we will have three sources of water—underground, surface, and the water which would be delivered by the central Arizona project aqueducts.

Mr. HOSMER. And between those three sources you intend to avoid a series of problems for a longer period than if you had only the two.

Mr. GOOKIN. That is correct, sir.

Mr. HOSMER. Also in this combined operation you intend to store some of these imported waters underground.

Mr. GOOKIN. We would like to, sir, but there would not be enough. The best we could hope to do is to reduce the rate of decline of our ground water tables.

Mr. HOSMER. Well, there would be water going down into existing underground storage by the process of seepage, is that correct?

Mr. GOOKIN. That is correct, sir.

Mr. HOSMER. Whatever was built up by this means in a good import year would be in the bank to pull out on a year when your canal was dry; is that correct?

Mr. GOOKIN. I would say, sir—rather than having the ground water levels rise we would be faced with a situation where we would hold the ground water level static during the better years and not drop much during other years.

We might, of course, have some years in which there would be a rise—we certainly hope so.

Mr. HOSMER. In order to have stability in the water supply picture this buildup of underground water must occur; is that correct?

Mr. GOOKIN. Buildup or stabilize.

Mr. HOSMER. Stabilize.

Mr. GOOKIN. Yes, that is correct.

Mr. HOSMER. The water that is imported, after it is fed to the crops, seeps down and gets into this area.

Mr. GOOKIN. Some portion of it does, sir.

Mr. HOSMER. Now, what studies have been made on the phenomenon of subsidence? Is there any assurance that this seepage will, in fact, occur?

Mr. GOOKIN. There are studies in progress at the moment by the Geological Survey and there has been an article prepared by one of the members of the Geological Survey. There are other studies prepared by people from the university and there is attached to the Governor's statement an article on that.

Mr. HOSMER. You are talking about the article by Carl Winikka.

Mr. GOOKIN. Yes.

Mr. HOSMER. Or the one by Kam?

Mr. GOOKIN. There are the two.

Mr. HOSMER. Two.

Mr. GOOKIN. Yes.

Mr. HOSMER. I have reviewed them both and I see nothing pertinent to the particular point upon which I am questioning, namely, whether or not there is actual assurance of sufficient permeability to permit this seepage back into the present underground reservoir area.

Mr. GOOKIN. We have in the past, of course, experienced minor rises particularly during the year 1940–41. Our best estimates are that a million acre-feet per year now reaches the ground water reservoirs. Presumably if we can put some more water on the basin overlying the ground water reservoir some portion of that will seep down to the reservoir.

Mr. HOSMER. The Kam article mentions the subsidence near the surface begins with irrigation and there is an amount of compaction of the voids at these, the surface levels.

It also mentions the deep subsidence that occurs in the empty water sands down at the water table level does it not?

Mr. GOOKIN. Yes, sir.

Mr. HOSMER. And when the water table level sands compact this causes a disappearance of the void between the grains of sand in which the water formerly occupied space. Does it not?

Mr. GOOKIN. I would not say disappearance. I would say a reduction.

Mr. HOSMER. A reduction.

Mr. GOOKIN. Yes.

Mr. HOSMER. In other words, you have a reduction factor, yet unknown, according to these studies, in the permeability of those compacted sands.

Mr. GOOKIN. That is correct, sir.

Mr. HOSMER. At some point the compactness would be sufficient to shut off the flow of water altogether; the void would be totally eliminated.

Mr. GOOKIN. Theoretically, this could be so.

Mr. HOSMER. What do we know about the compactness at the present time in relation to the degree of permeability which has been reduced?

Mr. GOOKIN. We have no precise figures on that, Mr. Congressman, but I think there is no real fear that the compaction has proceeded to the point where materials are impermeable. They still retain a substantial degree of permeability.

Mr. HOSMER. Now, you say that and it is true that permeability may exist in the present areas where some of your surface water still penetrates, but we are talking about these areas where you are expecting imported water to be spread on soil that is being used for agriculture and then to permeate to the depths.

These are the very areas where compaction has occurred.

Mr. GOOKIN. If the compaction did reach the degree where it was impermeable—and I certainly doubt that this is true, you would then have a perched water table, which is to say you would have a water table on top of the impermeable layer and another water table below it.

Mr. HOSMER. But we know none of the characteristics of this new water table above the compaction area where it would flow—what would happen to it? No studies have been made in this direction.

Mr. GOOKIN. We have not made such studies, no sir.

Mr. HOSMER. There is an indication that when you get this cracking and gorging that there are often times variations in direction of flow.

Mr. GOOKIN. That can well happen, yes, sir.

Mr. HOSMER. Now, I would hope that some serious work would be done on the various subjects that I have brought up here.

I happen to come from an area that has a subsidence problem due to the extraction of oil and there are very few conditions actually occurring that were anticipated simply because this was a subject about which very little knowledge exists.

If in fact these compactions build up a lid on your present water table you are not going to receive the benefit of the stabilization of those tables as you hope for. You don't know whether or not you are going to be able, and to what extent, you can recover this water that sits on top of the compaction.

Mr. GOOKIN. Well, that is a fairly common practice—to have perched water tables and I see no real problem there. The water, once placed on the surface of the basin to the extent that it does percolate and to the extent that it does recharge the ground water will remain in the basin.

Mr. HOSMER. You have on one of these charts—Well No. T. 7 S., R. 6 E., sec. 12—you have a water table that went from 107 feet below the surface to 214 below the surface. Obviously compaction is occurring somewhere close to the 107-foot level and not close to the 214-foot level. The compaction is occurring and creating a lid over present underground water source, so whatever storage you are going to have from the seepage of imported water is probably going to be somewhere upward from the 107-foot level—a new reservoir of unknown characteristics because it has not been formed yet.

Mr. GOOKIN. I would say that might be theoretically so, Mr. Congressman. From a practical standpoint we have no reason to believe that this subsidence actually is creating a permeable area. We normally have in Arizona alternate layers with varying degrees of permeability, some of which are quite impermeable but as we drill our wells down we perforate into the zones where the aquifers are filled.

We don't necessarily perforate into the area where there are compacted materials which do not yield water.

Mr. HOSMER. You do not have anything that would lead a person to believe that this would happen.

Mr. GOOKIN. We have drilled wells. I have personally supervised the drilling of wells in these areas where the compaction and the subsidence has occurred. We find nothing unusual or different in those particular areas.

Mr. HOSMER. Have you logged these wells as to where the compaction is occurring?

Mr. GOOKIN. No, we don't—we did not find it there——

Mr. HOSMER. You generally have to do it by putting a radioactive bullet in there and use a Geiger counter to make a series of measurements of various kinds to find out how far underground the compaction occurs. This you have not done.

Mr. GOOKIN. No.

Mr. HOSMER. You just don't know what is going on. I think this is an important area since there is some success of the entire investment of the Government depending on what happens to this seeping water.

Mr. ASPINALL. Will my colleague yield?

Mr. HOSMER. I yield.

Mr. ASPINALL. What my colleague is saying is that the Governor had made this a part of his statement and it is in the file and what you would like to know is the authenticity of that statement, is that correct?

Mr. HOSMER. That is right. It looks like a half dozen studies have been done on the subsidence problem but nobody has done a complete study of the entire problem in relation to the desired ends of this project.

Governor GODDARD. We have with us Professor Myers of the University of Arizona. I think Professor Myers has some information with regard to some studies that are being carried on.

Mr. HOSMER. They are not complete studies.

Mr. MYERS. Mr. Chairman, no these are continuing studies but our Institute of Water Utilization, University of Arizona, has for several years been working on the problem of ground water recharge. This ground water recharge has been successful. We can depend on two things.

First, in permeable areas where we can drop the water down directly through various layers, down to the ground water aquifer and also, we are able to make use of existing irrigation wells; that is, by recharging the irrigation wells we are able to get the water down in a considerable quantity.

Now the problem here, of course, as in the case of surface we recharge directly down to the geological strata so as to shortly remove the sediments which are in the water and we can do that in pumping

areas and by moving the water through vegetation, particularly grass—and we have been able to do that successfully—but this continues as one of our major studies in the Institute of Water Utilization.

It has gone along far enough and with the cooperation of several agencies, various irrigation districts in Phoenix and Tucson; also the Bureau of Indian Affairs—where the recharge of the ground water aquifiers has been successfully done up to this point.

Mr. HOSMER. That is true, but do you know to what extent you are going to depend upon injection wells in order to get water down to the depth that you want for recharging?

Mr. MYERS. We have to depend in some areas almost entirely on the injection well.

Mr. HOSMER. What I am trying to figure out is how big an operation this is going to be. How many hundreds of thousands of kilowatts of power is it going to take to pump that water down to a 200-feet level? How much is the cost going to be for cleaning the water up to get it down there? What about the algae problem and all of these other things? The biological considerations that you have to get into?

Mr. MYERS. Our studies have not yet given us the full answers to some of the problems as yet.

Mr. HOSMER. Well, that was what I was trying to bring out. This is an area where it is important to the ultimate success of this project and it apparently has not been covered yet.

Thank you, Mr. Chairman.

Mr. ROGERS. The Chair recognizes Mr. Johnson of California.

Mr. JOHNSON. Thank you, Mr. Chairman. I just want to make one comment in connection with the matter discussed with you about the recharging of water. I think we have a shining example in our home State in Orange County where we are buying the surplus Colorado River water and we are spreading it or we are recharging it.

We charged a certain fee for the water, an acre-foot of water, coming out of the ground and created a pool or pot which would allow each person to purchase surplus Colorado River water and use it to recharge—it could be respread and also recharged. That has not been very successful as yet, in Orange County, in making use of this water.

This added supply that would assist in recharging in Orange County; that was carried on when I was in the State legislature. Regarding the matter here of algae in the State of Arizona—this is the same as some of ours where the algae were susceptible.

I want to say, Governor, that we enjoyed our stay in the State of Arizona last November and we had a good opportunity to take a look at the newly constructed dam, and also a trip to Lake Powell—the hearings held in your city of Phoenix, and also the field trips which pointed up the need for water which you are seeking through this project.

Most of us from California were interested in the agreement that recommended the 4.4 and we all joined in coauthoring the legislation with Arizona.

As of this date I am sure that our State is in agreement with the Governors of the other States in the basin and are all working toward a solution of this problem in the Pacific Southwest. As one member from California I am glad to state that the Governor has told all of us he is in complete agreement with the legislation.

Governor GODDARD. I appreciate your comments.

Mr. WYATT. Governor, I think the answer to this question is quite clear but I want to hear it from the Governor of Arizona because of the volume of mail that I have been getting on the subject.

Am I correct that the construction of the Marble Canyon Dam alone without Bridge Canyon and the completion of the central Arizona project that these two projects in themselves would not have any effect in changing the physical characteristics of the Grand Canyon National Park or the Grand Canyon National Monument?

Governor GODDARD. Mr. Wyatt, I would like to answer that question on the basis of my rather limited knowledge and then I would like to ask Mr. Gookin to give you a more technical answer.

It is the best information that we are able to achieve and it is in our interest that we maintain the Grand Canyon in its pristine state; that there would be no effect from the Marble Canyon Dam which would be upstream of both public territories, both the monument and the park, and that from Bridge Canyon Dam, from the high dam that there would be a flowing back but that it would not appreciably change the appearance of the canyon, only in those parts of the canyon which are very, very infrequently visited—the common areas where people view the Grand Canyon or go into the Grand Canyon would be essentially as they are today.

I will ask Mr. Gookin to amplify that statement.

Mr. WYATT. Governor, before Mr. Gookin speaks, I am interested in the Marble Canyon only because as I understand it we are considering all these as the bills do purport to authorize both dams on Marble Canyon only because of the fact it is well above both the park and the monument.

The construction of the Marble Canyon Dam alone and the central Arizona project would not have any effect in changing the physical characteristics of these two areas.

Governor GODDARD. That is correct.

Mr. ASPINALL. It most certainly will destroy any river running by the wild river boys, will it not?

Governor GODDARD. It would have the same effect as Glen Canyon has had on the river runners.

However, Mr. Aspinall, I feel that the benefits accruing would be that so many more people would be able to have access to so much more at such reduced cost.

Those river runs are an expensive proposition—very few people can afford it.

Mr. ASPINALL. May I say I think it is in the same light as in the Grand Canyon. I think more people would enjoy it than at the present time just looking at some white water 5,000 feet below them. But these people are going to be in here testifying next Monday and Tuesday.

Mr. REINECKE. I would like to point out there is one difference between the inundation by Lake Powell and the potential inundation by the reservior created by Marble; namely, there were no real rapids that were flooded out by Lake Powell whereas in the case of Marble Canyon there will be a number of rapids that will be flooded out. So that as far as the white water boys are concerned there is a difference.

There will be loss of some rapids in the case of Marble where it was not true in the case of Powell.

Governor GODDARD. You are right, Mr. Reinecke, it will probably be a lot safer to go down the Canyon in a rubber boat—they won't have to be helicoptered across the heavy rapids.

Mr. UDALL. Let me make very clear what will happen, on behalf of myself and the other two Members of the Arizona House delegation.

Marble Canyon is 12 miles above the most easterly point of the Grand Canyon National Park. The central Arizona project does not even begin until you get over a hundred miles below the Grand Canyon National Park and Monument so that as has been stated here the white water in the Grand Canyon was cut off, the wild state of the river was south of the Glen Canyon Dam and this is gone regardless of what happens in this legislation.

But in any event after Marble is constructed and even if you construct Bridge Dam on top of that there would be well over a hundred miles of wild Colorado River running through the Grand Canyon Park and the Grand Canyon National Monument and in some areas just above the canyon.

Mr. REINECKE. The white water has not been destroyed within the Grand Canyon at the present time. You cannot go all the way down the river because of the Glen Canyon Dam but the rapids still exist in the Grand Canyon.

Mr. WYATT. The reason for my inquiry is that I have had a number of letters, as I assume the other members of the subcommittee have also, which say that the construction of either of these dams will destroy and ruin the Grand Canyon and I want to be sure that the record is clear so far as the State of Arizona is concerned on this point and I think it is.

Mr. UDALL. I have a couple of unanimous-consent requests to make. We had agreed that Arizona would make one basic presentation for all of the agencies and all of the districts.

In the other body and in the field hearings in Arizona nearly every one of the major irrigation districts was heard from or filed statements. Only two irrigation districts were omitted and some leaders of those districts have been greatly behind us, and I simply want to have filed in the record a statement and a letter of their support for this project.

There is a letter from Mr. James L. Savage and one from Mr. N. S. Cooper and then a joint statement. Mr. Savage is president of the Central Arizona Irrigation and Drainage District and Mr. Cooper is president of the Maricopa-Stanfield Irrigation and Drainage District. Both of their letters, dated August 17, 1965, to me indicate their support of the project.

Mr. ROGERS. Is there objection?

Mr. UDALL. Mr. Chairman, both of them are in the audience—if they would just stand.

Mr. Savage and Mr. Cooper. They have a large group of people with them who might also stand for identification.

Mr. ROGERS. Is there objection? The Chair hears none and the information will be put into the record at this place.

(The material referred to follows:)

CENTRAL ARIZONA IRRIGATION AND DRAINAGE DISTRICT,
PINAL COUNTY, ARIZ.,
Eloy, Ariz., August 17, 1965.

Hon. MORRIS K. UDALL,
House of Representatives, Washington, D.C.

DEAR CONGRESSMAN: At a meeting held by the board of directors of the Central Arizona Irrigation and Drainage District on August 16, 1965, the board of directors authorized me to submit to you the following information for use before the Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs, House of Representatives, 89th Congress, in support of H.R. 4671, which will authorize the construction, operation, and maintenance of the Lower Colorado Basin project:

1. The cultivated land in our district is approximately 135,000 acres.
2. The water requirement of this land is presently met almost entirely from the pumping of underground water which is rapidly being depleted.
3. For maximum production this land requires an average of 5 acre-feet of water per acre per year, or approximately 675,000 acre-feet per year.
4. Our district is ready and willing to contract with the Secretary of Interior for up to 675,000 acre-feet of water per year from any water brought into the State of Arizona from the Colorado River or any other source on an if, as, and when basis and at a price to be determined by the Secretary of Interior under H.R. 4671 based upon the economic ability of the land to pay.
5. For any years for which no water from the Colorado River is available, our water requirements, to the extent available, will continue to be met from the underground sources and for the years where there is not sufficient water from the Colorado River to meet our total requirements, the difference between the water we may be able to contract for with the Secretary and our total requirements will still, to the extent available, be met from the underground water.

Due to the facts as outlined above, our district would not hesitate to contract for less than a full or firm water supply.

This information may be used by you in any manner that you see fit.

Very truly yours,

JAMES L. SAVAGE, *President.*

MARICOPA-STANFIELD IRRIGATION & DRAINAGE DISTRICT,
Stanfield, Ariz., August 17, 1965.

Hon. MORRIS K. UDALL,
House of Representatives,
Washington, D.C.

DEAR CONGRESSMAN: At a meeting held by the board of directors of Maricopa-Stanfield Irrigation & Drainage District on August 16, 1965, the board of directors authorized me to submit to you the following information for use before the Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs, House of Representatives, 89th Congress, in support of H.R. 4671, which will authorize the construction, operation, and maintenance of the Lower Colorado Basin project:

1. The cultivated land in our district is approximately 117,300 acres.
2. The water requirement of this land is presently met almost entirely from the pumping of underground water which is rapidly being depleted.
3. For maximum production this land requires an average of 5 acre-feet of water per acre per year, or approximately 586,500 acre-feet per year.
4. Our district is ready and willing to contract with the Secretary of Interior for up to 586,500 acre-feet of water per year from any water brought into the State of Arizona from the Colorado River or any other source on an if, as, and when basis and at a price to be determined by the Secretary of Interior under H.R. 4671 based upon the economic ability of the land to pay.
5. For any years for which no water from the Colorado River is available, our water requirements, to the extent available, will continue to be met from the underground sources and for the years where there is not sufficient water from the Colorado River to meet our total requirements, the difference between the water we may be able to contract for with the Secretary and our total requirements will still, to the extent available, be met from the underground water.

Due to the facts as outlined above, our district would not hesitate to contract for less than a full or firm water supply.

This information may be used by you in any manner that you see fit.

Very truly yours,

N. S. COOPER, *President.*

JOINT STATEMENT OF JAMES L. SAVAGE, PRESIDENT, CENTRAL ARIZONA IRRIGATION & DRAINAGE DISTRICT AND NEWTON S. COOPER, PRESIDENT, MARICOPA-STANFIELD IRRIGATION & DRAINAGE DISTRICT, AS PRESENTED BY JAMES L. SAVAGE

Mr. Chairman and members of the committee, my name is James L. Savage, of Eloy, Ariz. As president of the Central Arizona Irrigation & Drainage District, I appear here on behalf of not only our district, but also the Maricopa-Stanfield Irrigation & Drainage District located immediately adjacent to our district. With me is Mr. Newton S. Cooper, of Casa Grande, Ariz., president of the Maricopa-Stanfield Irrigation & Drainage District; Mr. R. J. Ellis, attorney for both districts; Mr. Gordon Jorgensen, engineer for both districts; and a large delegation from both districts. I am speaking on behalf of these two districts to urge your committee and Congress, to support and approve H.R. 4671, which will authorize the construction, operation, and maintenance of the Lower Colorado River Basin project. Of primary concern to us is the construction of the central Arizona unit which will bring needed water to our districts. I would like to submit at this time to the committee a map marked "Exhibit A" showing the two districts and their relative location in the State of Arizona.

I would also like to submit at this time the statement and economic survey covering Central Arizona Irrigation & Drainage District marked "Exhibit B" and also a similar report for the Maricopa-Stanfield Irrigation & Drainage District marked "Exhibit C" as prepared by the districts' consulting engineer, Mr. Gordon D. Jorgensen, executive engineer of R. W. Beck & Associates. These statements set forth in detail the effect of our two districts upon the economy of Pinal County in Arizona and also the State as a whole.

It also shows the great need of additional water if the economy of these areas is to be sustained. The Central Arizona Irrigation & Drainage District and Maricopa-Stanfield Irrigation & Drainage District serve a highly developed area of 286,000 acres in southwestern Pinal County, Ariz. The area contains some of the richest soils in Arizona and is blessed with abundant sunshine and a long growing reason. Agriculture is the basis of the economy of the area.

Substantially all the land within the districts is arable and irrigable. At the present time 252,000 acres are, or have been in the past, improved and cultivated, but lack of water has limited the 1964 planting to approximately 162,000 acres.

The Santa Cruz River, which traverses the districts, is an intermittent stream and cannot be relied upon as a source of surface water. The farmers in the districts must rely entirely on pumped underground water for irrigation. There are approximately 1,111 operating irrigation wells in the district. Between 1940 and 1964, the static water level in the wells declined an average of 155 feet. During the 5-year period which ended in the spring of 1964, the static ground-water levels declined as much as 100 feet. The depth to ground water in the districts presently ranges down to more than 500 feet, with an average depth of approximately 260 feet. During the pumping season, drawdown increases these depths by 50 to 100 feet. I would like to call your attention to the charts at the end of exhibits B and C which graphically set out the decline of the underground water levels in both districts. With the decline in ground-water levels and the resultant increase in pumping costs, a considerable portion of this excellent agricultural area must now be left idle, and more lands will, unless supplemental water is forthcoming, go out of production. Such a reduction in the agricultural operations in the districts would have an adverse effect on the economy of the districts and the entire State of Arizona. The present annual value of agricultural products of the districts, crops and livestock, is estimated at $51 million. The actual value of lands and improvements within the districts is estimated at $114 million. At the present time all irrigation wells and ditches are owned by the individual landowners. The individual landowners in these districts, in order to conserve water and make the most economical use thereof, have, at very great expense to themselves, concrete lined most of their irrigation ditches and many of them have constructed pumpback systems whereby they pick up and reuse the water in the irrigation of crops. Many of the farms have been staked leveled in an effort to make the precious water go as far as possible.

The districts were formed to supply supplemental water to the existing farmlands within the districts either by pumping or from any available source, including the Colorado River. The decline in groundwater levels is caused not only by the pumping of irrigation water within the districts, but also by increased use of water outside the districts for municipal, industrial, and agricultural purposes. Water from the Colorado River is the only immediate means by which badly needed supplemental water for these existing farmlands can be obtained to save this rich agricultural area.

Mr. UDALL. A related request is a brochure giving all the economic data which was prepared by these gentlemen about their two districts and I request that this be put in the file.

Mr. ROGERS. Is there any objection? The Chair hears none and that information will be included in the file.

Mr. UDALL. A lot of testimony has been developed this morning about subsidence in some areas of Arizona. In order that the members have a little better view of this thing, I have a number of photographs here which I would like to circulate among the members and have them end up in the file.

Mr. ROGERS. They will be included in the file.

Mr. ASPINALL. Did the gentleman take these photographs himself?

Mr. UDALL. No; I can assure the chairman I did not.

Mr. ASPINALL. Are they authentic?

Mr. UDALL. They are authentic. I have seen these areas myself.

Mr. ROGERS. Without objection the photographs will be put in the file.

Mr. UDALL. May I ask a question Mr. Chairman?

Mr. ROGERS. The Chair recognizes the gentleman from Arizona.

Mr. UDALL. Reference was made here yesterday to the presence of Ernest W. McFarland, former U.S. Senator and a former Governor of Arizona and I would like to ask unanimous consent that he be allowed to file a statement in support of this legislation.

Mr. ROGERS. Is there objection? The Chair hears none and your unanimous consent request is granted.

Mr. ASPINALL. The former Governor is here.

Mr. UDALL. Yes and I would like the record to show that the Governor is here and he is one of the best servants that Arizona has had.

(Mr. McFarland's statement follows:)

STATEMENT OF HON. ERNEST W. MCFARLAND

Mr. Chairman and members of the committee, I want to thank you for this opportunity to appear before your committee to make this brief statement in support of this most vital legislative proposal.

Last November, I had the opportunity of personally welcoming many of the members of this committee to our great State on the occasion of the field hearings held in connection with the pending bills. I was gratified with the results of those hearings and with the keen interest which each member of this committee showed in finding an effective means of alleviating the critical water shortage of our State.

During your visit, you saw firsthand what the availability of ample water—or the lack of it—can and does mean to our State. You saw the results of irrigation and reclamation projects. And you also viewed areas which were not so fortunate—areas choked and parched for lack of water—areas which had once been rich and abundant when blessed with an adequate water supply.

As I stated in the field hearings, the proposed project is very near to my heart. My work and my entire career have brought me close to the development of irrigation and reclamation in the State of Arizona. I came to Arizona in 1919. My first exposure to the problems of water legislation came in 1923 when, as assistant attorney general, I was called upon by members of the legislature to prepare a

legal brief regarding the Colorado River compact which was then pending before the legislature. Later, as an attorney for the San Carlos Irrigation and Drainage District, I assisted in the suit which settled the water rights on the Gila River. And, as a superior court judge, I heard many water cases which directly or indirectly affected most of the water rights in the State of Arizona.

I have seen the State grow—and I have seen the water problem grow even faster than the State. During this time, I have seen areas in my own neighborhood—Pinal County—wither after an optimistic and hopeful beginning because ground water resources gave out and planning and development had not provided sufficient alternative sources of water.

In 1940, the year I was elected to the U.S. Senate, we had a terrible drought in Arizona. In that year, Roosevelt Dam was dry, and we had one of the worst water shortages in the history of the State of Arizona.

In 1941, we stepped up efforts to arrive at solutions to the same problem we are considering here today. Senator Hayden and I began at that time to work for the authorization of central Arizona project legislation. Although our efforts were delayed and hindered by World War II, we never ceased in our efforts to obtain an authorization. Senator Hayden and I cosponsored bills which would have authorized the central Arizona project. We worked long and hard in support of these bills which were twice passed in the Senate—first in 1950 and again in 1951—but failed passage in the House. The statements I made before your committee and the Senate committee in 1949 regarding the need for water—the need for a central Arizona project—are even more pertinent today.

The situation has not improved, gentlemen—it has deteriorated during the 12 or more years during which Arizona, following the mandate of this committee, adjudicated the question of entitlement with California.

During the litigation, I assisted in drafting the complaint in *Arizona* v. *California* while I was in the Senate. When I was Governor of the State, the trial of the case was commenced, and I assisted in the hearings in San Francisco. The decision of June 3, 1963, confirmed our right to divert and use our just share of the waters of the Colorado River.

And here we are—15 years later—with a Supreme Court decision and decree establishing our entitlement and with a legislative proposal for a project which would put this water to good use. The passage of this time and the bitter contest in which we have been engaged have been costly to our State. The losses which we have suffered through the unnecessary 15-year delay in the initiation of construction of this project are economically irreparable. Construction costs have skyrocketed in the interim. Our ground water levels have declined to the point where many thousands of acres of first-class agricultural land are lost and our water supply situation—serious 15 years ago—is at a crisis stage today. While millions of acre-feet of water have flowed unused down the river, many areas have gone bankrupt on water and returned to desert. And the toll of casualties continues to mount while we continue to pray for authorization of a great water project which will sustain life in our great State and in the entire Colorado River Basin.

The question is frequently asked what Arizona has done in the interim toward conserving water and preventing the use of water on new desert lands. First, we are not asking for water for the irrigation of new lands. Second, our underground water code prevents the use of pumped water on new lands in critical ground water areas. Third, practically all the farmers have already, at their own expense, lined their own farm irrigation ditches; and canals and laterals in irrigation districts are being lined at a rapid rate. For example, the Salt River Valley Water Users Association, among other irrigation districts, is spending millions of dollars lining the canals and laterals of the Salt River reclamation projects. We look forward to the day when our water agencies shall have achieved optimum conservation of the waters which they administer.

While the ultimate goal of the pending legislative proposal is the same as it was when I initially cosponsored the Central Arizona Project Act, I note significant differences. First—and probably more significant than any—is the size and magnitude of the project. Advancements in engineering and technology now make it possible—indeed necessary—to plan development on a comprehensive, regionwide basis to obtain maximum utilization of all of the mainstream and tributary waters of the Colorado, and to augment that supply by importation of water from sources never dreamed of before. I remember during consideration of our central Arizona project legislation in the early 1940's, Commissioner

Harry Bashore of the Bureau of Reclamation described the idea of importing water to the Southwestern United States from areas having surplus floodwaters. If the concept of importing water from any one of several water-abundant sections of the country to the arid Southwest was only a dream in the 1940's, it can and must become a reality in the last half of this century.

I note, also, a distinct difference in the attitudes and views of representatives of the States most critically affected by the legislative proposal. In 1950 and 1951, when this matter was considered by your committee, the opposition came from California and representatives of Nevada who contended that there should first be an adjudication of the water rights. Now we have seen the final resolution of this long and expensive controversy by Supreme Court decision and decree. And we have heard, during these hearings, the unqualified support of the pending legislation by Senator Thomas Kuchel and Governor Pat Brown, and other representatives of the States of California and Nevada. Many of California's delegation have introduced the companion bills which are pending before this committee.

What is even more encouraging and gratifying is the general consensus arrived at between representatives of all seven Colorado River Basin States on certain basic issues which might have strained the good relations and spirit of cooperation long existing between my State and the upper basin States.

We of Arizona feel we have complied with the directive of this committee. We feel we have made great strides in obtaining the understanding and support of the other basin States. And I want to thank the representatives of those States publicly for their farsighted and cooperative approach. We have returned to this committee with a project proposal which has been thoroughly investigated and analyzed and found to be even more feasible and even more vital than when it was first presented to the committee 15 years ago.

Let me conclude by saying that I have faith that this Congress will not permit the existing economy of Arizona to founder. Indeed, I am confident this Congress will move rapidly forward to prevent that from happening. I thank you for your time and consideration in permitting me to urge you to proceed to authorize this sorely needed project at the earliest possible date.

Mr. JOHNSON. Mr. Chairman, I ask unanimous consent that all of the cooperative representatives from California have an opportunity to file a statement for the record.

Mr. ASPINALL. An additional statement after the ones that have already been filed?

Mr. JOHNSON. Those that have not filed.

Mr. ROGERS. Is there objection? The chair hears none.

(The statements referred to are on pp. 72–78.)

Mr. UDALL. Mr. Chairman, we have of course a vast number of Arizonans who are interested in this legislation, many of them would like to testify but all of them have come here to support this legislation. I would like to have a list of those people from Arizona which I have prepared be made a part of our record.

Mr. ROGERS. Without objection it is so ordered.

(The list of Arizonans interested in this legislation follows:)

LIST OF ARIZONA CITIZENS PRESENT AT THE HEARINGS

Senator Carl Hayden.
Senator Paul Fannin.
Congressman John J. Rhodes.
Congressman Morris K. Udall.
Congressman George F. Senner, Jr.
Hon. Samuel P. Goddard, Governor, State of Arizona.
Clayton Niles, administrative assistant to Governor.
Hon. Barry M. Goldwater, former Senator, Arizona.
Hon. Ernest McFarland, former Senator and Governor, Arizona.

Arizona Interstate Stream Commission:
Douglas J. Wall, chairman.
Evo De Concini, vice chairman.
Victor I. Corbell, member and president Salt River project.
Sam Dick, member and president Yuma Valley Water Users Association.
Ashby I. Lohse, member.
Linton Claridge, member.
J. A. Roberts, member.
John Geoffrey Will, attorney for commission.
Ozell Trask, special attorney for commission.
John E. Madden, special attorney for commission.
Mark Wilmer, special attorney for commission.
William S. Gookin, State water engineer.
Vivian Talton, office secretary.
Ray Killian, executive secretary.
Rich Johnson, president, Central Arizona Project Association.
Morley Fox, director, Washington office of Central Arizona Project Association.
J. A. Riggins, Jr., attorney, Salt River project.
Leslie M. Alexander, assistant general manager, Salt River project.
Roger Ernst, manager, land department, Arizona Public Service.
Tom Choules, attorney, Wellton-Mohawk Irrigation District, North Gila Irrigation District, Unit B Irrigation District.
Bryant Jones, attorney, Yuma County Water Users Association.
Elliott Waits, president, Yuma Mesa Irrigation District.
Thadd Baker, attorney, Yuma Mesa Irrigation District.
Jack Weinberger, board member.
Eldon Poulson, board member.
James L. Savage, president, Central Arizona Irrigation & Drainage District.
Newton S. Cooper, president, Maricopa-Stanfield & Drainage District.
R. J. Ellis, attorney, for the above districts.
Gordon Jorgensen, engineer for above districts.
Dr. Harold Myers, dean of the College of Agriculture, University of Arizona.
Clifford A. Pugh, area engineer, Bureau of Reclamation, Phoenix office.
Bruce Blanchard, central Arizona project planning engineer, Phoenix office.
Robert Comstock, reports coordinator, Phoenix office.
O. N. Arrington, chief of special services, Arizona Game and Fish Commission.
Dr. Wendel Swank, director of Arizona Game and Fish Commission.

PERSONS APPEARING AS WITNESSES

Hennen Foreman, executive vice president, Arizona Public Service.
Dr. Hiram Davis, economist, Phoenix, Ariz., Western Management Consultants.
George Rocha, chairman, Tribal Council, Hualapai Indian Tribe of Arizona.
Royal Marks, counsel, Tribal Council.
Jack Jackson, president, Arizona Game Protective Association.
Jerry Lobel, Scottsdale, Ariz.
Dr. John Ricker, Phoenix, Ariz.
Dr. John Tyson, Phoenix, Ariz.

Mr. UDALL. Yesterday, I made reference in my testimony for the three Arizona Congressmen, of some of the economic effects of the shortage of water in our area and I have a number of photographs here showing some pumps closed down and homes abandoned.

These are all taken in the area that would be served by this project and I think I would like to supplement the testimony that was given yesterday and I would like to ask to pass these to the members of the committee and that they end up in the file of the subcommittee.

Reference has been made to the exchange provision in this legislation, by my colleague Mr. Senner and by Mr. Dominy. I ask unanimous consent that an exchange of correspondence between the Secretary and the Salt River project, showing the projects constructive attitude toward this provision, be included in the record.

Mr. ROGERS. Is there objection? Hearing none—so ordered.
(The material referred to follows:)

SALT RIVER PROJECT,
Phoenix, Ariz., August 2, 1965.

Hon. STEWART L. UDALL,
Secretary of the Interior,
Department of the Interior,
Washington, D.C.

Re Exchange provision—Lower Colorado River Basin project.

DEAR SECRETARY UDALL: The proposed legislation to authorize the Lower Colorado River Basin project, as introduced by various Members of Congress, contains the following provision with reference to exchange or replacement of water supplies under the central Arizona unit:

"The Secretary may require as a condition in any contract under which water is provided under 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 but no such exchange or replacement shall require a contractor to bear any cost of said exchange or replacement water in excess of the costs that would have been incurred in connection with the continued use by the contractor of its existing supply, nor shall such exchange or replacement otherwise result in economic injury to the contractor."

Recognition of this exchange principle has been a matter of considerable importance to various areas of Arizona lying outside the area to be directly benefited by Colorado River waters. The Salt River project has recognized the importance of this exchange concept to Arizona, in general, and, particularly, to various communities throughout the northern part of the State. In fact, in January of 1964, in a letter to Mr. Dewey Farr, of Lakeside, Ariz., a copy of which is attached, we discussed our willingness to cooperate in working out water exchanges, but pointed out certain limitations and restrictions beyond which the project could not go. Our basic concern is expressed in the following paragraph of this letter:

"In negotiating any water exchange contracts with the Department of the Interior for the exchange of Colorado River water (as we believe the Secretary of the Interior already has the authority to do), we would expect full assurances that the individual water users within our boundaries, including cities, towns, and farms, would not suffer by lesser quantities or inferior quality than they are now receiving through the facilities of the Salt River project—and with this concept and expectation we feel sure that none of your people would disagree."

Many landowners within the Salt River project, whose lands have old and valuable water rights from the Salt and Verde Rivers, have a growing concern over the exchange provisions of the bill in view of new provisions, such as the guarantee of 4,400,000 acre-feet of water to California.

If the individual landowners, owning old water rights in downstream irrigation districts in Arizona, are not given adequate protection in the so-called exchange agreements, these landowners assert that, in times of extreme shortage of water in the Colorado River, the new upstream diversions, created by exchanges, would remain firm and the downstream lands with old water rights would be the ones to suffer a water loss in order to fulfill the guarantee to the State of California. In other words, the downstream irrigation districts, who had been compelled to execute exchange agreements for the accommodation of upstream or out-of-the-basin users, would find themselves making up Colorado River water shortages (properly chargeable to upstream central Arizona project water users) from waters appropriated long ago under State law by their individual landowners.

This, to say the least, would be a poor trade, when the established irrigation districts and water users' organizations actually get no direct benefit from the exchange arrangement and, in addition, end up taking delivery from a source under the control of another agency and subject to the hazards and interruptions of a multistage pump lift and a single long canal from the Colorado River—only for the purpose of accommodating the needs of an out-of-basin municipality or upstream user.

Water law throughout the Western States has, since the beginning, recognized the principle of water exchanges—but always with the limitation and restriction

imposed that the downstream user, whose water is being physically diverted, is entitled to a replacement of such water without impairment of quantity or quality. The shareholders of Salt River project are not entitled to ask for for more—nor are they obligated to accept less—than this protection afforded by the general law of the Western States. Furthermore, I am sure you recognize that the board of governors of the Salt River Valley Water users' Association has no authority to enter into a contract—even with the Secretary of the Interior—which would have the effect of diminishing, impairing, or interfering in any way with appropriated water appurtenant to lands owned by the association's individual members.

Consequently, as we pointed out to Mr. Farr in the attached letter, any water exchange contracts with the Department of the Interior pursuant to the proposed legislation must have incorporated in them "full assurances that the individual water users within our boundaries, including cities, town, and farms, would not suffer by lesser quantities or inferior quality than they are now receiving through the facilities of the Salt River project * * *."

We hope that this reiteration of our willingness to negotiate exchange contracts, as well as this expression of our concern over full and adequate contract protection to the vested water rights of individual landowners within the Salt River project and other irrigation districts, will be helpful to you in analyzing and discussing the proposed legislation before committees of both the House of Representatives and the U.S. Senate in the near future.

If we have raised questions which need further discussion and further comment, we would be pleased to personally meet with you at your convenience.

Very truly yours,

VICTOR I. CORBELL, *President.*

SALT RIVER PROJECT,
Phoenix, Ariz., January 17, 1964.

Re central Arizona project exchange water.

Mr. DEWEY FARR,
Manager, NavoApache Electric Cooperative,
Lakeside, Ariz.

DEAR MR. FARR: You have asked for an expression from the Salt River project with reference to the much-discussed exchange problem in connection with Senator Hayden's S. 1658. As you are well aware, the exchange problem is one fraught with many technical and legal problems; and, although the problems are many, we do not believe that any of them are insurmountable if approached by reasonable men on a reasonable basis.

As a general approach to the problem, I believe that we can assure you and the residents of northern Arizona that we look with favor upon solving such of the water needs of northern Arizona as the Department of the Interior feels may reasonably and properly fit into the central Arizona project plan.

Feeling that actions speak louder than words, we can point to the past to judge what our future attitude might be. Although we have never entered into exchanges on the major scale contemplated by some in connection with the central Arizona project, we have worked closely and cooperatively with the Phelps Dodge Corp., the game and fish department, the State land department and others in solving water problems which affect the economy of the State.

The first major exchange contract in the State of Arizona was entered into between the Salt River project, the Phelps Dodge Corp., and the Department of Interior in 1944. This contract permitted Phelps Dodge to divert water from the Black River for use in the Morenci area by exchanging water developed and stored by Phelps Dodge through the construction of Horseshoe Dam. Later a similar arrangement was entered into when Phelps Dodge constructed Show Low Lake and made a transmountain diversion into the Salt River watershed, with additional diversions being made from Black River for mining operations at Morenci. Just recently the Salt River project again entered into a contract with the Phelps Dodge Corp. in connection with Phelps Dodge construction of their new dam on Clear Creek, and, in this instance, even went to the extent of permitting Phelps Dodge to have storage rights within the Salt River project reservoirs.

Our Big Lake contract with the game and fish department is another example of a cooperative effort to assist others in working out State water problems. Furthermore, recognizing the need for amendment of the State laws to allow transfer of water rights for fish, wildlife, recreation, and municipal purposes,

the project worked cooperatively with the Arizona Game and Fish Department, State land department, Senator Udine, of Coconino County, and other legislators to amend the water laws in 1962 to allow water rights transfers under certain prescribed conditions.

In negotiating any water exchange contracts with the Department of Interior for the exchange of Colorado River water (as we believe the Secretary of Interior already has the authority to do), we would expect full assurances that the individual water users within our boundaries, including cities, towns, and farms, would not suffer by lesser quantities or inferior quality than they are now receiving through the facilities of the Salt River project, and with this concept and expectation we feel sure that none of your people would disagree.

I hope this letter will serve the purpose of assuring those associated with you in bringing supplemental water to northern Arizona that the Salt River project will not take an arbitrary position opposing water exchanges and that we are willing, at any time, to discuss the matter with you, your associates, and the Secretary of Interior.

Very truly yours,

SALT RIVER VALLEY WATER USERS' ASSOCIATION,
VICTOR I. CORBELL, *President*

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., August 20, 1965.

MR. VICTOR I. CORBELL,
President, Salt River Project,
Phoenix, Ariz.

DEAR MR. CORBELL: Thank you for your letter of August 2 discussing the exchange provisions of the pending Lower Colorado River Basin project legislation.

We are glad to receive the views of the district on this most important matter and can assure you they will be given the fullest consideration in connection with implementation of the provision should the legislation be enacted.

Sincerely yours,

STEWART L. UDALL,
Secretary of the Interior.

Mr. UDALL. Mr. Chairman, I think this covers most of the matters that I wanted to reach this morning. I would like to say to my friend, Mr. Hosmer, that he is a valuable member of this committee and I think he has raised some very interesting questions on the subsidence problem.

I know he has been faced with something similar in his State and he has given it a great deal of study, but let me just put in focus the magnitude of the problem that we have in Arizona.

We are using out of the ground this year three and a half million acre-feet of water. Mother Nature returns, according to our best calculation, about 1 million of this, so that we have a shortage or overdraft of 2.5 million.

If this project were to go into operation tomorrow and if we could triple the size of the aqueduct that we are talking about and find through some magic how to make it full we would still barely have enough water to sustain the economy as it now exists and what we are hoping to do is to cut down the draft on this underground reservoir and hopefully some day give Mother Nature a chance to build it back up through the million acre-feet, or so, that goes into the underground in the present soil condition and under the present conditions of operation.

We want to explore all of these problems. We want to get answers. Even the import of this water is not going to give us enough to under take any great programs of recharging those underground areas.

Mr. HOSMER. Will the gentleman yield?

Mr. UDALL. Yes.

Mr. HOSMER. I think it is generally conceded that with an overdraft on the underground waters this will exist for at least a decade and a half and that this project will not ameliorate the situation totally, but I do hope that in the focus of these problems of Arizona and the service area of the central Arizona project that we will not forget the import of the legislation is directed toward problems other than those of the Arizona service areas; but also those of several other States, not in the lower basin alone but in the upper basin as well.

I was delighted that somebody brought up the matter of the Glen Canyon Dam and that we did have some meager discussion of imports yesterday.

Mr. UDALL. The question of imports is an overriding one and of vital interest to your State and mine, and I think we have to look down the road to solve this problem.

I think the local problem in Arizona is rescuing and saving our land and our overriding problem in the whole region is to solve the water problem of the region and do something of a substantial nature.

Mr. Chairman, before I close, it has been suggested by some of our Arizona friends here that the Honorable John Murdock have the right to file a short statement in support of this legislation.

Mr. ROGERS. Is there objection?

The Chair hears none and the subcommittee will be glad to receive his statement. (Will be found on p. 942.)

Mr. UDALL. Mr. Chairman, that is all I have.

Mr. REINECKE. Governor, a statement which you made and which was just reiterated by my colleague from Arizona indicated that the completion of this central Arizona project will not solve all of your problems and, as a matter of fact, I believe he mentioned yesterday they were short about two and a half million acre-feet at the present time.

What else do you intend to do to take care of the expanding economy beyond this?

Governor GODDARD. Mr. Congressman, we are making efforts in every direction available to us. We are trying to salvage water. Various cities are attempting to salvage saline water, sewage water. They are attempting to bring various water saving devices into being.

We are at the beginning stages, as Dr. Myers mentioned, of trying to study the possibilities and the actual physical recharging of every area that we can. In fact, if you flew over Arizona today you would notice that there are dams, water tanks on almost every available crevice of land to try to catch every bit of precipitation that we can.

We are interested primarily in the new departure toward getting into effect the redistribution through imports of surplus water.

I feel that this is the greatest hope for all of our States. I think perhaps the time has come when every one of our Western States that has arid areas is going to have to cast eyes in this direction and I believe the Governors are pretty well in agreement—especially in the lower basin States and I believe many in the upper basin States as well that I have talked to feel that this is an area that we are going to have to proceed along.

Mr. REINECKE. Do you have any regulations on curtailing the use of water in the State? If this is only a stopgap measure, you have to do more than just this, particularly with the population expanding.

Governor GODDARD. We recognize that. We have a water code, and we now have some 3,800,000 acres which are under critical ground water area definition under our State law where further drilling is prohibited. However, we hope to extend that. The three State universities are extending their efforts in the direction of trying to recover water, and we are bending every effort and it is my policy to achieve every effort toward water salvage, and so forth.

Mr. REINECKE. When Mr. Wilmer was commenting on the Supreme Court decision specifically regarding the perfected rights, I believe you indicated it was against your interest but it was fair. This smacks of the idea that perhaps Arizona was in there to get all it could by fair means or foul.

I would like to hear your interpretation of this, with regard to protecting California in 4.4.

Governor GODDARD. I think all of us who have tried lawsuits find it is best to put all of our best feet forward, and some of our poorest. Accordingly it was the position of Arizona since we had few perfected rights that under the present situation our rights were not protected. We tried to advance that position but did not succeed.

Governor GODDARD. We are under an obligation. I propose to see this carried through. The satisfaction of our agreements and the compacts we have entered into and the agreements we have entered into, that they are observed and if there is a shortage of water, we must bear it.

Mr. REINECKE. Though it may fall within the 2.8?

Governor GODDARD. This is presently the agreement and the understanding that the lower basin States have at this point.

Mr. REINECKE. One last question. You referred to Mr. Maughan's statement. I am not sure I got the answer. Did you indicate you had not read this statement?

Governor GODDARD. No, I have not read Mr. Maughan's statement.

Mr. REINECKE. You indicated you would back it up and that you would be willing to be responsible for any statement he makes.

Governor GODDARD. Our engineers are at the present time working with Mr. Maughan.

Mr. REINECKE. Will you be responsible for whatever statement he makes?

Governor GODDARD. This is our intention.

Mr. ASPINALL. I have a letter from the Governor in which he states this is Arizona's position.

The gentleman from Idaho, Mr. White.

Mr. WHITE. Governor, I have listened with interest to your testimony. I cannot comment further on your testimony, but being a Member of the Congress from the State of Idaho, I have a few observations and, with the committee's permission, I would like to make them at this time.

I think that the gentleman from Arizona in his last statement hit upon the actual condition that we have here. First of all, the Colorado River does not have sufficient water to supply all of the needs that it is being subjected to or is anticipated to be subjected to in the future.

He used the word "magic" to fill the Colorado with the water that would be needed.

As I sat here and listened to the colloquy and testimony yesterday presented before this committee, the phrase "unholy alliance" comes to my mind and the glue that sticks this alliance together is the importation of water from the Pacific Northwest.

I think that looking at the testimony that was presented here yesterday, where we are putting together the upper basin and the lower basin, and California, and we even have in the Secretary's testimony yesterday that we might give a little water to Oregon, we might give a little to Nevada, Wyoming, New Mexico all the way down the line.

The Commissioner talked about the possibility that 2½ million acre-feet capacity probably would not be sufficient to do the job.

We have minimized all through these hearings the importation of water. We have minimized that even in the legislation that is before us. We have talked about provisional authorizations. We are talking about a complete and detailed analysis of work that will deliver water into various parts of your State and also we have talked about the various court decisions as to the distribution of the water between the lower basin and California, and I have heard the chairman talk about the possibility of the amount of water that is now being discharged from the upper basin and what will happen in the future if the upper basin discharges are not made in the amounts that are presently made.

It seems to me that this committee would be remiss and its analysis of this particular legislation if it allowed the 3-year period for the analysis of importation and the impact that it will have on the Pacific Northwest to not have sufficient studies prior to the passage of this legislation.

It seems to me we are talking mainly about the transfer of water from the Pacific Northwest and I think again this is the glue that is sticking California together with Arizona and the glue that is sticking the upper basin together with the lower basin, the compact and all of the other States that have joined with you and your Governors' conference and the Southwest region of the United States.

We have a series of river dams on the Columbia River, they have in certain periods of the year, surplusages of water; because of the very nature of the construction they do not store any amount of water. The last storage of any size is in the Albany Falls Reservoir in northern Idaho. Then we get into the upper reaches of the river in Flathead, Hungry Horse, and so forth, but there is no storage and they talked about diversion of this water.

Yesterday the Secretary alluded to the possibility of the diversion at the mouth of the Columbia.

I submit for the committee's consideration, they were talking in reality about a downstream diversion that might ultimately have some effect on upstream diversion. If this water must reach that point, therefore it could not be diverted.

We have in the State of Idaho almost as many people as you have in the State of Arizona. We have an expanding economy. We have lands that are ripe to be reclaimed. We have hundreds of thousands of acres that are arable. We have areas where they can produce 700 bags of potatoes to the acre, if they can just put the water on the land.

Now, I am not trying to give you the impression that I am taking a position of someone opposed to this legislation, or to the possibility of the importation of water from the Pacific Northwest, but I think that the same amount of scrutiny should be given to the Columbia River and to the drainages and to the economy of the States of Idaho, Washington, and Montana as has been given to the State of Arizona and California, New Mexico, Colorado, Nevada, and the States of both the upper and lower basin.

Now, I think that this legislation is highly deficient in this area. I think that it has touched on, I think it has been circumvented, I think that we have thrown importation back in the rear of our minds here with respect to the testimony that has been developed. I think it has been done by every witness that has appeared. I think that it has been done by those people questioning these witnesses and I would hope, Mr. Chairman, that prior to the enactment and markup of this legislation that this provisional type of authorization should have a full analysis prior to passage.

I think that we have talked here about precedent, with respect to this legislation, and we have found it very difficult to find such precedent and I think that the committee in the past has always taken a position that a feasibility report of any particular program should be entirely available to the committee prior to enactment——

Mr. ASPINALL. The prepared statement is in the record and it is in order.

Mr. WHITE. We should have a hearing on these particular aspects of this legislation and pass over them the way that has been passed over, I think is an incorrect approach to the legislation.

Mr. ASPINALL. We have two sets of witnesses going into this question of importation quite thoroughly before we are finished.

Mr. WHITE. It seems to me, Mr. Chairman, the administration should have their presentation gone into.

Mr. ASPINALL. They will come back again.

Mr. HANSEN. Will the gentleman yield.

Mr. ASPINALL. The Chair would like to complete the testimony of this witness this morning and we have only about 5 minutes left.

Mr. WHITE. Mr. Chairman, I have waited very patiently for this opportunity——

Mr. ASPINALL. Yes, but the gentleman has not asked any questions yet, and he has used 6 minutes to state his position, which is all right as far as the hearings are concerned, but they do not write the record.

Mr. WHITE. Mr. Chairman, I hope this record will be written completely and I ask that consideration be given to this legislation before that time.

I have no further questions.

Governor GODDARD. May I assure the gentleman I gave him a misapprehension. Idaho was included in the Water Council of the Western Governors, and Governor Smylie was a part of this whole arrangement.

Mr. ASPINALL. The gentleman from California.

Mr. BURTON. No questions.

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

Mr. TUNNEY. No questions.

Mr. ASPINALL. The gentleman from Washington, Mr. Foley.

Mr. FOLEY. Mr. Chairman, I would like to ask a question or two of Governor Goddard and Mr. Gookin.

I was interested in the questions of Mr. Hosmer regarding subsidence and adequacy of studies on subsidence problems.

You have described the State of Arizona, along with the Southwest generally, as being a water-short area.

Would you say, Governor, that strenuous efforts have been made to conserve and salvage water in Arizona and the Southwest?

Governor GODDARD. I would say Mr. Foley that we are making such strenuous efforts, with the capacity that we have, which is limited because we are a small State and a poor State. We are making every effort that we can at the present time and we intend to do everything within our power to conserve water.

Mr. FOLEY. You are making every effort that you can now to conserve water——

Governor GODDARD. Within all our resources; I believe that is a correct statement.

Mr. FOLEY. Are there any municipal areas in Arizona that are not metering water?

Governor GODDARD. Do not what?

Mr. FOLEY. Are there any municipal communities in Arizona that do not meter their water?

Governor GODDARD. I don't believe so, I know of none.

Mr. FOLEY. Do you have unlined canals in any of your irrigation districts?

Governor GODDARD. I am sure we do.

Mr. FOLEY. The chairman mentioned a little earlier that the All-America Canal received approximately 5 million acre-feet of water. Is that canal lined?

Governor GODDARD. The All-America Canal I believe was required to be lined.

Mr. FOLEY. Is it presently lined?

Mr. UDALL. Will the gentleman yield?

Governor GODDARD. I am informed that it was not lined.

Mr. UDALL. It is not a concrete canal, of course, and needs linings and a good deal of water could be saved if this were done. That is part of the bill, to have studies made and determinations made as to how the losses in the All-American Canal could be cut down.

Mr. FOLEY. Isn't it true, Governor, that there are areas in the Southwest and the lower basin where communities do not meter their water and there is merely a flat charge made for water, regardless of the amount of use?

Governor GODDARD. I am not aware of such a situation.

Mr. FOLEY. Perhaps Mr. Gookin can answer.

Mr. GOOKIN. The large cities certainly are metered, there may be some of the smaller that are not, I don't know. I can find out.

(The information follows:)

THE CAPITOL,
Phoenix, September 10, 1965.

HON. WAYNE N. ASPINALL,
Chairman, Interior and Insular Affairs Committee,
House of Representatives, Washington, D.C.

DEAR MR. ASPINALL: On August 24 during the hearings before the Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs, the question arose as to how much of the municipal and industrial water which is

sold in Arizona is metered. I am advised that under date of August 30, 1965, a response to that question was submitted to you by Senator Fannin and Congressmen Rhodes, Udall, and Senner. I have reviewed their reply and adopt it as my own.

During these same hearings you also inquired as to the amount of water presently available to Arizona considering the provisions of the Colorado River compact and taking into consideration present uses, illegal and otherwise, from the Colorado River Lower Basin, and whether it is possible under the existing conditions to make the project a success without the use of water to which the upper basin is entitled under provisions of the Colorado River project. I am also advised that Senator Fannin and Congressmen Rhodes, Udall, and Senner responded to that inquiry on August 30. I have reviewed their response and I adopt it as my own.

Sincerely yours,

SAMUEL P. GODDARD, *Governor.*

AUGUST 30, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Interior and Insular Affairs Committee,
House of Representatives, Washington, D.C.

DEAR MR. ASPINALL: On August 24 and 26, 1965, during the hearing before the Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs on H.R. 4671, et al., to authorize the construction, operation, and maintenance of the Lower Colorado River Basin project and for other purposes, the question arose as to how much of the municipal and industrial water which is sold in Arizona is metered.

We have researched this problem and find that in December 1963, the League of Arizona Cities & Towns published a report entitled "Water and Sewer Rate Survey." In section 1 of that report there is contained a list of the municipalities in Arizona which have meters and an itemization of the number of meters in each municipality. A copy of the relevant pages of that report is attached.

It is our best estimate that the attached list demonstrates that approximately 97 percent of the municipal and industrial water deliveries in Arizona are metered.

Very truly yours,

PAUL FANNIN.
MORRIS K. UDALL.
JOHN J. RHODES.
GEORGE F. SENNER, Jr.

WATER AND SEWER RATE SURVEY

Prepared by the League of Arizona Cities & Towns, Phoenix, Ariz., December 1963

FOREWORD

The staff of the league biennially compiles and publishes information on current water and sewer fees and rate schedules. It is recommended that when making a comparison between charges of other communities, that caution be exercised since there are often cost factors influencing the level of charges which are peculiar to each municipality; i.e., pumping depth, transmission distance, source of supply, energy costs, etc.

We are indebted to those city and town officials and private water company representatives who have provided the information contained in this report, for they have made this bulletin possible.

The services of Mr. Arthur W. Rangeler, research assistant, and Mr. Richard D. MacRavey, assistant director, in the preparation and completion of this survey are acknowledged with appreciation.

Copies of the ordinances for any of the municipalities listed in this survey are available upon request at the league office. Any comments, suggestions, or criticisms from officials using this report will be welcome.

JOHN J. DEBOLSKE, *Executive Director.*

INTRODUCTION

Salient facts concerning the data appearing in this report are summarized on this page for the convenience of the reader. For the purpose of facilitating comparisons on succeeding pages, all cubic-foot figures were converted to gallons.

Watermeter deposit.—A meter deposit is required by most of the reporting systems; seven cities and towns, however, do not require a deposit. There are a few cases where the resident property owner is exempt from paying a deposit, and there are some instances where the deposit is required only of people living outside the city limits. Meter deposits, where required, are predominantly flat fee amounts and range from $5 to $150. Some municipalities establish a different flat fee for the various classes of services; i.e., residential, commercial, etc. In several cases the deposit is based upon the size of the meter connection.

Water connection fee.—Connection fees, required in 41 communities, are as follows: based on meter size (22 cities and towns); flat fee prescribed (15 systems); actual cost basis (2 facilities); either cost or flat fee, whichever is greater (1 town); and one community indicates that commercial hookups are based on a graduated scale method, whereas residential connections are based on a flat fee.

Minimum water charge—gallons allowed.—Minimum water charges are based on the following methods: Flat fee (31); size of meter, number of units, and summer demand (1); different flat amount for certain classes of users (6); flat rate for residential and meter size for commercial (1); and size of meter connection (16). Practically all reporting cities and towns indicate a specified number of gallons allowed the minimum charge.

Monthly water rates.—Graduated charges, which decrease as consumption increases, are used by 31 systems; and 2 cases exist where rates decrease as usage increases for the regular rate category, and for the elective category the rates increase as usage increases. A flat rate is charged for water consumption by 18 systems, and 4 other systems levy a flat rate for each class of user. Where areas outside the corporate limits are served, it is the practice among reporting systems to establish higher outside rates.

Sales tax included.—If a "Yes" is recorded in the column entitled "Includes Sales Tax," this means that the base rate includes the sales tax. The base rate plus sales tax is reflected by a "No."

Sewerage connection fee.—Where a connection fee is required, the fee ranges from $2 to $200. Most of the fees are based upon a flat amount. There are, however, other methods upon which fees are calculated, as follows: Size of connection (three systems); actual cost (one system); actual cost or flat charge, whichever is greater (one system); and distance of extension involved (one system).

Monthly sewer service charge.—There is no sewer charge levied by eight cities and towns, and seven other communities report no charge levied inside the corporate limits. A flat rate is used by 24 municipalities, a number of these using a different flat rate for the various classes of users. One city levies a rate based upon the size of the watermeter. Additional charges are also levied by some communities for each fixture, commercial washing machine, etc. Seven municipalities indicate that charges for multiple units, commercial, and industrial use are based upon water usage.

Billing period and type billing machine.—A monthly billing period is reported by 46 water systems, and a cycle billing by 10. Billing periods reported by sewer systems are as follows: Monthly (21); quarterly (2); semiannually (1); annually (1); period option (1); and cycle (1). All reporting systems, except 12, use machine billing.

Delinquency and shutoff.—The period before a bill becomes delinquent ranges from 10 to 40 days. After delinquency occurs, the period before shutoff varies from "as soon as possible" to 90 days.

WATER RATE SURVEY

SECTION I

CITY OR TOWN	OWNERSHIP	NO. OF CONNECTIONS	METER DEPOSIT	CONNECTION FEE
AVONDALE	Municipal	1,000	$10.00	$5%.50 Turn-on..... 1.00 Turn-off..... 1.00
BENSON	Municipal	565	7.50	50.00
BISBEE	Arizona Water Co.	3,320	Minimum.....10.00	No Charge
BUCKEYE	Municipal	680	Residence....10.00 Business.....25.00	50.00
CASA GRANDE	Arizona Water Co.	2,687	Minimum.....10.00	No Charge
CHANDLER	Municipal	2,827	Minimum.....10.00	Inside: 5/8" ..... 75.00 1 " ..... 140.00 1½ " ..... 215.00 2 " ..... 300.00 Outside: Above rates plus 1/3
CLARKDALE	Clarkdale Realty, Inc.	600 (350 Active)	5.00	Domestic Meters - ...50.00 Commercial - Graduated Scale
CLIFTON	Morenci Wtr. & Elec. Co.	836	5.00	Turn-on..... 1.00
COOLIDGE	Arizona Water Co.	1,089	Residence....10.00 Business.....10.00 to 50.00	No Charge
COTTONWOOD	Cottonwood Wtr. Works. Clemenceau Wtr. Co.	810 70	None	No Charge
DOUGLAS	Municipal	3,625	None	Actual Cost Turn-off..... 1.00
DUNCAN				
EAGAR	Town of Eagar	935		Hook-up.....100.00
EL MIRAGE	Municipal	740	10.00	50.00 Turn-on..... 1.00 Turn-off..... 1.00
ELOY	Municipal	1,202	3/4".....10.00 1 ".....15.00 2 ".....20.00	35.00
FLAGSTAFF	Municipal	5,215	Residence...10.00 Business: Based on average mo. bill.	3/4".....80.00 1 ".....160.00 1½ ".....290.00 2 ".....560.00

CITY OR TOWN	OWNERSHIP	NO. OF CONNECTIONS	METER DEPOSIT	CONNECTION FEE
FLORENCE	ARIZONA WATER CO.	660	$10.00	NO CHARGE
FREDONIA	FREDONIA WATER CONSERVATION DIST.	188	NONE	INSIDE.....$37.50 OUTSIDE.....45.00 TURN-ON..... 1.00 TURN-OFF..... 1.00
GILA BEND	A. H. STOUT CITY WATER WORKS			
GILBERT	MUNICIPAL	690	10.00	ACTUAL COST TURN-OFF..... 5.00
GLENDALE	MUNICIPAL	7,000	10.00	INSIDE: OUTSIDE: 3/4"..... 90.00.....115.00 1 "..... 140.00.....165.00 1½ "..... 225.00.....250.00 2 "..... 480.00.....505.00 3 "..... 710.00.....735.00 4 "...1,200.00...1,225.00 6 "...2,180.00...2,205.00
GLOBE	MUNICIPAL	2,226	NONE	INSIDE: OUTSIDE: 3/4"..... 25.00..... 50.00 1 "..... 35.00..... 75.00 LGR.....ACT.CST.....ACT.CST. RE-CONNECTION, IF TURNED OFF FOR NON-PAYT... 1.00
GOODYEAR	MUNICIPAL	320	NONE	TO 3/4".....75.00 ALL OTHERS-COST PLUS 10% TURN-ON..... 1.00 TURN-OFF..... 1.00
HAYDEN	DISTRIBUTION: MUNICIPAL PRODUCTION: KENNECOTT COPPER CO.	425	10.00	COST OR 50.00 (WHICHEVER GREATER)
HOLBROOK	MUNICIPAL	1,200	MINIMUM.....10.00 RESIDENT OWNER..... NONE COMMERCIAL: BASED ON EST. USAGE.	NO CHARGE
HUACHUCA CITY	ARTIC WATER CO.	- - -	10.00	NO CHARGE
JEROME	CLARKDALE REALTY CO.	162	5.00	50.00
KEARNY	GALBREATH DEVELOPMENT CORPORATION			
KINGMAN	MUNICIPAL	1,900	NEW CONNECTIONS PRIOR TO JANUARY 1, 1963 INSIDE: OUTSIDE: RESIDENCE..... 5.00 10.00 COMMERCIAL.....10.00 10.00 NEW CONNECTIONS AFTER JANUARY 1, 1963 INSIDE: OUTSIDE: 5/8-¾" RESIDENCE 5.00 10.00 5/8-¾" COMMERCIAL 10.00 10.00 1 " ..... 15.00 15.00 1½ " ..... 15.00 15.00 2 " ..... 25.00 25.00 OVER 2 " 50.00 50.00	INSIDE: OUTSIDE: 5/8-¾"....60.00.....70.00 1 "...100.00....125.00 1½ "...175.00....225.00 2 "...325.00....325.00 OVER 2", MATERIAL COST PLUS 50.00 (INSIDE ONLY - ABOVE FEE INCLUDES TO 50 FEET SERVICE LINE-MAIN LINE TO PROPERTY LINE) TURN-OFF/ON.1.00.....1.00

CITY OR TOWN	OWNERSHIP	NO. OF CONNECTIONS	METER DEPOSIT	CONNECTION FEE
MAMMOTH	Arizona Water Co. Francis Jacobson Pedro Water Co.	184 100	10.00 None	No Charge
MESA	Municipal	12,627	10.00	Inside.....65.00 Outside.....75.00
MIAMI	Arizona Water Co.	1,883	10.00	No Charge
NOGALES	Municipal	1,999	Residence...$10.00 Business.... 15.00	3/4" Inside.....$ 15.00 3/4" Outside..... 30.00 Turn-on..... 2.00
PARADISE VALLEY				
PARKER	Municipal	600	Renters..... 10.00	3/4"..... 40.00 1 "..... 60.00 1½ "..... 100.00 2 "..... 125.00 Above 2" .....Council Determination
PATAGONIA				
PEORIA	Municipal	1,000	5.00	Inside..... 50.00 Outside..... 80.00 Monthly Stand-by Fire Hydrant.... 1.50
PHOENIX	Municipal	142,476 (As of 6/30/63)	Owners: Inside..... None Outside.....15.00 Tenants: Inside.....10.00 Outside.....15.00	5/8" to 3/4"..... 30.00 1 "..... 175.00 1½ "..... 290.00 2 "..... 360.00 Above 2".....Actual Cost - - - - - - - - - - - - Sprinkle System Standby (Per inch per month) Inside..... .75 Outside..... 1.50
PRESCOTT	Municipal	4,400	Domestic: Inside..... 5.00 Outside....10.00 All Others: Estimated Two months' billing	5/8" to 3/4".....100.00 3/4".....120.00 1 "..... 140.00 1½ "..... 210.00 2 "..... 350.00 2 " Fire..... 415.00 2 " Compound.....517.00 3 "..... 545.00 3 " Compound.....650.00 4 "..... 675.00 4 " Compound.....950.00 6 "..... 1,250.00 6 " Compound.....1,750.00 Turn-on (if within 10 days after shut-off) 2.00

CITY OR TOWN	OWNERSHIP	NO. OF CONNECTIONS	METER DEPOSIT	CONNECTION FEE
SAFFORD	MUNICIPAL	3,037	INSIDE: OUTSIDE: TO 3/4".....5.00 10.00 TO 3/4" FOR OTHER THAN DOMESTIC OR RESIDENCE.....10.00 15.00 1".....20.00 30.00 1½".....25.00 37.50 1½".....35.00 50.00 2".....60.00 90.00 ABOVE 2".....100.00 150.00 2". FIRE PROTECTION ONLY.....5.00 7.50 ABOVE 2" FIRE PROTECTION ONLY...10.00 15.00	INSIDE: 3/4"....COST OF MATERIAL & LABOR IN EXCESS OF 100' OF PIPE. ABOVE 3/4".....ACTUAL COST LESS AMOUNT EQUAL TO ABOVE EXEMPTION OUTSIDE: ACTUAL COST EXCLUSIVE OF AN AMOUNT EQUAL TO COST OF 3/4" METER ASSEMBLY & 3/4" CORPORATION COCK.
ST. JOHNS				
SCOTTSDALE	(CITY OF PHOENIX)		$15.00	5/8" TO 3/4".....90.00 1".....175.00 1½".....290.00 2".....360.00 ABOVE 2" ACTUAL COST SPRINKLE SYSTEM STANDBY (PER INCH PER MO.). 1.50
SHOW LOW	MUNICIPAL	480	10.00	50.00 TURN-OFF..... 1.00
SIERRA VISTA	(A) SOUTHWEST WTR. CO. (B) ARIZONA WTR. CO. (C) COCHISE ENTERPRISES	700 148	10.00 10.00	NO CHARGE NO CHARGE
SNOWFLAKE	MUNICIPAL	561	10.00	3/4".....50.00 1".....100.00 1½".....150.00
SOMERTON	MUNICIPAL	400	NONE	TURN-ON..... 1.00
SOUTH TUCSON	(SEE CITY OF TUCSON)			
SPRINGERVILLE	MUNICIPAL	274	RESIDENCE.....5.00 BUSINESS.....10.00	95.00
SURPRISE	(TOWN OF EL MIRAGE)		10.00	50.00 TURN-ON..... 1.00 TURN-OFF..... 1.00
TEMPE	MUNICIPAL	8,990 (AS OF 10/1/63)	RENTERS.....10.00	5/8".....65.00 3/4".....80.00 1".....110.00 1½".....165.00 2".....225.00
THATCHER	(CITY OF SAFFORD)	400		
TOLLESON	MUNICIPAL	721	10.00	INSIDE: 3/4".....50.00 ABOVE 3/4" - COST OF MAT'L & LABOR PLUS 10% OUTSIDE: COST OF MATERIAL & LABOR PLUS 20%
TOMBSTONE	MUNICIPAL	427	10.00	50.00

CITY OR TOWN	OWNERSHIP	NO. OF CONNECTIONS	METER DEPOSIT	CONNECTION FEE
TUCSON	MUNICIPAL	61,605 (As of 10/1/63)	RENTALS & HOUSING PROJECTS....10.00 (PROPERTY OWNERS EXEMPT)	INSIDE: / REMOTE OUTSIDE: 3/4"....45.00 / 50.00 1 "....95.00 / 100.00 1½ "....200.00 / 205.00 2 "....250.00 / 255.00 TURN-ON....1.00 ADDL. FOR PAVEMENT CUTTING:...30.00 (OVER 2" = COST PLUS 10%) FIRE PROTECTION SERVICES: METERED; WITH DETECTOR CHECK VALVE; ALARM CHECK ALLOWABLE UNDER CERTAIN CONDITIONS WITH REGULAR INSPECTION. INSIDE: / OUTSIDE: 2" 6.00 / 6.00 3" 6.50 / 6.75 4" 5.00 / 7.50 6" 6.00 / 9.00 8" 7.00 / 10.50 METERED / MINIMUM GALLONS 2" 5,750 / 3.00 / 4.00 3" 7,500 / 4.50 / 6.75 4" 8,750 / 5.00 / 7.50 6" 9,750 / 6.00 / 9.00
WILKENBURG	MUNICIPAL	925	RESIDENCE....5.00 BUSINESS....BASED ON CONSUMPTION	3/4"....50.00 OTHERS....ACTUAL COST
WILLCOX	MUNICIPAL	723	10.00	25.00
WILLIAMS	MUNICIPAL	790	10.00	INSIDE: 5/8"....50.00 1 "....100.00 1½ "....150.00 2 "....250.00 OUTSIDE: DOUBLE ABOVE RATES
WINKELMAN	ARIZONA WATER CO.	222	10.00	NO CHARGE
WINSLOW	MUNICIPAL	2,525	RESIDENCE: PER UNIT....10.00 COMMERCIAL & IND.: DETERMINED BY WATER SUPT. (MINIMUM....20.00)	1"....70.00 1½"....140.00 2 "....200.00 ABOVE 2"....ACTUAL COST (PAYMENT IN ADVANCE) TURN-OFF....1.00
YOUNGTOWN	YOUNGTOWN WATER CO.	1,000 (APPROX.)	DEPENDS ON METER SIZE	3/4" METER....65.00 1 " METER....90.00 1½ " METER....165.00 2 " METER....225.00 3 " METER....375.00 TURN-ON....1.00 TURN-OFF....1.00 TURN-ON AFTER DELINQUENCY....4.00
YUMA	ARIZONA WATER CO.	8,632	RENTERS....10.00 BUSINESS....10.00 OR MORE (BASED ON USE)	NO CHARGE

Mr. FOLEY. Aren't there instances, Governor, where irrigating farmers allow water to stand in the canals?

Governor GODDARD. I am sure that there are practices by farmers that we have not been able to control. We are trying to extend our controls as fast as our capacity is limited, to have a ground water code. It is admittedly not as stringent as it should be. We are trying to rectify this situation.

Mr. FOLEY. Well, there is no question, is there, Governor, that the control of these water conservation practices are within the police powers of the State of Arizona?

Governor GODDARD. I believe that certain practices would be, yes.

Mr. FOLEY. And you say that the code is not as stringent as it should be?

Governor GODDARD. That is correct.

Mr. FOLEY. In your judgment.

Governor GODDARD. Not as stringent as it could be.

Mr. FOLEY. Have you recommended to the legislature increasing the stringency of the water code?

Governor GODDARD. In connection with this project, I have advocated and will continue to advocate that we adopt every practice of which we are capable, to save water.

Mr. FOLEY. Specifically, Governor, my question is, Have you sent an executive message to the Legislature of Arizona recommending increased stringency in the water code of Arizona to preserve municipal and agricultural waters?

Governor GODDARD. We have done more than that. We have recommended that the individual cities undertake projects. We have tried to do this situation on a current basis and we are going to continue to try to get this done in the future.

Mr. FOLEY. I will ask you this question then, Governor: How did the legislature react to your message?

Governor GODDARD. The legislature to this date has not changed the ground water code.

Mr. FOLEY. Have the municipal communities responded to your recommendations?

Governor GODDARD. Yes, they have.

Mr. FOLEY. In all cases?

Governor GODDARD. Not in all cases, but in the major municipalities we have efforts to conserve water, which include many different approaches, as I mentioned—the salvage of sewage water, the recovery of saline waters; we are engaged in experiments to try to contain the evaporation of waters.

Mr. FOLEY. What concerns me, Governor, is that the studies that could be made, and the actions that could be taken, the procedures that could be followed to salvage and conserve water within the State of Arizona and the Southwest generally are not being done. This should not be the attitude of a water shortage area, of an arid area which desperately claims itself in need of additional water.

It would seem to me——

Mr. ASPINALL. Will the gentleman yield to the gentleman from Colorado?

Mr. FOLEY. Yes.

Mr. ASPINALL. We do not want to have statements made at this time, but questions.

Mr. FOLEY. May I ask one final question?

Mr. ASPINALL. If you have a question, instead of making a statement here, all right.

Mr. FOLEY. Governor, yesterday Secretary Udall stated that there were several sources of augmenting water to the Colorado River, and he mentioned them in the following order: Conservation and salvage, desalinization, possible imports from northern California, and imports from the mouth of the Columbia. The Secretary stated, as I recall, that the first thing that should be done is to increase efforts to conserve and salvage water. Would you agree with that statement?

Governor GODDARD. I would agree with that statement, and I would like to suggest in specific answer to your question, that private users such as they are, the municipal or quasi-muncipal corporations or cooperatives, the Salt River Valley Water Users Association has embarked on a 10-year watershed improvement program which will cost the association nearly $10 million in its hope that the water yield from the blight-infested lands will be increased by two-tenths per acre-inch, per acre, per annum, by removing the junipers.

Dr. Meyer has testified concerning the continuing and constant investigation of these problems by the universities.

We have, as in other areas.

Mr. ASPINALL. The gentleman from Wyoming?

Mr. RONCALIO. Thank you, Mr. Chairman. Governor, your questions will now end where your water begins—with Wyoming.

No further questions.

Mr. ASPINALL. The gentleman from Idaho.

Mr. HANSEN. Mr. Chairman, I have one short thing to say——

Mr. ASPINALL. Is this a question of the Governor?

Mr. HANSEN. This is not a question.

Mr. ASPINALL. The Chair will have to rule against a statement at this time.

The committee will stand in recess until 2 p.m.

(Whereupon, at 12 noon, the committee stood in recess, to reconvene at 2 p.m. on the same day.)

AFTERNOON SESSION

Mr. ROGERS. The Subcommittee on Irrigation and Reclamation will come to order for further pending business. This afternoon we have scheduled the Honorable Thomas C. Lynch, attorney general of the State of California appearing in lieu of Governor Brown. He will be accompanied by the Honorable Northcutt Ely, special assistant attorney general, the Honorable Charles E. Corker, assistant attorney general.

Gentlemen, if you will come to the witness chair.

Mr. BURTON of California. Mr. Chairman, I would like to point out to the members of the committee that the most illustrious resident of the San Francisco's noted Fifth Congressional District is our distinguished attorney general, Mr. Lynch.

He has served as our county's district attorney for a number of years and is now serving all the people of the State most effectively in his capacity as attorney general.

He is not only a dear friend but there are four registered voters in his family and they all live in my district so I have got to get along with him.

Mr. ROGERS. Thank you, Mr. Burton.

STATEMENT OF THOMAS C. LYNCH, ATTORNEY GENERAL, STATE OF CALIFORNIA; ACCOMPANIED BY NORTHCUTT ELY, SPECIAL ASSISTANT ATTORNEY GENERAL; CHARLES E. CORKER, ASSISTANT ATTORNEY GENERAL; AND THOMAS M. STETSON, CONSULTING ENGINEER

Mr. LYNCH. Mr. Chairman, may I also introduce Mr. Tom Stetson who is a consulting engineer for the State of California.

Mr. ROGERS. Let the record reflect that Mr. Stetson also accompanies you.

Mr. LYNCH. Mr. Chairman, members of the committee, my name is Thomas C. Lynch. I am attorney general of California. I have the honor to appear not only in that capacity, but at the request of the Governor of my State, Edmund G. Brown. He wants me to tell you that he would be here today but for the aftermath of the last 2 tragic weeks in our State. He wants me to tell you that he wholeheartedly and enthusiastically supports the legislation offered by 37 representatives in Congress and by both California Senators.

I assure you that a California consensus—as close to unanimity as you will find in a State of nearly 20 million people—supports the Governor in that position.

That position is urged by the Colorado River Board of California, a State agency whose members are nominated by the public entities which have Colorado River water rights; the Metropolitan Water District of Southern California, the Department of Water and Power of the City of Los Angeles, the San Diego County Water Authority, Imperial Irrigation District, Palo Verde Irrigation District, and Coachella Valley County Water District. Each of these public agencies supports the pending bill.

Likewise, it has the most earnest support of our sister State—our historic water antagonist with whom we are now in agreement—Arizona. It has the support of Nevada, which has a community of interest with both Arizona and California. It has the support in principle of the U.S. Government, expressed by the Bureau of the Budget and the Secretary of the Interior.

I hope and I believe that this legislation will come to have the strong support of other regions: the States of the Upper Colorado River Basin and Western States outside the Colorado River Basin which may be benefited. It deserves the support of the entire Nation. The most immediate benefit will be to the Lower Colorado River Basin, whose problems produced this agreement after decades of embittered and futile combat. Benefits, less immediate but fully as substantial, will later accrue to areas adjacent to the Colorado River Basin. The precedent and the principle mark a legal and political breakthrough as important as any new scientific discovery in man's fight against drought.

I was delighted to learn on Friday that representatives of the seven Colorado River Basin States had agreed on basic principles for regional legislation. This is good news for the entire Nation.

The seven-State accord is a second great step toward making regional water development a reality. This accord will be as significant as the original agreement between Arizona and California which established unity among the lower basin States—Arizona, California, and Nevada—earlier this year.

Many problems remain, but they will also yield to the constructive spirit with which the seven States have approached their problems. I am sure this committee will give thorough attention to the unresolved problems as the hearings progress. I should like to confine myself to the very significant subjects on which there now appears to be a meeting of minds.

The lower basin agreement which has united Arizona, California, and Nevada is, as I am sure everyone in this room fully realizes, an astonishing development. It came about when men of good will from all over the Colorado River Basin became fully aware that the interests of our region can be served only by agreement and not by combat. We shall all face a continuing struggle and problems far more serious than anyone could have realized in 1952 when Arizona and California squared off against each other for the fourth time in the U.S. Supreme Court. Now, our struggle is against nature. It is a struggle we can win if we are all together; which we shall surely lose if we are divided.

I had the privilege of watching this agreement happen. I shall tell you about it in some detail, because the time has come for further agreement—this time in the Congress of the United States. We look to this committee to fashion a final agreement which will serve the West and set a pattern for the rest of the country which is reaching the limits of available water, and which must eventually turn to regional planning as the basis of regional accomplishment.

I became attorney general of California at the beginning of September 1964. The constitution of California imposed on me the responsibility of representing California in interstate litigation. I was told by some that the problems of the Colorado River were insoluble. The U.S. Supreme Court had entered a decree in *Arizona* v. *California* the preceding March. The decree had not settled the problems of the Colorado. It had only framed some of the issues for renewed combat. I made it my first business to study the Colorado problem intensively. I have continued to do so. I discovered that these reports were in substance correct. Winston Churchill once described Russia as "a riddle wrapped in a mystery inside an enigma." He might well have been speaking of the Colorado.

The decree—and I append a copy to this statement—concluded one of the greatest trials in history. The purpose of the suit was to answer yes or no to the question posed in 1952 by the State of Arizona; is there water to supply the central Arizona project?

The decree failed to answer that question. Instead, it answered two others; first, how is 7.5 million acre-feet per year of consumptive use from the main river to be divided among Arizona, California, and Nevada? It is to be divided 2.8 million to Arizona, 4.4 million to California, 300,000 acre-feet to Nevada.

Second, how is water in excess of 7.5 million acre-feet to be divided among them? It is to be divided equally between Arizona and California, except that the Secretary of the Interior may by contract give

4 percent of the excess to Nevada, coming out of Arizona's 50 percent.

Lest there be any doubt, I repeat what my predecessor said, "We accept those decisions. We do not ask Congress to change the Court's decree."

Unfortunately, these omit the major question which requires an answer. How is less than 7.5 million acre-feet to be divided? Engineering opinion was unanimous that ultimately there would be no excess over 7.5 million acre-feet for the three States. In time, there will be less than 7.5 million acre-feet. But the Court expressly refused to decide how a supply of less than 7.5 million acre-feet would be divided. The Court left that question to be decided by the Secretary of the Interior or the Congress.

There are two limitations on the Secretary's power: (1) "Present perfected rights" must be given interstate priority by the Secretary before he allocates the remaining water among the States. (2) The Court will review the Secretary's exercise of discretion. However, the quantities of "present perfected rights"—those exercised by use prior to 1929 when the Boulder Canyon Project Act became effective and all Federal rights existing on that date—are left to future agreement or litigation. The standards by which secretarial discretion is to be controlled are otherwise unspecified.

As an alternative to a secretarial allocation, Congress can enact legislation providing for allocation of shortages if the main river supplies less than 7.5 million acre-feet.

The Court left unanswered the question Arizona had in effect asked the Supreme Court: "Is there water for the central Arizona project?"

It left unanswered the question we in California face: "Is there to be a disastrous exception to the historic rule of law throughout the West that water is never taken from existing projects to supply new projects to be built in the future?" We thought there could be only one answer.

There was no possibility whatever that Arizona could be expected to yield that which Arizona had sought for a generation, and for which her need is increasingly great: the central Arizona project.

There was no possibility whatever that California would yield water used by her projects in order to build the central Arizona project, except as a decree by the Supreme Court had so determined. The Supreme Court had expressly and unanimously rejected the special master's recommendation that proration of shortages within the 7.5 million acre-feet should be imposed on the States. We demanded, as we had to, protection of existing projects. The Arizona Legislature twice sought the same protection for Arizona's existing projects.

Secretary Udall had suggested in two successive regional plans a way to avoid the hard question to which the answer appeared so ruinous to Arizona or California. Our entire region is indebted to his inspiration, stimulated I am sure by the dreadful responsibility the Court had thrust on him to destroy either the hopes of Arizona or the existing projects of California.

The resource of the Colorado is water. Water generates power. Power generates money. And through money the water supply can be made to replenish itself. Imports of water can avoid shortages in the 7.5 million acre-foot quantity. Water users in both States would be made whole to the extent of the decreed allocations out of that 7.5 million acre-feet.

The two Pacific Southwest water plans could not, however, overcome the handicap of lack of time. Arizona's need for a central Arizona project was immediate and urgent. Investigations, engineering, and economic studies were necessary for a project to import water to replace Colorado River water exported to central Arizona. All three take substantial time, even on a crash basis. My State resisted—it had to resist—a central Arizona project which would deplete the water available to California projects so long as replacement of that water was only a hope or a promise.

After several months of study, I attended my first public meeting devoted to this unhappy dilemma. It was called in December by the Southern California Water Conference. Representatives from all over the Colorado River Basin were present.

There was a serious—even grimly somber—mood of men patiently willing to state and restate without rancor their deeply held positions. Theirs was a firm determination not to compromise or suggest compromise in matters essential to survival.

Californians protested they did not insist upon 4.4 million acre-feet from the Colorado and also water from some alternative source. But they could not yield that 4.4 million until the alternative source had been achieved. That would take time.

Californians also recognized Arizona's need. They did not want to insist that Arizona's overdrawn ground water basins continue to be pumped without respite until a great regional plan to replace the central Arizona project supply could be readied for adoption as a whole. But they were determined to defend California's 4.4 million acre-feet.

At the end of the conference, this question emerged:

Is it possible to estimate the shortage in the Colorado River supply and provide for priority of existing projects until an import of water to make up that shortage has actually been achieved?

Next day, Secretary Udall came to Los Angeles. While the California group was waiting to meet with him, the question was put to the chief engineer of the Colorado River Board. He estimated the probable ultimate shortage at 2.5 million acre-feet.

That consists of 1.5 million acre-feet annually which the Mexican treaty assures to Mexico, and about 1 million acre-feet of annual channel and reservoir losses between Lee Ferry—where the lower basin begins—and the Mexican boundary. You can see that unless 2.5 million acre-feet is imported, the 7.5 million acre-feet annual average—which article III(d) of the Colorado River compact requires to be delivered at Lee Ferry—will provide only 5 million acre-feet of consumptive use.

Would it be possible to assure protection for existing projects until at least 2.5 million acre-feet was imported into the main river?

Steward Udall gave a cautiously affirmative reply. This inspired negotiations which resulted in the legislation before you.

In the first week in February, Senator Kuchel offered S. 1019 in the U.S. Senate. Counterparts were offered in the House, and Senator Hayden has said that he will press for prompt passage in the Senate if one of these counterparts is passed by the House.

I shall not try to discuss the details of the bill. I shall point out only how it answers the hardest questions.

First, it gives the same protection to existing projects of all three States, Arizona, California, and Nevada, except that California is limited in that protection to 4.4 million acre-feet. If there is less than 7.5 million acre-feet, shortage will be borne by the central Arizona project before existing projects are forced to cut back. The 4.4 limitation on California exists because only California's existing projects use more than the quantity decreed out of the first 7.5 million acre-feet available each year from the river.

You would suppose that this was not a matter of consequence to Arizona projects, since Arizona's uses plus central Arizona project use will be substantially less than Arizona's 2.8 million acre-feet. In fact, the problem was of universal concern. As I have said, Arizona's Legislature has twice sought protection for Arizona's present projects against demands of the central Arizona project. This bill makes that principle applicable to both sides of the river, and to all three States.

Second, the bill makes it unnecessary to provide an answer to the truly unknown and unknowable "ultimate water supply" available from the Colorado River. That requires study of hydrology and law. The law is the Colorado River compact which only the Supreme Court at the end of another 10 years of litigation may definitely construe. We must avoid that path. This bill requires an answer only to the easy question. How much water is probably available to the lower basin until imports from other regions become available? That question, I am assured, can be answered: Enough to justify the central Arizona project for immediate authorization and construction on these conditions. That, I am sure, will be the subject of engineering testimony and evidence before you.

Third, the bill makes it unnecessary to face the cruelest dilemma ever imposed by man or nature on a great region: either to go on letting temporarily unused upper basin water flow down the river, unused, to the Gulf of California; or put it to use with projects which must be abandoned when the upper basin requires that presently unused water to which it has a guaranteed right by compact. This bill uses that wasted water for its best purpose—a temporary resource to be replaced by imports.

Fourth, this bill gives every State and every region a continuing incentive to make the regional plan work. Arizona and California both need far more water than they can expect from their shares of 7.5 million acre-feet. This bill gives both States an equal interest in the excess above 7.5 million acre-feet which must be provided. It gives the maximum assurance now possible that a choice between an empty Lake Powell in the upper basin or an empty Lake Mead in the lower basin need never be made.

The bill does not preclude the solution of very real problems regarding the maintenance and future development of the many resources and uses in the Lower Colorado River Basin including recreation and fish and wildlife. All three States bordering the river have a great stake in the water of the river, not only from the standpoint of the water it can supply off-stream uses but also for the natural resources and recreation uses it supports.

I will conclude by telling you there is——

Mr. ASPINALL. Mr. Chairman, where does that last statement come from?

Mr. LYNCH. That I have appended to this statement, Mr. Chairman.

Mr. ASPINALL. Why isn't it appended to the statement like the statement on page 2? I don't have a copy of it.

Mr. LYNCH. We didn't have time, Mr. Chairman, to get that in.

Mr. HOSMER. I wonder if he could read that again.

Mr. ROGERS. Could you read that appendix again?

Mr. LYNCH. Yes. The bill does not preclude the solution of very real problems regarding the maintenance and future development of the many resources and uses in the Lower Colorado River Basin including recreation and fish and wildlife. All three States bordering the river have a great stake in the water of the river, not only from the standpoint of the water it can supply off-stream uses but also for the natural resources and recreation uses it supports on the river.

Mr. ASPINALL. Thank you, sir.

Mr. LYNCH. I will conclude by telling you that there is still some controversy about the bill in California. However, it is a happy kind of controversy. Who is entitled to the most credit for launching the agreement?

Like victory of any kind, this plan has—I should say it has needed—many fathers. We are still, I think, in the negotiating stages. I hope that the members of this committee who are not from Lower Colorado River Basin States will promptly enter their claims to joint paternity. We need your support.

I would pay tribute to the three men who have done more than any others to further this concept of regional planning. The first is Stewart Udall, Secretary of the Interior, who offered two regional plans which contained basic principles of the bills before you.

The second is Governor Brown. First, in launching the California water plan as the first major business of his administration, he demonstrated to the Nation that regional animosities can be reconciled to the benefit of mutually hostile antagonists. Second, he defended Secretary Udall's plan when Arizona and California could otherwise have killed the concept with renewal of ancient hostility.

The third is Senator Kuchel. He has provided leadership which has put regional water problems ahead of party politics, ahead of interstate hostilities, and ahead of personal advantage. His bill is S. 1019 in the Senate. The 37 House bills were heard first, in this committee, because this appears to be the best and quickest way to get the job done.

Mine is a very rare privilege: to travel to Washington as attorney general of California and to urge approval on behalf of the Governor of California of a central Arizona project, with assurance that I will be well received when I return to California. I think you will want to share with me the sense of great accomplishment that has come to all of us who have helped fashion the present agreement.

Mr. Chairman, gentlemen, I have with me Mr. Northcutt Ely, who I am sure most of you know; Mr. Charles Corker, assistant attorney general in charge of water litigation in my office, and also Mr. Thomas Stetson who is a consulting engineer for the State of California.

As I pointed out, I have been attorney general of the State of California for less than 1 year. Obviously I have not had the opportunity that so many have had of becoming thoroughly immersed, if I may coin a phrase, in the Colorado River litigation and I will defer, if I am permitted, some of the questions to my colleagues.

Mr. ROGERS. General, with regard to the present perfected rights which you mentioned, how much water is estimated to be included in that particular category?

Mr. LYNCH. We do not have before us the figures which are to be provided by the people who are claiming these rights. Perhaps Mr. Ely could give us an estimate on that.

Mr. ELY. The court allowed until next March 9 for the exchange of data among the States as to their claims. I may say that in general California claims present perfected rights, that is, water used prior to 1929, of the general order of 3,600,000 acre-feet.

And the corresponding rights in Arizona we would estimate as 600,000 to 800,000. I am sure Arizona would give you a lower figure for California than I have given. Just what they would contend I don't yet know.

Mr. ROGERS. How many different categories would there be, Mr. Ely, that would be asserting these prior perfected rights?

Mr. ELY. The present perfected rights are defined by the decree, Mr. Chairman, in substance as water which had been applied to use prior to June 1929, plus water for Indian or other Federal reservations. In California there are two major districts which have rights of that character, the Palo Verde Irrigation District and the Imperial Irrigation District, and also the smaller reservation division of the Yuma project in California, plus a scattering of small water users along the river, plus the decreed Indian reservation rights.

These are our present perfected rights in California.

In Arizona, the old Yuma project would be in that category, so also the Colorado River Indian Reservation and some other Indian rights and perhaps other scattered smaller claims. All together I would suppose——

Mr. ROGERS. Well, let's say the unknown or unidentified prior perfected rights at this time would be minimum, would they not?

Mr. ELY. Yes, comparatively so.

Mr. ROGERS. Are there any limitation statutes in either of the States, Mr. Ely, with reference to registration of these rights?

Mr. ELY. No. Under the court's decree it would be water which had been applied to use prior to 1929 and under State law a right must be asserted, maintained, with reasonable diligence. The question of whether any rights that existed in 1929 were subsequently abandoned or lost has not arisen and I do not think will arise.

Mr. ROGERS. Well, there isn't any reason, then, that the full extent of this could not be determined with a certain degree of definiteness at the present time?

Mr. ELY. It can and will be determined fairly rapidly.

Mr. ROGERS. There will be no new ones born, no new right of any kind born.

Mr. ELY. No; not of the characterization of present perfected rights. They are cut off as of June 25, 1929.

Mr. ROGERS. Mr. Aspinall.

Mr. ASPINALL. Mr. Chairman, I am glad to have General Lynch and his group before us this afternoon, and may I say, Mr. Attorney General, as far as California is concerned, you have presented a very excellent statement. I think that you have set forth very ably the position that California takes and must take with the understanding

that the advantage to your State from this legislation is perhaps prospective importation but, most of all, it is the assurance of 4.4 million acre-feet of water from the Colorado River regardless of any contingency that may arise on the river; is that correct.

Mr. LYNCH. Well, it does assure us, Mr. Chairman, 4. ——

Mr. ASPINALL. You can answer either "Yes" or "No", General.

Mr. LYNCH. I will answer "Yes."

Mr. ASPINALL. Surely. I would also like to welcome my good personal friend, Mike Ely, before this committee once again. The last time he was here with any particular consistency of attendance was when he was leading the most valiant fight against the upper Colorado River program along with my genial friend, Mr. Hosmer, and those associated with him from the lower Colorado River.

I hope that he can lend perhaps a little bit more understanding if not any more ability—most assuredly I recognize Mr. Ely as one of the most able water attorneys in the United States, or the world, for that matter—a little more understanding than he was inclined to yield until the vote was counted on the Colorado storage project.

I would say, Mike, the first time that I have been able to say this publicly, that Mrs. Aspinall and I both appreciated the fact that you were willing to come over to the office after it was all over with and shake hands and we started out anew from there.

Mr. ELY. Thank you. You are more than generous. I meant what I told you that day.

Mr. ASPINALL. Now, Mr. Rogers has just asked you a question as far as the present recognized rights are concerned. I gave some figures this morning about the present uses and releases for 1963. The question was raised afterward why I picked out the worst year. Of course, this wasn't the worst year.

This happened to be the year to be picked out as of this time during the filling of Glen Canyon Reservoir at Lake Powell. Do you remember those figures that I put into the record? Either one of you.

Mr. ELY. In general, Mr. Aspinall.

Mr. ASPINALL. Would you be in agreement in general?

Mr. ELY. I think you used the diversion figures below Hoover Dam as though they were the consumptive use figures. If the figure you gave, for example, for Palo Verde, 300-odd thousand, is intended to be the—was that intended, Mr. Aspinall, to be the diversion or consumptive use?

Mr. ASPINALL. Consumptive use. It is recognized that some of the water comes back into the river.

Mr. ELY. I would take your word for it that these figures are correct. I am sure you must have verified them.

Mr. ASPINALL. Under any picture that we can make at the present time, and although the General only referred to it indirectly, under any condition how much water is there left in the Colorado River, lower basin, that is, for the Central Arizona project from the entitlement due the lower basin?

Mr. ELY. Well, this is—that is a more complicated question than appears. It requires an answer in some detail. You mean the entitlement of the lower basin under the compact?

This entitlement, if I may say so, is in several categories. The first is the apportionment in perpetuity made by article III(a) of the com-

pact and the second is the right to increased use of 1 million acre-feet by article III(b).

Mr. ASPINALL. That is Gila River water.

Mr. ELY. No, Mr. Chairman; not necessarily.

Mr. ASPINALL. Do you want to take that, then, as the water that originates below Lee Ferry?

Mr. ELY. Well, it is not even necessarily that, Mr. Aspinall, at least in my view. The equation doesn't end there, however, because article III(e) of the compact provides that the States of the lower division shall not require the delivery of water and the States of the upper division shall not withhold water not reasonably required for beneficial consumptive use. This means that to the extent the upper basin is not in fact consuming water, that water must flow on down the river if required for consumptive use in the lower basin even though that requirement in the lower basin is in excess of the two figures of 7.5 million and 1 million that I have given you.

Moreover, there are two additional qualifications upon this matter. The States of the upper division are required by article III(d) not to deplete the flow below 75 million acre-feet in each period of 10 consecutive years. And article III(c) provides that they shall in addition, if the surplus in the basin is not adequate to meet the Mexican burden, supply one-half of the deficiency. So it is not easy to answer your question as to the quantity by which the uses in the lower basin may have exceeded their "entitlement." They didn't exceed their entitlement at all in 1963 if you look to all articles of the compact. They may well have exceeded 7.5 million or 8.5 million but that is not the limit upon the lower basin's right to use for the reasons I have just indicated.

Mr. ASPINALL. One further question. Here is where the controversy comes in. I am glad to have your answer. This question of consumptive use. But you recognize now that the Federal Government has given its consent to the Colorado River storage project, that it will have close to a billion dollars invested in this project, that it is the theory of the project that the power produced at the generating plants pay back the costs of the project, and that the upper basin is presently withholding water in its reservoirs under article III(e), in order to take care of this delivery of power do you not?

Mr. LYNCH. Yes.

Mr. ASPINALL. III(e) if I remember correctly, and that this water will be delivered.

Now, in accordance with your understanding, then the upper basin will be required to deliver additional water to the lower basin provided it is not consumptively used in the upper basin, is that right?

Mr. ELY. This is true, Mr. Chairman, with this—in fairness, this qualification. The compact is silent upon a most important point. There are now reservoirs above Lee Ferry and below, Glen Canyon above, Hoover Dam below, and a great unsolved problem in the compact is what is to be done to preserve equitable balance between those two reservoirs.

I am not asserting here that Glen Canyon must be drawn down to dead storage while Lake Mead remains full, nor do I think that you could say that Glen Canyon should be maintained full while we drew Lake Mead down to dead storage. This is a problem the compact did

not treat. It is one which as yet this proposed statute has not dealt with definitely. It is a great unsolved problem.

Mr. ASPINALL. Who has the power to make the decision?

Mr. ELY. The Congress. The Secretary until Congress controls him. I might say——

Mr. ASPINALL. Does the Secretary have any authority under any existing law to take care of any distribution of the upper basin water?

Mr. ELY. Well, the Secretary is directed by the Colorado River Storage Project Act first of all to comply with the law of the river, of course, including all the compacts and the treaty, and second——

Mr. ASPINALL. You just admitted we don't know what the law of the river is exactly in that respect.

Mr. ELY. That is correct. There is an unsolved point there and I would be by your side in resisting an unwarranted assertion by the Secretary of authority. But until Congress does give him directions, I don't know what he can do, charged with the responsibility for operating both reservoirs, except to exercise his judgment.

I may say, Mr. Aspinall, that I am here by the courtesy of Attorney General Lynch and I will be returning on my own time later, and I don't want to be taking his time.

Mr. ASPINALL. I like to pick your brains any time I can under any conditions because you are able, no question about that.

Mr. ELY. Thank you.

Mr. ASPINALL. Well, I won't pursue this any further but I do think that there is a very important question involved here and that it is a question which has to do with what is commonly understood as the law of the river and the upper basin undoubtedly will stand on this theory, its rights, and the lower basin will stand on its theory.

Mr. ELY. If I may say, I think all of these problems are negotiable.

Mr. ASPINALL. Well, I would like to believe that but after I have lived through the years that I have under the cloud of the controversy that existed between the lower basin and the upper basin getting the Colorado storage project authorized and seeing the years that it took for the Arizona-California suit, I am not so sure.

Mr. Lynch, in your insert to your statement you referred to an accord as having been reached with the upper basin. In fact, there is no accord, is there, at the present time?

Mr. LYNCH. Well, I have been advised, Mr. Chairman, since I arrived here that they have been negotiating and had reached some agreement. Mr. Ely has been participating in that and I am sure could inform us.

Mr. ASPINALL. Well, it was referred to yesterday as a "consensus." There is quite a bit of difference between a consensus and agreement and contract and a compact.

Now, what do you wish to stand on here?

Mr. LYNCH. Well, I have been given to understand, and I have been advised that there was an agreement among individuals which does not necessarily bind their States, of course, but I would classify it as the same type of a meeting of minds out of which the so-called Arizona-California compromise came.

Mr. ASPINALL. I understand. You already have an understanding, you have an agreement that if you can have 4,400,000 acre-feet of water

annually, then you will give up your right to any additional water in the Colorado River until there is water imported. Isn't that right?

Mr. LYNCH. That is the essence.

Mr. ASPINALL. You don't have an agreement like that with the upper basin because I have letters in my file in answer to the inquiries I made to the Governors which are in opposition to the legislation. I won't beg the issue but I think we should understand this.

On page 4 of your statement you referred to the decree and then you say:

> The purpose of the suit was to answer "yes" or "no" to the question posed in 1952 by the State of Arizona: Is there water to supply central Arizona project?

Mr. LYNCH. The Supreme Court decree, Mr. Chairman.

Mr. ASPINALL. And left it up to the Secretary; is that correct?

Mr. LYNCH. Left it up to further determination, in my opinion, to agreement between the parties or by the Secretary or by the Congress.

Mr. ASPINALL. Do you think the parties of the lower basin can override the decision of the Court which gives to the Secretary of the Interior authority to divide the waters in times of shortage?

Mr. LYNCH. May I ask Mr. Corker to answer that?

Mr. ASPINALL. Surely.

Mr. CORKER. Article II(B)(3) of the decree in *Arizona* v. *California* deals with the problem that arises if there is less than 7.5 million acre-feet available to the three States within the lower basin, and it provides that—

> the Secretary, after providing for satisfaction of present perfected rights in the order of their priority dates without regard to State lines and after consultation with the parties to major delivery contracts and such representatives as the States may designate, may apportion the amount remaining available for consumptive use in such manner as is consistent with the Boulder Canyon Project Act as interpreted by the opinion of this Court herein and with other applicable Federal statutes.

The other applicable Federal statutes are any statute by which Congress deals with the problem of allocating shortages.

The Supreme Court in its opinion, and this is quoted from page 44 of the slip opinion, says expressly:

> Congress can undoubtedly reduce or enlarge the Secretary's powers if it wishes. Unless and until it does, we leave in the hands of the Secretary where Congress placed it full power to control, manage, and operate the Government's Colorado River works and to make contracts for the sale and delivery of water on such terms as are not prohibited by the Project Act.

Mr. ASPINALL. I agree with that last statement. Congress didn't tie the hands of the Secretary in the Project Act, but at the present time the Secretary has this authority, and no agreement arrived at between the States without the approval of Congress, in my opinion, can take this authority away from the Secretary.

Mr. CORKER. I think there is no argument about that, sir. It is up to the Secretary or to the Congress.

Mr. ASPINALL. General Lynch, the State of California at the present time is using approximately 5.1 million acre-feet of water from the Colorado River; is that correct?

Mr. LYNCH. That is correct; yes, sir.

Mr. ASPINALL. As I understand it, you do not stand upon that figure as water which you are using under perfected rights; is that right?

Mr. LYNCH. No. We do not.

Mr. ASPINALL. It isn't right?

Mr. LYNCH. May I have the statement again, sir?

Mr. ASPINALL. I said at the present time the State of California is using approximately 5.1 million acre-feet of water.

Mr. LYNCH. That is correct.

Mr. ASPINALL. At the present time.

Mr. LYNCH. Right.

Mr. ASPINALL. I ask you if those were all founded upon perfected rights, and your answer as I understand it was "No."

Mr. LYNCH. No. They are not.

Mr. ASPINALL. And that it is the figure that Mr. Ely gave us, 3.7; was that right?

Mr. ELY. 3.6.

Mr. ASPINALL. 3.6 million acre-feet are perfected rights.

Mr. LYNCH. We do not have established at the present time, Mr. Chairman, all of the present perfected rights. That is what I would call an educated estimate, having in mind that we think we recognize the areas where these claims will be made and there will not be some claim made by someone about whom we have no knowledge.

Mr. ASPINALL. The Chairman asked me if this water is in existing claims or if it is water for which there are existing claimants. As I understand it, with Arizona's willingness based on 4.4 million acre-feet, California, in this instance, doesn't contend that she has more than—more claimants than those claimants who can readily establish perfected rights to 4.4 million acre-feet of water at this time; is that correct?

Mr. LYNCH. I will ask Mr. Ely.

Mr. ELY. As I say, the claims have not been exchanged among the States as their present perfected rights. Our understanding is that Arizona claims for her projects that were using water prior to 1929 plus Indian-decreed rights something on the order of 800,000 acre-feet.

Mr. ASPINALL. About how much?

Mr. ELY. About 800,000. Arizona might give you a different answer, but I think that figure is approximately correct.

Mr. ASPINALL. But this wouldn't make any difference, would it, Mr. Ely, because of the fact that California has already limited herself to 4.4 million acre-feet of water under the California Limitation Act.

Mr. ELY. You are correct, and the language of section 304(a) of the bill before you recognizes in Arizona their rights also, not only their present perfected rights but also contract rights and decreed rights, as entitled to the same protection as our 4.4 million. The total of Arizona rights that fall into those categories is greater than their present perfected rights alone which are simply one component. I would estimate the total of the Arizona rights covered by that category, that is, contract, present perfected rights, and so on, to be of the general order of 1.2 million, generally comparable to California's 4.4 million.

Mr. ASPINALL. Page 9, General—you have a statement which reads as follows:

That consists of 1.5 million acre-feet annually which the Mexican Treaty assures to Mexico, and about 1 million acre-feet of annual channel and reservoir losses between Lee Ferry—where the lower basin begins—and the Mexican boundary.

In this figure that you have given to us, does it include the 800,000 acre-feet of water lost by evaporation from Lake Mead?

Mr. LYNCH. I am told that it does; yes, sir.

Mr. ASPINALL. On page 11, the first paragraph:

Third, the bill makes it unnecessary to face the cruelest dilemma ever imposed by man or nature on a great region: either to go on letting temporarily unused upper basin water flow down the river, unused, to the Gulf of California; or put it to use with projects which must be abandoned.

Now, at the present time with the Glen Canyon Reservoir being in the state of filling and the Flaming Gorge and the Curecanti within a few months, and Navajo projects, how much water is going to go unused from Lee Ferry down to Old Mexico?

Mr. LYNCH. Perhaps Mr. Ely can answer that.

Mr. ELY. After consumptive use requirements are met in the lower basin, the problem then arises how shall Lake Mead be restored and how shall the other basin reservoirs be filled? It will take a great many years to refill Lake Mead, now half empty, and to fill the upper basin reservoirs, now three-quarters empty. Something of the order of 40 million acre-feet.

Mr. ASPINALL. What period of time really does the Department of the Interior and the Bureau of Reclamation consider would be the necessary time to fill all these reservoirs?

Mr. ELY. Well, I would prefer they answer that themselves, but obviously 40-odd million acre-feet must be accumulated if they are all to fill, and obviously it will take a number of years, the number depending on whether we are successful and fortunate in having a series of wet years or unsuccessful and unfortunate in having a series of dry years.

Mr. ASPINALL. They figure 10 years under their expected flow of the river. Do you figure that that is a problematical figure, from your observation, or one upon which we can depend?

Mr. ELY. I would prefer to defer that to some of the engineering witnesses who will follow, who will go into this very question of probabilities.

Mr. ASPINALL. All right. On page 11, at the bottom of the page, General:

It gives the maximum assurance now possible that a choice between an empty Lake Powell in the upper basin or an empty Lake Mead in the lower basin need never be made.

What do you mean by that statement?

Mr. LYNCH. First of all, may I point out, Mr. Chairman, I am making this statement on behalf of the Governor of California, so I must rely on the assistance of Mr. Corker and Mr. Ely on some of the technical questions.

Mr. ASPINALL. I understand your difficulty and I understand the Governor's necessity of staying in California at this particular time. I am a little bit meticulous in getting some of these answers but I tried to find out what the flow of the river was, what the availability of water was, to both basins because I think this is absolutely necessary for this committee. So if you can't answer it I will understand, but I am a little bit disappointed.

Mr. LYNCH. I believe, however, Mr. Chairman, that Mr. Corker can give you an answer.

Mr. ASPINALL. That will be fine.

Mr. CORKER. Mr. Aspinall, this directs attention toward the provisions of the bill which contemplate——

Mr. HOSMER. Will you speak up?

Mr. CORKER. The statement in General Lynch's statement directs attention toward the provisions of the pending legislation which contemplate importation works to augment the supply of the Colorado River by a quantity of not less than 2.5 million acre-feet. If those importation works were now in existence, obviously Lake Mead would be in far more satisfactory condition with respect to content than it is at the moment. If importation works had been in existence last year, there would not have been the unfortunate situation where it was necessary to empty Lake Powell in order to restore the water in Lake Mead.

The necessity of meeting the demands on the river, including filling the two great reservoirs, requires importation of water and this is the proposal that is made to alleviate the problems of the entire Colorado River Basin.

Mr. ASPINALL. I have one more question before I give up my time. That has to do with the study of the—the results of the study sent to me under the date of August 13, 1965, entitled "Colorado River Water Supply," which bears the signatures of Gookin, Head, Steiner, Cole & Maughan.

Do I understand that it is your desire that they be permitted to testify as to this study that they made?

Mr. CORKER. It is our understanding, sir, that they would testify for the entire lower basin.

Mr. ASPINALL. And that the Governor of California stands upon the contents of this statement.

Mr. CORKER. I believe he has so advised that that statement would stand as the statement for all.

Mr. ASPINALL. Thank you very much.

Mr. ROGERS. The Chair has noticed that not only the members of the committee are having difficulty in hearing but also the official reporter. So if the members of the committee will speak up, it would be helpful.

Mr. SAYLOR. Mr. Lynch, it is a pleasure to have you before the committee. I listened with interest to your statement and to your answers to questions by the chairman.

I would like to call attention to your statement on pages 8 and 9 with regard to a meeting called in December by the Southern California Water Conference in which you state:

> Californians protested they did not insist upon 4.4 million acre-feet from the Colorado and also water from some alternative source.

From your statement to the chairman it is very evident at the present time California is putting to beneficial consumptive use approximately a million acre-feet more than 4.4. Is this correct?

Mr. LYNCH. I think the figure would come to about 700,000.

Mr. SAYLOR. Now, if this legislation is passed in the manner in which it is drafted, what will happen to the people in California who are presently using from the river the 700,000 acre-feet?

Mr. LYNCH. Well, we will have to import water from other sources, some of it, I believe, from northern California. I might say, Mr. Saylor, that there is presently a contract between the Metropolitan

Water District of Southern California and the State of California to deliver a substantial quantity of water to southern California, I believe by 1972.

Mr. ASPINALL. Would my colleague yield?

Mr. SAYLOR. Yes.

Mr. ASPINALL. It is true, is it not, General, that there is a loss of approximately 400,000 acre-feet of water because of seepage and other losses in the areas, evaporation, because of unlined canals, and so forth, and that there is a loss of several hundred thousand acre-feet, we don't know how much, because of illegal users? Isn't this true?

Mr. LYNCH. That is a technical question. I would be glad to have Mr. Stetson answer it.

Mr. ASPINALL. I just want Mr. Saylor's question answered in full as far as possible.

Mr. STETSON. It is true there are seepage losses in the All-American Canal, an unlined canal. As far as your figure of several hundred thousand acre-feet of unlawful uses, this would not be correct, at least on the California side of the river.

Mr. ASPINALL. Do you know how much there is lost because of illegal users on the California side?

Mr. STETSON. No, sir; I do not know how much, but I would hazard a guess that it is less than 50,000 acre-feet, and the Federal Government is now moving against some of those illegal users, at the State's request.

Mr. SAYLOR. Now, Mr. Lynch, you say by 1972 there is an agreement between the Metropolitan Water District and California that there wil be delivered from northern California a certain quantity of water, is that correct?

Mr. LYNCH. That is basically correct; yes. I am not familiar with all of the details of the contract. I believe Mr. Ely is.

Mr. SAYLOR. Mr. Ely?

Mr. ELY. I can give you a general answer. The Metropolitan Water District has contracted with the State for substantial quantities of water to come through the State aqueduct from the north. These quantities, however, are required in addition to the waters from the Colorado River that the Metropolitaan Water District brings in and are not in substitution for them. If the Metropolitan Water District were able to continue to use its full contract quantity of 1,212,000 acre-feet from the Colorado, it would still need water from the north. If it ultimately loses 600,000 or 700,000 acre-feet of its supply from the Colorado, which will happen when California is cut back to 4.4 million in the Colorado, of necessity metropolitan needs just exactly that much from other sources. Our hope is that ultimately the importations into the Colorado River would be large enough so that the Metropolitan aqueduct could continue to run to capacity. But if the importations are only 2.5 million, the Metropolitan would only have a half-full aqueduct. Metropolitan owns only 550,000 acre-feet within the 4.4 million, whereas its aqueduct was built to carry 1,212,000. Its loss of 600,000 or 700,000 would have to be replaced by importation of more than 2.5 million into the Colorado, or imported directly from northern California as Mr. Lynch has indicated.

Mr. SAYLOR. Now, General, will the Federal Government have to pay for any of the works involved in transporting water from northern California to southern California?

Mr. LYNCH. They will not, sir. California has a bond issue of about $2 billion which was voted about 4 or 5 years ago which is to pay the cost of this project. This is known as the California water plan. It is a comprehensive plan embracing all of California, basically bringing water from the north into the central and southern regions.

Mr. SAYLOR. You have heard Mr. Ely say that if this water comes in, all it will do is to take the place of water that the Metropolitan Water District is presently taking out of the Colorado River. Do you concur in that?

Mr. LYNCH. Not necessarily, no, sir. I don't know whether it will or will not.

Mr. ELY. Perhaps I left a misapprehension, Mr. Saylor. The amount required by the Metropolitan Water District for its future requirements is so great that even with a full Colorado River aqueduct it will need much more than that.

Mr. SAYLOR. In other words, Mr. Ely, from your statement it is very evident that whether the Metropolitan Water District continues to get its present full supply from the Colorado and the water from northern California, they will need all of that water, to maintain their present growth and prospective needs for Metropolitan Los Angeles, is that correct?

Mr. ELY. That is correct, sir.

Mr. HOSMER. Would the gentlemen yield?

Mr. SAYLOR. So that what we are actually faced with is a situation that California might, within the foreseeable future, find itself unable to supply all of its needs in Metropolitan Los Angeles if there is not more than 4.4 million acre-feet out of the Colorado River. Is this correct?

Mr. LYNCH. I would answer that by saying that unquestionably the possibility is there. However, we are in addition to importing water from northern California exploring other sources of water and reuses of water. For example, we are engaged with the Federal Government in the study of desalinization. We have access to the water. We are also studying the reuse of water and we are actually in some places, perhaps only on a pilot basis, reusing water.

Mr. SAYLOR. Now, following the question, on the bottom part of page 8 you state a question:

> Is it possible to estimate the shortage in the Colorado River supply and provide for priority of existing projects until an import of water to make up that shortage has actually been achieved?

Was this the basic question that came out of the conference in December held by the Southern California Water Conference?

Mr. LYNCH. It is perhaps my statement of the general sense of the meeting. I was present at the meeting and the figure of 2.5 million acre-feet was brought up and I was one of those who made the suggestion, could not the 4.4 of California be guaranteed until such time as this figure which had been suggested of 2.5 million acre-feet be imported into the river. This I might point out, Mr. Saylor, was opposed to another suggestion that California's 4.4 be limited to 25 years, which was the basis of some other type of agreement. This was a countersuggestion. It was not a document or specified in exact

language but in my opinion, and I was present, this was really the sense of the proposal.

Mr. SAYLOR. As I gather, this was a question that was put to Secretary Udall and in the meantime the chief engineer of the Colorado River Board estimated the probable shortage at 2.5 million acre-feet.

Mr. LYNCH. I must assume that is true, sir. All I can say to you is the figure 2.5 was given to me and I must accept it. I have no knowledge, of course, of engineering or hydrology.

Mr. SAYLOR. General, I am not trying to question the figures that you put here. I just want to get them in the proper context so that I can understand what was in your mind when you prepared the statement that you have before us.

Mr. LYNCH. What was in my mind, sir, was the suggestion and the information which was presented to me by the people who know much more about it than I do.

Mr. SAYLOR. Now I have added up here roughly the figures that you have in your next statement, in your next paragraph. A million and a half acre-feet to Mexico, a million charged to channel reservoir losses between Lee Ferry and the Mexican boundary, 4.4 million to California, 0.3 million acre-feet to the State of Nevada, or 300,000 acre-feet. This adds up to 7.2 million acre-feet that are the present losses or charges, which leaves basically 300,000 acre-feet for all of the present uses which you intend in this bill to guarantee to Arizona.

My question, sir, is how can you, representing the Governor of the State of California, come here and ask this committee to approve a bill calling for the use of at least 2.8 million acre-feet of water for Arizona and central Arizona project when your figures in your own statement indicate that even with importation of 2.5 allowing for no evaporation or water losses whatsoever, in the canals or tunnels, in the two reservoirs which are included in this bill, ask Congress to approve anything of this tremendous size.

Mr. ELY. Mr. Saylor, the answer to your question is that these are—the figures you have added are like adding oranges and apples.

Mr. SAYLOR. Oh, no, no, they are not, Mr. Ely, they are not like adding oranges and apples because I am adding gallons and gallons.

Mr. ELY. No, I am sorry. You are adding debits and credits. The statement made by the attorney general is in substance this, that when the upper basin deliveries at Lee Ferry are reduced to 75 million acre-feet per 10 years, if they are, then it would be necessary to add 2½ million acre-feet to that income in order for the lower basin to have 7½ million acre-feet of consumptive use for these reasons: 1.5 million acre-feet which is visible at Lee Ferry, must flow right on through to Mexico. That is a debit. And 1 million acre-feet of the water visible at Lee Ferry is going to be evaporated by the sun before it reaches Mexico. That is another debit.

Seven and one-half million acre-feet of consumptive use would consequently necessitate the importation of 2½ million acre-feet to offset those losses, if and when the upper basin deliveries at Lee Ferry are reduced to 75 million acre-feet per decade.

The alternative to this is that the lower division States might invoke article III(c) of the compact to require the upper division to increase its deliveries at Lee Ferry to meet half of the Mexican treaty burden. To the extent they did, then this shortage of 2½ million

would be alleviated. But the very interpretation of article III(c) of the compact is in collision between the two basins. Hopefully, the importation of 2½ million acre-feet, including a million and a half to bear the whole Mexican burden, would permanently eliminate that collision.

If the water is not imported to carry the Mexican burden, then this unhappy conflict over interpretation of the compact must be resolved, as Attorney General Lynch has said.

But if 2½ million is imported, there is a net available for consumptive use, 7½ million, of which 2,800,000 would be available to Arizona, 4,400,000 to California, and 300,000 to Nevada under the terms of the decree.

Mr. SAYLOR. Well, following page 1 is an insert in General Lynch's statement which says that he was delighted to learn on Friday that representatives of the seven Colorado River Basin States had agreed on basic principles for regional legislation. He goes on to state that this was good news for the entire Nation.

I would like to know whether or not they agreed that the upper basin should bear in some proportion the charges of a million and a half acre-feet to Mexico.

Mr. ELY. I was there, Mr. Saylor, and the four points upon which the States agreed included a point to the effect that the Mexican treaty burden is a national obligation, that we feel that it is properly the first priority against imported water, and that the cost fairly allocable to the importation of the water to bear that burden should be nonreimbursable.

I think it might be helpful, Mr. Chairman, if I placed in the record the entire text of the consensus arrived at there as reported to the committee by Congressman Udall. May that be done, Mr. Chairman?

Mr. ROGERS. Was this put in the record yesterday, Mr. Ely?

Mr. ELY. Congressman Udall referred to it. Whether it went into the record I don't recall at the moment.

Mr. UDALL. I read in full the four parts of the consensus. I did not read the full text, including the preamble.

Mr. ELY. I think it would be helpful if it goes in here.

Mr. SAYLOR. Mr. Chairman, I ask unanimous consent that at this point in Mr. Ely's statement, two pages, containing the four points, be inserted at this point in the record.

Mr. ROGERS. Without objection it is so ordered.

(The material referred to follows:)

There is a general recognition in the West that Arizona's water situation is only a part of a larger problem which confronts all of the States of the Colorado Basin. During the past week informed and experienced representatives of the seven Colorado River Basin States—Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming—met for several lengthy and fruitful sessions exploring the basin's water situation as it is affected by the legislation before the committee. We are gratified by the broad consensus of views on many fundamental factors.

This consensus, without affecting the accord heretofore arrived at among the lower basin States, as set forth in H.R. 4671, 89th Congress, expresses certain principles with respect to the rights, obligations, and requirements of each basin as against the other. These principles are:

1. The upper basin's right to the use of water of the Colorado River, pursuant to the Colorado River compact, shall not be jeopardized by the temporary use of unused upper basin water by any lower basin projects.

2. The importation of substantial quantities of water into the Colorado River Basin is essential to the adequate development of both the upper and lower

Colorado Basins. It is recognized that this importation must be accomplished under terms which are fair to the areas of origin of the water so imported. The pending legislation should authorize the Secretary to construct importation works which will deliver not less than 2,500,000 acre-feet annually, upon the President's approval of the Secretary's finding of feasibility.

3. Such importation works should be planned and built so as to make the imported water available, if possible, not later than 1980. Water supply prospects on the Colorado River, based in part upon the temporary use of water allocated to the upper basin, appear adequate to furnish a full supply to the central Arizona project accompanied by the safeguards for existing projects agreed to by Arizona and California, until some time during the last decade of the present century. Thereafter, the central Arizona project supply would diminish unless supplemented by importation.

4. Satisfaction of the Mexican treaty burden should be the first priority to be served by the imported water. The costs of importation allocable to the satisfaction of that burden, which is a national obligation, should be nonreimbursable.

Mr. ROGERS. It appears that there will be two rollcalls and I think perhaps we had better stand in recess until about 10 minutes to 4.

(Whereupon, a recess was taken.)

Mr. ROGERS. The Irrigation and Reclamation Subcommittee will come to order. It will resume its hearings.

The Chair recognizes the gentleman from Pennsylvania.

Mr. SAYLOR. General, in your comments before the short recess, you said that the State of California has made arrangements to have a project which would get water from northern California down to southern California. I think you gave us in round figures some quantities of water that you expected to be transported. Is that all the water you expect to bring from northern California?

Mr. LYNCH. If I may, sir, I have brought up another engineer who is the Chief Assistant Engineer of the California Division of Water Resources, Mr. Wesley Steiner. He is here and I am sure he can provide you with a much more competent answer than I can.

Mr. SAYLOR. Mr. Steiner?

Mr. STEINER. We do not foresee the initial deliveries in the State water project to southern California of 2 million acre-feet as forever satisfying the needs of southern California. By no means. It will take subsequent stages, of either the State water project or the regional plan of development, to meet those growing needs.

Mr. SAYLOR. Well, now, all I asked General Lynch was whether or not your water plan for the State of California, which he said you people had bonded themselves in an effort to pay for it—whether or not they contemplated bringing down more water than he testified to.

In other words, how much water does your water plan contemplate, Mr. Steiner, of bringing from northern California to southern California?

Mr. STEINER. The water project for which the people of the State of California are presently bonded envisions bringing 2 million acre-feet to southern California. The California water plan, a broad long-range plan for the development of the water resources of California, anticipates further development, further construction beyond that which we presently have under construction and for which we have bonding authority. As for the amount of additional importation, I am sorry, sir, I would have to look that up. It is several million acre-feet more. I don't have the exact figure. I will be happy to submit it.

Mr. SAYLOR. I will ask unanimous consent that Mr. Steiner be per-

mitted to get those figures from his office and place them in the record.

Mr. ROGERS. Is there objection?

Mr. HOSMER. Reserving the right to object, this is not the only additional source of water to which southern California looks. For instance, the MWD is in the process of studying the feasibility of desalination. There are other ideas floating around. So I would not want this to be construed in any way to be the figure which the gentleman is going to argue a premise that it would be detrimental to this bill.

Now I withdraw my reservation.

Mr. ROGERS. Is there objection? The Chair hears none. If you will furnish those figures, Mr. Steiner, they will be included in the record.

(The information referred to follows:)

DEPARTMENT OF WATER RESOURCES,
Sacramento, September 10, 1965.

Hon. WALTER ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation, Committee on Interior and Insular Affairs, House of Representatives, Washington, D.C.

DEAR MR. ROGERS: This is in response to Congressman Saylor's request on August 24, 1965, during hearings on H.R. 4671 and companion bills, that I submit for the record the magnitude of the importation to southern California contemplated in the California water plan but not encompassed in the State water project, now under construction.

For purposes of this response, I will use the areal definition of southern California utilized by the Secretary of the Interior in his report on the Pacific Southwest water plan; i.e., that portion of California bounded on the west by the Pacific Ocean; on the south by the international boundary with Mexico; on the east by the State boundaries with Arizona and Nevada; and on the north by the Ventura-Santa Barbara County line, the Tehachapi Mountains, and the Sierra Nevada Mountains northward to, and including, Mono County.

The California water plan, a flexible system of physical works designed to meet estimated requirements in all areas of California under conditions of ultimate or full development, contemplates the importation of 9,100,000 acre-feet annually to southern California to supplement local water resources and importations in existence at the time that the plan was formulated (1957). The plan, however, was predicated upon the assumption that California would receive in perpetuity 5,362,000 acre-feet annually from the Colorado River. The Supreme Court's decision in *Arizona* v. *California* and the continuation of the drought on the Colorado now make it imprudent for California to assume a permanent supply of waters originating in the Colorado River Basin in excess of 4,400,000 acre-feet. Were the California water plan revised to reflect this reduction of 962,000 acre-feet in the estimated supply available from the Colorado, the supplemental supply required under ultimate conditions of development in southern California would increase to slightly over 10 million acre-feet annually.

The State water project, presently under construction, constitutes the first stage of State development under the California water plan. The State water project will bring to southern California 2,477,900 acre-feet annually of waters surplus to northern California's needs. The Metropolitan Water District of Southern California has contracted for 2 million acre-feet of this amount. Thirteen other public agencies have contracted for the balance.

The supplemental supply made available to southern California by the State water project leaves a balance of approximately 7.5 million acre-feet to be provided by subsequent stages of the California water plan, sea water conversion, waste water reclamation, and/or a regional program of water development for the Pacific Southwest.

Sincerely yours,

WESLEY E. STEINER,
Assistant Chief Engineer, Staff and Services Management.

Mr. SAYLOR. Mr. Steiner, does the water that the State of California contemplates, in its overall plan, to transport from northern

California into the central and southern part of the State of California all originate in California?

Mr. STEINER. All of the water that is contemplated in the California State water plan does originate within the State of California with the possible exception of some small amounts in the Klamath River that originate in the State of Oregon.

Mr. SAYLOR. And part of the watershed for the Klamath River is in California?

Mr. STEINER. That is correct.

Mr. SAYLOR. Now, as I look at the map of the United States and particularly the 17 Western States, I found one of the principal rivers in the West is the Rio Grande. Is there any contemplation, either by the people of California or of the States in the Colorado River compact to transport water to make up this 2½ million acre-feet from the Rio Grande?

Mr. LYNCH. I am advised, sir, by my colleagues that the answer is "No."

Mr. SAYLOR. Well, it might be a good idea. After all, there was a deal that Texas pulled across some years ago with regard to the charges on the Rio Grande. It would not be a bad idea to take another look at it.

Mr. ASPINALL. Would the gentleman yield? The gentleman is almost too right in his last assumption. But the truth of the matter is that we just authorized a project that would transfer water from the Colorado River over to the Rio Grande.

Mr. SAYLOR. I realize that. I am just looking at the rivers, where they—where we are going to get this two and a half million acre-feet.

Now I find no principal rivers through the northern part of Texas, through Oklahoma.

Mr. ROGERS. Would the gentleman yield? You are going in the other direction.

Mr. SAYLOR. Kansas, and I find the Arkansas River has its headwaters in the district of Colorado—First District of Colorado.

Is there any contemplation of transferring water from the Arkansas?

Mr. LYNCH. No, sir.

Mr. SAYLOR. Then I go up along the line and come to a good river, the Republican River. Are you contemplating taking any of that out?

Mr. LYNCH. If I can give a nonpartisan answer, sir; no.

Mr. SAYLOR. The next is the Platte River which has its beginnings in Wyoming and also in northern Colorado. Is there any contemplation of taking water out of that river?

Mr. LYNCH. I know of no plan, sir.

Mr. SAYLOR. Going north you come to the Niobrara River. Is there any desire to transport water from that river into the Colorado River Basin?

Mr. LYNCH. Not that I know of, sir.

Mr. SAYLOR. And as I go north I find the Missouri River. Do you know of any plans to transfer water into the Colorado River Basin from there?

Mr. LYNCH. I don't know of any presently, but I think you are getting near possibilities. [Laughter.]

Mr. SAYLOR. The next river—I should say the next rivers have most of their sources in Canada, so since we are going to investigate the Parsons plan and since Canada already has a treaty with the United States regarding the water in the Great Lakes, I certainly hope that you are not contemplating importation from there.

The only rivers that I find now are the ones that happen to flow through eastern Montana, Idaho, Oregon, and Washington known as the Columbia River—the Columbia Basin. Would there be some contemplation of transporting water from there?

Mr. LYNCH. I would say definitely, sir.

Mr. SAYLOR. I just wanted to know where the people of California and the people of the lower basin were contemplating getting this two and a half million acre-feet.

Do you know of any present plans that the Department of the Interior has for the transportation of water, either through the canal system proposed to be built in California or through any other system that would transport water from the Columbia Basin to Colorado?

Mr. LYNCH. I personally do not know of a plan, but perhaps one of my colleagues might.

Mr. SAYLOR. Mr. Steiner?

Mr. STEINER. No, sir.

Mr. SAYLOR. Have you heard of anybody in the Bureau of Reclamation selling the program to transport water from the Columbia Basin down to the Colorado?

Mr. STEINER. I believe, Congressman, that some of the Bureau people have been contemplating it, but I have never seen a study made by the Bureau of Reclamation involving diversion of Columbia River water to the Colorado.

Mr. SAYLOR. We've got another river here that has come in for quite a bit of comment lately. It happens to be a river in the 49th State of the Union. It is known as the Kuskokwim, and a little east of the Kuskokwim in the Yukon. Do you know of any plans to transport water from the State of Alaska to Colorado?

Mr. LYNCH. I do not know of plans but I have heard the subject discussed. I believe it is the Parson plan.

Mr. SAYLOR. I had not heard the Parson plan got that far west. It was my understanding that they were up in the Hudson Bay region.

Mr. LYNCH. It was my understanding that they were in the Yukon Basin.

Mr. SAYLOR. Also in the Hudson Bay Basin.

Do you know, sir, of any negotiations at the present time between the United States and Canada or any of the States of the United States and any of the Provinces of Canada with regard to importation of water from Canada to the United States?

Mr. LYNCH. I do not, sir; no.

Mr. SAYLOR. I have just been advised that about 1951 the united western study completed by the Bureau of Reclamation proposed a diversion of water in the Columbia Basin into California—better get that one out and dust it out a little bit. I am sure the Secretary will have it up here when we speak to him tomorrow. The rainfall on the island of Hawaii is quite heavy.

Mr. HOSMER. Would the gentleman yield? There is a possible source that he has not projected yet—I have a UPI dispatch No. 174 of August 19 before me which says the Senate Public Works Appropriations Committee approved today more than $40 million in a water project for Pennsylvania during the current year.

Now, do you know of any plan for transferring water from these projects to the Colorado Basin?

Mr. LYNCH. No, sir, I do not.

Mr. SAYLOR. No, sir, but such a picayune sum should not even be mentioned.

Mr. HOSMER. I think you could have done better for Pennsylvania than that.

Mr. SAYLOR. If they had asked me I would have done much better.

That is all, Mr. Chairman. Thank you and members of your staff that have testified.

Mr. ROGERS. Mr. Johnson?

Mr. JOHNSON. Thank you, Mr. Chairman. I want to thank the attorney general and his associates.

I want to say you have a very fine statement here and you represent our State ably in your chair there today. My observation of the Governor and his position is that he supports the Lower Colorado Basin project with Bridge Canyon in it; is that right?

Mr. LYNCH. Well, he supports the bill and Bridge Canyon is in the bill.

Mr. JOHNSON. As I understand it, there was more or less a meeting of the minds of all of those people who were meeting here, as discussed here earlier this afternoon. Bridge Canyon is in legislation and it is now before the committee in the bill.

I just wanted you to know that it was California's position to support the bill as it was with Bridge Canyon in it.

Mr. LYNCH. Yes, it is, Mr. Congressman.

Mr. JOHNSON. I presume you are in support of the Marble Dam that is to be constructed?

Mr. LYNCH. Yes. Our position very frankly is that we are for the bill as it stands. I understand there is some talk that the Bridge Canyon study or construction might be deferred, but as the bill now stands, both Bridge and Marble are in it.

Mr. JOHNSON. Also, it is an observation of mine that the 4.4 million has been agreed to as being California's share?

Mr. LYNCH. This is what the Supreme Court decreed——

Mr. JOHNSON. That is in the bill now?

Mr. LYNCH. Yes. That was the Supreme Court's decree specified as California's share.

Mr. JOHNSON. Also, any other waters developing in California such as the saline water program or importation into our State, this would not affect the 4.4 million acre-feet from the Colorado?

Mr. LYNCH. That is correct; only if water augments the Colorado River main stream.

Mr. JOHNSON. Also, if the 2½ million acre-feet were found and imported into the Colorado River Basin, that would take away all fears of any further depletion of the 4.4 and this would eliminate it?

Mr. LYNCH. This should guarantee 4.4 for California.

Mr. JOHNSON. Then if any further water were imported in the basin, California would be entitled to consideration?

Mr. LYNCH. Yes, sir; that's correct.

Mr. JOHNSON. That is all, Mr. Chairman.

Mr. ROGERS. Mr. Hosmer?

Mr. HOSMER. I will reserve my time, Mr. Chairman.

Mr. ROGERS. Mr. Udall?

Mr. UDALL. Mr. Lynch, I want to congratulate you and your associates for a very effective presentation.

I see lots of witnesses come before this committee and I think you have done a good job for your State and for the States of the lower basin in the presentation that you have made and in your response to the various questions.

I was interested in your closing comment on page 13 that it was a remarkable privilege and a fine day when you could come here and support the authorization of our project and feel that you might go home without being hanged from the nearest lamp post.

It was the gentleman from California, Mr. Hosmer—I was kidding him the day we introduced these bills, a man like himself who made a great career in fighting Arizona water projects and if he and I were putting bills in the hopper together along this line—I said that the President wanted us to march forward to the Great Society and he said, when this day has come this is the Great Society, we are already there.

Mr. ASPINALL. If the gentleman will yield—at the expense of whom? [Laughter.]

Mr. SAYLOR. Could I answer that? Will you yield?

Mr. UDALL. Yes.

Mr. SAYLOR. Your statement bears out what I said this morning, 30-odd Congressmen from California.

Mr. UDALL. We want to construct this project at the expense of no one. I said in the statement yesterday on behalf of myself and the delegation, that we recognize the rights of California, we recognize the rights of the upper basin, we ask for nothing that is theirs. We ask only for what is ours.

In the same connection, Mr. Lynch and the people with you, I wanted to just touch on a couple of points here.

We have had considerable discussion about the language in the bill covering the use of 4.4 which is given to California, and as you very accurately described it, this was part of the compromise that was reached between our States starting last year. This has been termed by some as a guarantee and I would direct my question, I guess, to Mr. Ely—this is perhaps inaccurate terminology.

Arizona does not purport to guarantee that California will always receive 4.4. What we say in the legislation is that California up to 4.4 has a priority in time of shortage as against new Arizona uses?

Mr. ELY. Both statements in substance are correct. They both are subject, perhaps, to this qualification that the language of the bill treats California's existing uses, up to 4,400,000 acre-feet, and the existing uses in Arizona and Nevada without any such limitations, as together being entitled to a priority, to use your term. The diversion for the central Arizona project would have to be reduced to the extent necessary to supply all of them. This means that all existing uses in

Arizona and Nevada, of the general order of 1,200,000—like 4.4 million of California's existing uses—are protected in the way you have described.

Mr. UDALL. The reason I wanted to develop this is simply one of terminology and if you assume a disaster situation in which the upper basin is out and we are out in a long-range drought and there is only 4 million acre-feet coming down the river, Arizona does not purport to guarantee in this legislation that California will get 4.4. We simply give you a priority on the existing water within the lower basin allocation.

Mr. ELY. As Mr. Lynch says, that is quite true also with respect to priorities of Arizona and Nevada existing uses.

Mr. UDALL. You made my second point very adequately. The gentleman from Pennsylvania talked of the things that Arizona gave up in this settlement and, as you have just pointed out, I think we have to distinguish not between Arizona giving up to California certain priorities or guarantees, the priorities were given to existing uses on both sides of the river, including a million acre-feet around Yuma as against new projects on the theory that was expressed here earlier and very eloquently in Mr. Lynch's statement, the feeling that where you have existing old projects with established uses that they should have some measure of priority as against brandnew projects.

Mr. LYNCH. That is right.

Mr. ELY. We limit priority protection to 4.4 million in California's case. The net effect of the formula is simply this: as the supply shrinks toward 7.5 million, the first 700,000 acre-feet of the shortage is absorbed by California. We reduce from 5.1 to 4.4. The next loss is taken by the Central Arizona project, which suffers the next curtailment, so that California could get 4.4 million and Arizona's existing uses 1,200,000 along with Nevada's existing uses.

Mr. UDALL. I wanted to pay tribute to my California colleagues in the Congress and to the people at the table because at long last in the lower basin we have begun not to look at pieces of paper and water rights on paper, we have begun to look at the overall water problems in an attempt to get some wet water to do the job we all know has to be done. I think that the attitude that has been shown is a most constructive one and it is one that wears well on my friends from the other side of the Colorado River.

In your statement on page 12, Mr. Lynch, you said that you wanted to pay tribute to three people who made possible the resolution of some of these differences in the basin and I want to simply say in the presence of the distinguished chairman of this committee that, while I fully agree with what you said there, that I think before the final chapter in this great problem is written, that we will add not only for what he is going to do, but for what he has done in the past, the name of the gentleman from Colorado, Mr. Aspinall. It was his letter of November 1962, before the Supreme Court ruling, which said in effect to the Interior Department, "regional planning is the way to do this job, you have to work as a region, you have to look ahead," and suggested to the Interior Secretary that he'd better get busy on some plans and ideas for meeting the water needs of the region and it was this that prompted the work that went into the regional plan.

It is the gentleman from Colorado who was a builder and a constructive man who is one of the real fathers of this regional concept in putting together the upper basin project for Colorado and the upper basin States.

Mr. LYNCH. We are most happy to join you in that, Mr. Congressman.

Mr. UDALL. One final point. The gentleman from Pennsylvania suggested a couple of times today that the agreement embodied in this bill between Arizona and California is one in which California gets everything and Arizona gets nothing, and that he is not surprised at all that California entered into it.

Is it your feeling that California gave up nothing and that you lose nothing in this agreement?

Mr. ELY. Mr. Udall, as I tried to express, California, by this agreement, takes the first shock, we take the first impact, the known and certain loss of 700,000 acre-feet. That is a very grevious burden to a project already existing in steel and concrete, built at a cost of $500 million. We face this loss even if there is as much as 7.5 million acre-feet to divide, even though, in such case, Arizona takes no reduction in her existing uses—indeed, may expand them to 2.8 million acre-feet from their present level of 1.2 million.

We recognize that this is a necessary consequence of the bargain we made in 1929 in the Limitation Act. If we were selfish, we would simply stand our ground, and oppose this project, for if no central Arizona project were built, this loss probably would not happen to us. But we recognize the necessity of pulling together in a regional plan to import water to serve both basins. We, therefore, undertake this grave burden knowingly. In compensation, Arizona has agreed to accept the contingent risk of the next loss.

I would agree with you that certainly, California has not gained everything, and Arizona lost everything, by this compromise. Quite the contrary—while it is possible that Arizona will have less than a full aqueduct in the future, we know California will have less than a full aqueduct as soon as yours goes into service.

Mr. UDALL. There were major concessions made on both sides in order to reach this agreement and start down this cooperative road to really meet the water needs of this area.

Mr. ELY. Indeed there were.

Mr. UDALL. I assume there were residents of California when this was first being discussed who were less than enthusiastic about it.

Mr. LYNCH. There were very, very many.

Mr. UDALL. I want to join finally in all the good things that Mr. Aspinall said about Mr. Ely and it has been my real privilege to work with him and there are few people in this country or the world, as the chairman said, who have the knowledge of water law and his vision and who have his ability to work with people, and I am mighty happy that he is on our side and we are working with him and not against him.

Mr. ELY. That is praise from a very high source, indeed, and I am very grateful.

Mr. UDALL. I yield to my friend from Pennsylvania.

Mr. SAYLOR. First, I would like to join in the accolades to Mr. Ely. I consider him one of the finest lawyers it has been my privilege to

know. I appreciate his keen analysis of legal problems that he has presented to not only this committee, but to all others who have had an opportunity to sit down and discuss them, but I am a little concerned with the statement that Mr. Ely gave in response to you and I would like to clear it up.

You said California gave up a certain number of acre-feet. Now, is it not a fact that in all of the contracts which the State of California and its political subdivisions have with the Secretary of the Interior authorizing the withdrawal of water from the Colorado River, and all of those that are in excess of 4,400,000 acre-feet said they were revokable and gave you no permanent rights?

Mr. ELY. In substance you are correct, Mr. Saylor. I would phrase it in the statutory terms of the Boulder Canyon Project Act. We were limited not to 4.4 million but to 4.4 plus one-half of the excess or surplus unapportioned by the Colorado River compact. To the extent that our contracts exceed 4.4 million, they are, by definition, dependent upon the physical availability of excess or surplus waters unapportioned by the compact.

There is such excess or surplus now, that should not waste to the gulf. Our contracts give us the right to use that excess or surplus up to a total of 962,000 acre-feet. We are in fact using, as Mr. Lynch said, a total of 5,100,000. This is not a use in excess of our limitation or in excess of our contract rights. Our present use of 700,000 acre-feet is in the secondary category of "excess or surplus," physically available for a limited time.

Mr. SAYLOR. I am perfectly happy to have California use it rather than have it wasted. But I did not want this record to look as though California and its political subdivisions did not know when they built those projects that they would use more than 4.4 million acre-feet of water from the Colorado. There might come a day when there is not the availability of that water and that those projects were built knowingly, that 4.4 was the maximum under the compact.

Mr. ELY. The 962,000 is excess or surplus, which is available for a protracted period, but will gradually fade. In this respect it is exactly like the hazard that may ultimately face the central Arizona project. Part of her supply may fade. About half of the supply for the Metropolitan Water District is in this category of excess or surplus because they get only 550,000 out of the 4.4 million, against a total contract quantity of 1,212,000.

But let me offer this as an example of the justification of constructing the central Arizona project. Notwithstanding this hazard, we are deeply grateful to those who made the decision in California to go ahead with the Metropolitan aqueduct to carry 1,212,000 acre-feet, even though more than half of that capacity is subject to the hazards of eventual loss as "excess or surplus." The availability of this water has developed our economy to the point where we can, as Mr. Steiner said, bond ourselves to finance importation of water to replace the lost "excess or surplus" Colorado water. We think, by the same token, the availability of a full central Arizona aqueduct, even for a limited period of time, gradually tapering off thereafter, is a justifiable investment for the U.S. Treasury.

Mr. SAYLOR. Now, let us assume, Mr. Ely, that we are in the year 1934. I am now reading from the central Arizona project hearings

held November 9, 1964, in Phoenix, Ariz., and the last page, page 142 has in it a chart showing the streamflow in million acre-feet per year. And I, of course, am picking the most adverse year that there is in the record and that is the year 1934.

Now, at that point, according to this chart submitted by the Bureau, there was less than 4 million acre-feet in the streamflow at the Lee Ferry.

Assuming there is no evaporation or loss anywhere else, and the central Arizona project had been built, this bill had been passed, who would have gotten the 4 million acre-feet of water that flowed past Lee Ferry?

Mr. ELY. Mr. Saylor, is the question directed to me?

Mr. SAYLOR. Yes.

Mr. ELY. I can give you an answer in lawyer's terms.

I am going to ask Mr. Steiner or Mr. Stetson to give you the more complete answer in terms of hydrology.

The Colorado River compact requires the upper division States to curtail their depletions to the point which will yield a minimum of 75 million acre-feet in any period of 10 consecutive years. Assuming that provision of the compact to be enforced, there never would be a flow available out of Lake Mead as low as 4 million acre-feet. This is because 75 million acre-feet delivered at Lee Ferry, equated by Hoover Dam, provides a much greater average outflow than 4 million. The fact is that there never has been any period of 10 consecutive years when the flow at Lee Ferry has been as low as 75 million so far. It has been of the order of 100 million down to 85 million. This is a lawyer's viewpoint.

Now, for the hydrology I would like to have Mr. Stetson or Mr. Steiner answer you specifically as to what would have happened had you had a 4 million acre-feet year.

Mr. STETSON. Assuming there was storage capacity in Lake Mead, this 4 million acre-feet would have flowed into Lake Mead and joined the other water in storage there, and then the Secretary would have released whatever quantity of water was necessary to meet the downstream requirement.

Mr. UDALL. The gentleman has to plug into his assumption that when the dam was built, the whole purpose of the project of this legislation and of Hoover Dam is to get some storage reservoir so we can even out dry years like 1934 and if you plug into your question the assumption that the dam had been built, 10 or 12 years earlier the answer to the question is that there would be about 30 million acre-feet in storage and they could deliver everyone's entitlement in 1934 and a lot left over. This is what they were trying to do.

Mr. SAYLOR. In 1934 they were not built. If this bill was passed, California would have gotten 4.4 million acre-feet or whatever there was in the river and everybody else would have gotten zero.

Mr. UDALL. No, sir, this is not true.

Mr. ELY. This is not quite the case, Mr. Saylor. Section 304 of the bill deals with the administration of article II(B)(3) of the Supreme Court decree. The decree directs the Secretary to so manage the releases from Lake Mead to supply, if possible, 7½ million acre-feet of consumptive use. If he can't, then article II(B)(3), the shortage

article applies, which in turn brings us to Congress to write the shortage formula which that article of the decree invites.

The Secretary is administering a fund of water in Lake Mead, which can be of the magnitude of 30 million acre-feet. If only 4 million came in for several years, which has never happened, he could still release 7½ million acre-feet per year for a protracted period of time.

That's what Hoover Dam is for, to conserve the flood flows, make them available in dry years.

Mr. SAYLOR. The reason I asked that question was that my assumption was based on the fact that there was only 4 million acre-feet that went down the river.

Mr. ELY. I think we are at cross purposes. When you say go down the river, you mean into Lake Mead—you mean into Lake Mead from Lee Ferry.

Mr. SAYLOR. I mean right now where you have your intakes to take your water across to either the metropolitan water district or——

Mr. ELY. Hoover Dam was in existence in 1934—it was in the process of construction and you cannot assume that we are taking that dam off the river. It is there.

Mr. UDALL. Even if we take Hoover Dam out in 1934 the language of the bill says that you can take care of existing uses in California and in Arizona and this bill does not put the Arizona uses which are nearly a million acre-feet in this order down around Yuma. It does not put them second to California. It is the existing, the old existing projects that this compromise bill attempts to give priority as against new uses.

Mr. SAYLOR. I thank the gentlemen, for yielding.

Mr. UDALL. Let me say one thing more here.

I think Mr. Ely has hit on something that is very vital and important and is right at the heart of this. As a part of this compromise, Arizona recognizes that it will take 10 years before we can take out a drop and you get to the question now of what is going to happen to these excess flows? Are we going to stand here on our legal rights and insist this water must go into the Gulf of California and waste into the ocean?

Our position is no, we want our friends in California to use as much of that as they can to help their growth and to take care of the shortages until they can get their State plan into effect, until we can do some of these long-range things, and I am hopeful that the same attitude he pointed out will apply in the upper basin.

We do not want to take any of their rights away. But during this 25- or 30-year period ahead of us when all of the hydrologists say that the upper basin can't use 7½ million acre-feet and that it will be coming down the river we would hope that they would look at us as we look toward California with the spirit that is there, we do not want it wasted, and we want to go ahead and use it with the clear understanding that they get it back when we are ready to do so. That is the heart of what we are talking about.

Mr. Chairman, I have used too much time and I cease at this point.

Mr. ROGERS. Mr. Skubitz?

Mr. SKUBITZ. No questions.

Mr. ROGERS. Mr. White?

Mr. WHITE of Idaho. There have been many hypothetical questions asked here.

I would like to ask a clarification of your answer to Congressman Johnson with respect to excesses above the amount of 2½ million acre-feet being imported and as to what the division of that water might be, should there be an importation in excess of 2½ million feet.

You said it would be a consideration. You did not elaborate. My understanding is that it would be equal. Is that correct?

Mr. LYNCH. Could I have Mr. Ely answer this?

Mr. ELY. This is a point that I was consulting with Mr. Lynch about because it had been referred to earlier, in conversations, by Mr. Weinberg. Mr. Lynch had not had the opportunity to hear that discussion.

The problem is contemplated, Mr. White, in section 304(d), on page 9, line 18. This says:

> If the importation of water into the Colorado River system makes available for release, as determined by the Secretary, sufficient water to satisfy annual consumptive use in Arizona, California, and Nevada, in excess of 7,500,000 acre-feet, such excess consumptive use shall be apportioned in the manner provided in article II(B)(2)—

and so on.

Article II(B)(2) of the decree provides that if water in excess of 7½ million acre-feet is made available by the Secretary, it shall be divided 50 percent to California and 50 percent to Arizona, with power reserved in the Secretary to contract with Nevada for 4 percent of the 50 percent otherwise going to Arizona. But article II(B)(2), by its terms, deals with such water as the Secretary makes available for consumptive use in those three States, in excess of 7½ million. If water were imported into the Colorado River in excess of 2½ million acre-feet—pick any figure you like out of the air, say 4½ million—the Secretary, I take it, would be at liberty to contract for that excess importation in part with the upper basin States or users there, and in part with the lower basin. What this part of the language of the bills means it, so much of it as he does make available to the lower basin must be divided as the decree would divide the water originating in the basin.

Mr. WHITE. Do you feel that the Supreme Court decision would apply to imported water the same——

Mr. ELY. Not by its own terms. This language of the statute would adopt that pattern.

Mr. WHITE. The next question is, with respect to the possibility of augmenting the supply of water from southern California by importation from northern California, what amount of water is there a possibility of importing from northern California and how does it compare to the needs as you interpret them over the future?

Mr. ELY. That is a question I shall have to refer to the engineers, with this caveat at the beginning: That water which may be imported into the coastal plain of southern California is not in substitution for any part of the 4.4 million acre-feet from Colorado for two reasons.

Mr. WHITE. I realize that.

Mr. ELY. I need not go into that? It is water in addition to 4.4 million acre-feet from the Colorado we are talking about, then. Your

question relates to what California's total needs may be, and I refer that, if I may, to Mr. Steiner.

Mr. STEINER. California's ultimate water requirements we think will aggregate something over 50 million acre-feet under conditions of ultimate, or if you will, full development. We have within the boundaries of the State a full, natural, mean seasonal water crop of about 70 million acre-feet measured as runoff. Now, not all of this water crop can be readily developed. We do believe that at a price, and it may be pretty expensive, we can develop enough water within the boundaries of the State to meet the State's ultimate water requirements.

There is, however, we believe, a real question as to whether this is wise, from the standpoint of the entire region, and whether there isn't a much better approach to this in regional planning in which the States of California, Oregon, Washington, Nevada, and Arizona join in a program of benefit to all.

When I spoke of an ultimate requirement of 50 million acre-feet, I was speaking to the needs of the entire State. There is no contemplation of bringing all of this water to southern California.

Mr. WHITE. In line with the statement of the gentleman from Arizona that we have this water wasting at the present time and California should be entitled to use this water as long as it is being wasted, however, the recall provision would be made to the central Arizona project at such time as they needed water and you would be allowed to continue to use the 4.4 million acre-feet. What would it take in terms of water importation to make your area whole in the southern California area if you were to import this water from the various sources, and I am thinking how much water do you need from the Columbia Basin to make this area whole if you could have that water imported into the Colorado? This is what my people will ultimately ask me. How many acre-feet of water is the—we are talking about 2½ million acre-feet and we have this already without needs of California considered after the completion of the central Arizona project and the upper Colorado total usage of water. This is a fact that I should have for my information and this committee should have.

Mr. ELY. With Mr. Lynch's permission, since I was in the meetings with the upper basin people last week, let me hazard an answer.

If only 2½ million is imported into the river—as we all understand now—only 7½ million is made secure for the three States; California, Arizona, and Nevada. This would leave California short about a million acre-feet in the filling of the works already constructed along the Colorado River, for these works were built to carry 5.4 million acre-feet, not merely 4.4 million. Arizona can, as everybody knows, use more than a diversion of a million two hundred thousand in central Arizona. How much more I am not able to tell you, but maybe Mr. Udall could furnish a figure. The upper basin States have now come to the realization that they, too, will be short. The Colorado must be supplemented if they are to get the 7½ million they had hoped for. When you add all of these deficits up, assuming the upper basin were to be made secure to the extent of 7½ million and the lower basin to the extent of 7½ million, and in addition were to get an additional million to fill our aqueducts, if Arizona were to get, let's say,

an added million, then we are talking about total importations, I think, of the general order of 6.5 million acre-feet. The components: for the lower basin, 2.5 plus 2, or 4.5; for the upper basin, 2; total, 6.5.

From our viewpoint, our works were constructed to use 5,400,000, and if we get that much, I do not know of anybody who is proposing to build any additional projects in California.

The figure I am giving you, 6.5 million acre-feet, has all sorts of guesses built into it as to what the ultimate needs of Arizona or the upper basin might be. Speaking as a layman, I do not contemplate the importation of astronomical quantities into the Colorado River as such. I don't know how you would get them out again. There may well be additional importations that don't go into the Colorado, but fan out in various directions, as various schemes have proposed. When I say 6.5 million, I am speaking of water imported into the mainstream of the Colorado.

Mr. ASPINALL. Would the gentleman yield at this point? You are talking about the necessity of an importation of water into the Colorado Basin?

Mr. ELY. I am saying if the upper basin is to consume 7,500,000 acre-feet as she hoped up to the compact apportionment, then the Colorado River system must be supplemented in order to make that possible.

Mr. ASPINALL. What you are saying is that under any circumstances—there would necessarily be a shortage of a million two hundred thousand feet or a million four hundred thousand feet, some place around this figure which has not been agreed upon, in the upper basin.

Mr. ELY. What I am trying to say is this: I have read the Tipton report, which indicates that there is no possibility whatever of the upper basin being able to consume 7½ million acre-feet if the compact guarantee of 75 million acre-feet per a decade is honored. I believe the Tipton report shows that the upper basin ceiling on depletions would be of the order of 6,300,000, which would include about 700,000 acre-feet reservoir losses. Consequently water must be brought into the Colorado River if the upper basin is to use the 7.5 million it hoped to use under the compact. If Mr. Tipton is right, about 1.9 million must be imported for the upper basin.

Mr. WHITE of Idaho. I realize that you are out of the area, but you have great knowledge in the field. When you are speaking of Arizona—when you are speaking of Arizona's need, are you talking about the stabilization of the underground water supply in the State of Arizona as well?

Mr. ELY. I am in a field in which other people are better able to answer you.

The central Arizona area is now using on the order of 3½ million to 4 million feet, that is, consuming that much. The area's dependable local supply from the Salt, and the Verde and Gila is about 1,750,000 acre-feet annually. The rest is overdraft on groundwater. That overdraft, if those figures are substantially correct, is considerably in excess of 2 million acre-feet a year. Consequently if 1,200,000 is brought in from the Colorado, there remains an overdraft to be made up somehow, that the central Arizona importation of 1.2 million would not entirely meet.

Mr. WHITE of Idaho. In other words, to make up that deficiency we would have to add 2 million acre-feet to the 6 million acre-feet that you suggested?

Mr. ELY. I included in that horseback estimate, of 6.5 million, a million acre-feet of added water to make up the Arizona deficit, and a million to fill California's aqueducts. Please don't hold California, or anybody who is truly informed, to my answers. This is a curbstone effort to answer your question, but somebody else might give you a figure differing by several millions from my layman's answer. If 6.5 million were imported, this would give the upper basin 7.5, California 5.4, Arizona 3.8, Nevada 300,000, from the Colorado diversions.

Mr. WHITE of Idaho. I certainly want to thank you for the manner in which you have answered my question because this is as I said—this will be a question that will be asked of me many times and I want to compliment Mr. Lynch on his excellent presentation and for the group of people that are with him here and who have testified and I think the people of the State of California would be proud to see those who have ably represented them here.

Mr. UDALL. Will the gentleman yield?

I want to assure my friend from the Columbia Basin that all we are talking about studies and if you take what I felt were reasonable figures and I want to consider what Mr. Ely said—he is in the general area of the estimates. If you double that, let's say, you double it to 10 million. The fact is as I said yesterday, that the Columbia River wastes something like 160 million acre-feet every year into the ocean. If we took 5, 6, 7 percent—took 10 million acre-feet, it would leave 151 million acre-feet wasting into the Pacific Ocean for future uses in the Great Northwest. Just put this into focus. I am told that the water system in the city of New York, the Nation's biggest system delivers something in the order of 3 million acre-feet every year. You would have enough water left over even after permitting the use of that 10 million, enough to build 50 New York Cities, or put it to whatever other uses might eventually develop in the great Northwest. We think this is a very modest, very reasonable sort of thing that we are talking about in that context.

Mr. WHITE of Idaho. I would like to say to my colleague from the State of Arizona that I am concerned to the possible point of diversion, whether it would be from the Snake River or the mouth of the Columbia. I do not want to be categorized as one that would take the proverbial dog-in-the-manger attitude. I think this would be absolutely incorrect on my part.

All I have asked and all I have tried to intimate in my remarks is that I would like to see an analysis as to the works that are needed, as to the amount of water that would be diverted and its effect on the possible future needs of water in the Pacific Northwest. I think this is a logical, fair position for me to take and I think it is something that I should have before I make a firm decision as to what my position should be on this legislation.

Mr. HOSMER. Will the gentleman yield? I want to say to the gentleman that I am delighted that he is pursuing this line of inquiry in seeking these assurances. Because not only is his area involved as a potential source of importation, but my State is also involved as a potential source of importation and I was—I am—as anxious that

that side of the problem be handled properly as I am for water to come into the State at a more southerly location.

I hope you will continue and make certain that the bill's provisions relative to the areas of origin and so on afford every possible protection to any area that may be involved.

Mr. WHITE. I think it is mandatory that I do this. Thank you.

Mr. ROGERS. Mr. Wyatt?

Mr. WYATT. General Lynch, I come from a district in Oregon that has the lower 100 miles of the Columbia River of the boundary, so I too am interested, even more interested than Congressman White in this problem, and I would like to ask whether or not the State of California or any of its agencies or municipalities or their water agencies has participated in any way in any study on the diversion of water from the Columbia River Basin into California.

Mr. STEINER. I would like to respond, Congressman, for the California Department of Water Resources which is the official State agency which would make this kind of study if such a study were to be made. We have not made studies involving importations of water from any source outside of the State of California.

Mr. WYATT. You have no cost figures or estimates on various plans that have been suggested on this type of importation?

Mr. STEINER. We do not.

Mr. WYATT. Would this hold true as far as the municipal water system of Los Angeles is concerned, as far as you know?

Mr. ELY. There have been some studies made, I believe, by the Los Angeles Department of Water and Power as to the possibilities of importations from various points on the Columbia system, including the Snake. These have been entirely preliminary.

Mr. WYATT. How old are they, Mr. Ely?

Mr. ELY. I think within the past couple of years.

Mr. WYATT. General Lynch, on page 7, toward the bottom of your statement, you make the statement:

> My State resisted—it had to resist—a central Arizona project which would deplete the water available to California projects so long as replacement of that water was only a hope or a promise.

My question is, What is there presently that is beyond a hope or a promise which has caused the State to change its position?

Mr. LYNCH. No. 1 is the fact that in this bill, H.R. 4671, if it passes, California would be assured 4.4 million acre-feet until such time as an adequate amount of water is brought into the river. That is as opposed to a limitation which was all we had up to this time of 25 years for this assurance. So we feel that we gained what amounts to an assurance, I would say, rather than a guarantee that we will have 4.4 which we desperately need in southern California until such time as adequate water to meet the needs of the river is brought into the river.

Mr. WYATT. My point is, the hope or the promise did not refer to end purposes being more than a hope or a promise in the State of California—until they changed its position.

Mr. LYNCH. We are putting all things together that happened about that time. People from Arizona, California, and the other States came together and reached this agreement which had seemed impossible up to that time. First, No. 1, that central Arizona would

be built, California would support it and No. 2, that we would have an assurance that our water supply would be protected beyond the term of years. With that term of years we had no assurance that we could get adequate water after that time.

Mr. WYATT. Just one more question; I know the hour is getting late.

At the top of page 11 you asked this question:

"How much water is probably available to the lower basin until imports from other regions become available?"

My question is this: The Secretary of the Interior yesterday spoke about several sources of water to the area down there other than imports, among those being mentioned, the desirability of studying weather modification, specifically the possibility of desalting as a source of water and he also mentioned a study on conservation of existing water supplies. You do not mean by limiting the availability of other water imports in this sentence to indicate that that is the only source of water or of water supplies?

Mr. LYNCH. Very definitely not. I am very much interested, in my own State, in the fact that we are trying to reclaim water. We are studying the reclamation of water now by putting it back in the ground. We are participating in the Federal program for desalinization. Every conceivable method of conservation I can assure you, as can Mr. Steiner, is being tried in California.

Mr. WYATT. Thank you, General. Those are all the questions I have.

Mr. ROGERS. Mr. Tunney?

Mr. TUNNEY. I have two questions, Mr. Chairman.

First of all, I would like to compliment the attorney general of California for a most excellent presentation and also Mr. Ely for his very constructive help during the hearings this morning and this afternoon.

I would like to ask the attorney general, how long do you estimate, if you have had any opportunity to make such estimate, that it would take to build the necessary projects to import water from either northern California or from the Columbia River?

Mr. LYNCH. I do not think any answer can be given to that, Mr. Tunney, for the reason that there is to be a feasibility study and I doubt very seriously that anyone has yet blueprinted or pinpointed a definite plan for bringing water from a given area. That answer will not be known until the feasibility study is completed.

Mr. TUNNEY. But, would you estimate that it will take 15 to 25 years to build those works.

Mr. LYNCH. I would have to ask one of the engineers.

Mr. STETSON. The minimum would be 15 years and it could take as much as 30 years.

Mr. TUNNEY. We have had testimony yesterday that there would be a population in California, at least in the lower part of California, of 40 million people. I was wondering if there were any studies made as to what we would need in the way of water to supply these people.

Mr. STETSON. The projections made today for southern California, based on the Colorado River supply being reduced in approximately 1975 to 4,400,000 acre-feet and the delivery of northern California

water under the State water project indicates that southern California will have enough water to last until about 1990.

From that point on it would need water. The rate of increase beyond this point is an extra million acre-feet every decade.

Mr. TUNNEY. So it appears, if it is going to take between 15 and 30 years to build the necessary projects, to import water from the north, that we have to start right away.

Mr. STETSON. Yes, sir.

Mr. TUNNEY. I am curious—is it not true that California considers the central Arizona project and the Lower Colorado River Project Act as a part of a regional plan, the first step in a regional plan which will necessarily include the importation of water?

Mr. LYNCH. That's our feeling, sir.

Mr. TUNNEY. And that California would have greater hesitation in supporting this project if there was no question of importing water from the north?

Mr. LYNCH. That is correct.

Mr. FOLEY. Just so I understand the answer. When you use the word "north" are you including northern California or are you specifying the Columbia River in the north?

Mr. TUNNEY. No, I am not specifying—I am just saying importing water from the north where there is water.

Mr. FOLEY. Including northern California.

Mr. LYNCH. This is a possibility.

Mr. TUNNEY. It is my feeling this is the first step in a regional water project and this is one of the reasons I am supporting this legislation, that it is the first step in many steps to develop the Upper Colorado River Basin as well as to supply more water to the Lower Colorado River Basin.

I would like to ask an additional question regarding the Bridge Canyon Dam which is a part of this legislation.

It is my understanding that if the Bridge Canyon Dam is not built, that approximately $950 million by the year 2047 will be lost out of the Hoover, Parker, and Davis projects after they have paid off to help pay the central Arizona project, and this will be lost to the lower Colorado River for use to import water at some future date; is that correct?

Mr. ELY. I do not have the figures in mind, but the conclusion you state is inescapable. If Bridge Canyon revenues are not aiding to finance a central Arizona project, then Hoover revenues would be called upon to do so after 1987, and to that extent the fund available to finance importations is correspondingly reduced.

Mr. TUNNEY. How much additional money do you think would be lost as a result of Bridge Canyon Dam not being built?

Mr. ELY. I don't have the figure, Mr. Tunney. I have heard that it would be over a billion dollars in 75 years.

Mr. TUNNEY. Is it California's position, the State of California's position, that Bridge Canyon should be built?

Mr. LYNCH. Yes, it is.

Mr. TUNNEY. I do not have any further questions.

Mr. ROGERS. Mr. Foley?

Mr. FOLEY. One of your party indicated the total supply for the State of California to be 50 million acre-feet. The total available

supply to be 70 million acre-feet and the total need at 50 million acre-feet. How long a projection is that figure based on?

Mr. STEINER. Based upon ultimate development of all areas of California considered to be developable. This is a real crystal ball estimate.

Mr. FOLEY. According to this estimate without any reservation for development, there is an excess of 20 million acre-feet of available supply in California over the projected total need of California, is that correct?

Mr. STEINER. That is correct. Understand, please, that supply is broken up. It occurs in many separate streams. It will be extremely difficult and expensive to develop this last 20 million acre-feet. In fact, this may prove the case for an appreciable part of the 50 million.

Mr. FOLEY. When we are talking about the need as far as California is concerned, the question of importing water from other areas may come down to a matter of money rather than available water, is that correct?

Mr. STEINER. Money in part, and also the question of diminishing returns. Eventually one reaches the point where the next reservoir evaporates more water than it conserves.

In other words, it may be physically impossible to develop a part of this supply and put it to beneficial use.

Mr. FOLEY. General Lynch, in answer to Mr. Tunney's question, I think you implied that the importation of water from outside areas of the Colorado River region basin was an essential element in your support of this bill. Do you regard any portion of this bill as promising on the part of the Congress that importation will be made into the Colorado Basin from other regions?

Mr. LYNCH. I think of necessity it will have to be from other regions. If you are going to get 2½ million acre-feet the Secretary, as I understand the bill, is empowered to make the study as to where would be the most feasible place to get this water.

Mr. FOLEY. Do you regard the legislation as presently drafted, as comprising a promise on the part of the Congress to authorize the importation of water into the Colorado River Basin?

Mr. LYNCH. I cannot say it is a promise; no.

Mr. SAYLOR. What was that answer?

Mr. LYNCH. I said I cannot consider it a promise by the Congress.

Mr. FOLEY. Referring to section (d), page 9, providing for certain acts by the President in the event importation of water is made, would you read that as any implication in this bill that there will be importation of water?

Mr. ELY. You are referring to (d).

Mr. LYNCH. Can I ask Mr. Ely to answer this?

Mr. ELY. These deal entirely with contingencies that if water in excess of—if water is imported to provide an excess of 7½ million, it spells out what happens. But it starts with "if."

Mr. FOLEY. In your opinion, then, the Congress is not taking any step in this bill to authorize or promise importation of water into the basin?

Mr. ELY. That is correct.

Let me give you a straightforward answer. We think importations are essential. We are sorry that it was necessary in this bill to delete the provision that appeared in S. 294, Senator Kuchel's earlier bill, which would authorize the importations upon the Secretary's finding of feasibility. We think it is a foregone conclusion that water must be imported. I would not, myself, lead you into thinking that we expect these studies to produce a negative answer. We expect them to produce a positive answer, and be followed by positive results.

If you enact this bill, in my view you are launched on a program of investigation which will be followed by authorization of imports. We hope so.

Mr. WYATT. Will the gentleman yield?

Mr. FOLEY. Just one more question.

General Lynch, in the absence of any references in this bill to investigations or other references to the importation of water into the Colorado River Basin, would this legislation have the support of the State of California?

Mr. LYNCH. I am sorry, I didn't quite follow the question.

Mr. FOLEY. In the absence of any references such as title 2 to investigations for importation of water into the Colorado River Basin and in the absence of any other provisions in this bill dealing with possible importations of the water into the Colorado River Basin, if those were deleted from the bill as presently drafted, would this legislation have the support of the State of California?

Mr. LYNCH. I would have to take that up with my Governor, sir; I am not authorized to speak on an amendment to the bill.

Mr. FOLEY. You are not able to say whether it would have the support of the State of California?

Mr. LYNCH. No; I am not.

Mr. FOLEY. At least that is—there is a doubt in your mind at this time?

Mr. LYNCH. I am not able to state. I would be able to get you the answer, though.

Mr. FOLEY. I would appreciate that.

I will yield to the gentleman from Oregon.

(The information furnished by Mr. Lynch follows:)

STATE OF CALIFORNIA,
DEPARTMENT OF JUSTICE,
San Francisco, September 10, 1965.

Hon. WALTER E. ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation, House Committee on Interior and Insular Affairs, New House Office Building, Washington, D.C.

DEAR MR. ROGERS: During my testimony on August 24, 1965, on H.R. 4671, 89th Congress, and counterparts before the Subcommittee on Irrigation and Reclamation, Representative Thomas S. Foley, of the State of Washington, asked me to submit for the record the position of the State of California on two questions that he propounded. After consultation with Governor Brown and members of the Colorado River Board of California, I am pleased to provide the position of the State of California on both questions.

1. Would the legislation have the support of the State of California if title II, authorizing investigation of the importation of surplus waters into the Colorado River Basin, were deleted?

California supports the pending legislation with title II or some similar provision for augmenting the Colorado River supply. We take this position because

the water problems of the Pacific Southwest can ultimately be solved only by a regional plan. We would resist with all the resources at our command the deletion of title II without the substitution of some similar provision.

2. Does California concur in the Budget Bureau's proposal to substitute a national study by a National Water Commission for the study which H.R. 4671 would direct the Secretary of the Interior to make?

California urges that this study should be made by the Secretary of the Interior and not by a National Water Commission. The regional problem which H.R. 4671 proposes to resolve has already been intensively studied in some aspects by the Secretary. In many phases it is unique to the region. The urgency is great. Its study should not be deferred to the establishment of a national body, and a hierarchy of priorities for study which such a body might adopt.

I request that this letter be placed in the record at the appropriate place.

Sincerely yours,

THOMAS C. LYNCH,
Attorney General of California.

Mr. WYATT. I just have one statement I would like to make to General Lynch.

I am not certain whether you gentlemen were here when the Secretary of the Interior and the Commissioner of Reclamation testified yesterday, and I think you gentlemen should clearly understand that both Mr. Dominy and Mr. Stewart Udall yesterday said there was nothing in the bills pending before this committee which would either authorize construction of transmission facilities from the north or appropriate money in this regard and the record is quite clear, and I think you gentlemen in turn should know this. Thank you.

Mr. FOLEY. Yesterday, Secretary Udall, in answer to a question as to the possible sources of augmentation of water for the Colorado River Basin listed or stated four things—conservation, desalinization, possible importations from northern California, and possible importations from the mouth of the Columbia River. Are those in your judgment the sources of possible augmentation for the Colorado River Basin?

Mr. LYNCH. Not in my judgment because I am not qualified to answer that. I prefer one of the engineers to do that. I am not a hydrologist.

Mr. STETSON. Two of those sources would be a possibility as a source to develop as much as 2½ million acre-feet. But the other two probably would not.

Mr. FOLEY. Which two?

Mr. STETSON. Importation from the mouth of the Columbia, importation from northern California, could do it. As far as salvage—as far as salvaging losses, you cannot salvage 2½ million acre-feet. As to desalinization, this would be a questionable quantity, in my opinion.

Mr. FOLEY. California does not exclude water in northern California as a possible source of augmentation for the Colorado River Basin shortages, is that correct?

Mr. STETSON. That's right. That's correct.

Mr. FOLEY. Well, I am not talking about studies only, but as to the ultimate decision, does California have any objection to importations if proved feasible from waters, surplus water in northern California to augment any shortages in the Colorado River Basin?

Mr. STETSON. If this is the most feasible source, I would say no, it has no objection.

Mr. LYNCH. That would be very difficult, sir, if I may. We would have to know specifically what the intent was, where the water was to be appropriated. We might have an objection or make some suggestions because as has been pointed out, we have a fantastically burgeoning economy and our projections might disagree with the Secretary as to the feasibility of taking water from a given area. I don't think anybody would feel that we have in one particular spot a tap that we can turn on and get 50 million acre-feet of water. We don't.

Mr. FOLEY. I am sympathetic with that attitude.

Mr. LYNCH. On the coastal plain, for example, and I am familiar with this, but just visually, we have numerous streams running down into the ocean. There is water there.

Mr. FOLEY. Would it be correct to say that the State of California wants to have an opportunity to study its own water needs and feasibility of any importations from northern California before committing itself on this question?

Mr. LYNCH. I would say that on my own responsibility, yes.

Mr. FOLEY. You do not see anything wrong with any State of Washington having the same attitude, do you?

Mr. LYNCH. No, I do not.

Mr. ROGERS. Mr. Roncalio?

Mr. RONCALIO. General Lynch, on page 11 of your statement you state that this bill gives every State and every region a continuing incentive to make the regional plan work.

I direct your attention to page 24 of the bill, title VI in which a committee is to be created called the Colorado-Pacific Regional Water Commission and specifies the following: Arizona, California, Nevada, New Mexico, and Utah shall have one member each. Please note the absence of Wyoming and Colorado. I wonder in light of this if you still think every region should have continuing incentive?

Mr. LYNCH. It says one member representing each of the States which the President may find to be affected, such member to be appointed by the Governor of such State.

Mr. RONCALIO. Yes. But it omits Wyoming and Colorado.

Mr. UDALL. Would the gentleman yield to me? As the author of the bill, I would be happy to have an amendment to name those two States. I think it was perhaps an oversight in drafting the bill.

Mr. ELY. The measure started out to be a lower basin bill and these are the States of the lower basin as defined by the Colorado River compact. Utah and New Mexico are mentioned because they have minor interests in the lower basin. Wyoming and Colorado do not. From California's point of view, General Lynch would be supported by all of us in saying that we would be delighted to have any affected State, including Wyoming and Colorado, added.

Mr. RONCALIO. One or two other questions, if I may.

There is only so much water in the Colorado River. We have the charts and experience upon which we can rely. In view of this Congress appropriated at least $200 million this year, about a month ago, and many, many hundreds of millions of dollars in addition, to desalinization experiments.

Mr. ROGERS. If the gentleman would yield so the record would be complete, it has not appropriated the $200 million. As a matter of fact, the $200 million was not authorized. It was merely recognized

that the program would have this proportion; $15 million was authorized.

Mr. RONCALIO. I thank the chairman for this. In view of this type of action by the Federal Government, I would like to know what California has appropriated or spent in the last year or so for desalinization experiments.

Mr. LYNCH. I am advised that we have contributed—I do not know how much—to a Federal project that is presently underway in southern California. Perhaps Mr. Steiner has it.

Mr. STEINER. That is correct. I cannot give you the exact figure. I would be happy to submit them for the record. We have been involved for a considerable number of years in the study of desalinization and have worked closely with the Office of Saline Water. The State has not built any plants, itself, but participated financially with the Federal Government in the Point Loma plant.

Mr. LYNCH. There have been plants built by the Federal Government.

Mr. HOSMER. Over a period of time State contributions have aggregated several millions of dollars to the desalinization study.

Mr. RONCALIO. I thank you, Mr. Hosmer, for your splendid contributions in that regard.

Your observation reminds me also that earlier in our deliberations it was my feeling that the day would not come in our lifetime when water from a desalinization plant would be used for irrigation purposes. What is your opinion on that, Mr. Ely?

Mr. ELY. I am not competent to answer that. There are engineers here who are.

Mr. STETSON. You mean within 20 years it would be down to $20 an acre?

Mr. RONCALIO. Do you envision within the future that saline-made water can be used for some central Arizona purposes?

Mr. STETSON. For municipal and industrial use, yes.

Mr. ASPINALL. Will my colleague yield? I think you are afield now on desalination. The cost of desalination to take care of just the Mexican obligations alone, it will cost something in the neighborhood of $150 million a year even if the cost of desalination of water is reduced to one-third of what it costs at the present time. In other words, if you get it down to 35 cents a thousand gallons then it would cost in the neighborhood of $150 million a year to produce the water at the plant. So when you are talking in terms of using desalted water in place of irrigation water or by exchange, you are talking about rather large sums because that amount for taking care of the Mexican Treaty for 1 year is just about, as I figured out, one-fifth of the total cost of the proposed Lower Colorado River Basin project as recommended by the administration.

Mr. RONCALIO. Thank you, Mr. Chairman. One more question. In view of your reliance upon imports, would you agree to an amendment to this bill assuring the upper Colorado River States first priority for their projects and storage facilities, and second priority to central Arizona project in the event your imports do not cover shortages—that may develop between now and 1990?

Mr. LYNCH. I would have to see the language of any amendment and discuss it with my Governor. I could not agree.

Mr. FOLEY. Going back to the statement, General Lynch, this bill was supported in principle by the Bureau of the Budget. The Bureau of the Budget has suggested some amendments to the bill, including an amendment to establish a National Water Commission—what is the attitude of the State of California in that proposed amendment?

Mr. LYNCH. Can I ask Mr. Ely on that?

Mr. ELY. That question has caused quite an amount of soul searching. I don't know that the State has taken any formal position on it, but I believe it is fair to say that the consensus of the group is that we feel the problem on the Colorado is so urgent and so big, that it would be unfortunate to sweep it into the same kettle with the problems of New York and the Northeast, just as it would be unfair to ask New York to wait for a solution of its water problems until we worked out the complicated Colorado River situation.

Surely, the whole Nation has a water emergency, we now realize, but I would think that it is headache enough for the best experts you can get to solve that of the Colorado River without postponing it for some general discussion of the problem of pollution of Lake Erie and water supply for New York City.

I just hope that the Budget Bureau could be persuaded to realize that what it proposes is just too big a circus to move into our show. It is big enough the way it is.

Mr. FOLEY. Could we have in view of the fact that you have not apparently discussed this—I would appreciate it if you would—I appreciate Mr. Ely's answer, but it is an answer expressing a general consensus and not an official position of the State of California. In view of the fact that you promised to provide material to my earlier question, I would like to have also an answer from the State of California.

Mr. LYNCH. I hope you appreciate that the Governor and I have been extremely busy.

Mr. FOLEY. I appreciate that.

(Attorney General Lynch's answer appears in letter on p. 323.)

Mr. RONCALIO. Two short questions.

Is it the sense of your testimony that you do not plan two river basin diversion areas upstream in the Colorado?

Mr. LYNCH. I would have to ask an engineer. I don't know that.

Mr. STETSON. Into the river? Into the Colorado?

Mr. RONCALIO. Do you plan any interbasin diversion for imports on the Colorado?

Mr. LYNCH. Are you talking about California as a State?

Mr. RONCALIO. I have in mind the Snake River.

Mr. LYNCH. As I understand it, California does not contemplate these things. These are matters of study to be made by the Secretary and his recommendation as to how it shall be done.

Mr. RONCALIO. I was interested in what California is thinking in regard to this. Would you in effect make a diversion 1,500 miles upstream to divert several hundred acre-feet that much distance?

Mr. LYNCH. Into California or into Colorado? I don't think—in the State of California we do not plan any such diversion, no. That's a matter as I said for the Secretary to determine.

Mr. RONCALIO. You stress imports, and it would occur to me your legislation must stand or fall on the feasibility of 2½ million acre-feet

of imported water. Had anybody ever talked to the Lieutenant-Governor of British Columbia regarding diversion of Canadian water?

Mr. LYNCH. I haven't talked to him and I don't know anybody else who has ever talked to him.

Mr. RONCALIO. No further questions.

Mr. ROGERS. Mr. Hosmer?

Mr. HOSMER. I have just one question that I was asked on behalf of Mr. Reinecke to ask. He had to leave. He wanted me to ask this of General Lynch.

You were asked how much water was available in the lower basin until importing became available. As you say, that question I am assured, can be answered "enough to justify the central Arizona project and the needed authorization."

Mr. Reinecke wanted to know about the assurance—how are you assured that that amount exists?

Mr. LYNCH. I am sure that amount exists somewhere.

Mr. HOSMER. You said you were assured. He wants to know how you were assured.

Mr. LYNCH. May I set the stage for that portion of my testimony? This is what transpired at Los Angeles, and as you point out that was a rhetorical question and I was assured at that meeting that the amount of 2½ million acre-feet was the necessary amount to bring into the river. I was assured by the engineers there are resources, and in the interest of time I shall not name the potential sources where their water might be obtained.

Mr. HOSMER. I think that answers it.

Mr. FOLEY. I think we have time enough to name the sources. [Laughter.]

Mr. LYNCH. It has been a long day.

Mr. WHITE of Idaho. If the gentleman will yield further, I would suggest to the people of California—I am not saying I am attributing this to you, but I heard several local groups in California and Arizona who looked to the Snake River for water. The river measurement at Ox Bow which is a collection of all the water of the Snake as it discharges into the area along Oregon and Idaho, that the average flow is slightly in excess of 10 million acre-feet at the present time, and so if you are looking for 10 million acre-feet I suggest you continue to look at the mouth of the Columbia.

Mr. HOSMER. Thank you, Mr. Chairman.

Mr. ROGERS. General, do you have any information or data with regard to the proposed sources these engineers had in mind?

Mr. LYNCH. I personally do not, but I will ask if any of my colleagues do.

Mr. ELY. The potential sources are those that the Secretary has indicated and we have indicated in testimony today. We expect the Secretary to take a look at the northern California streams, at the Columbia. I suppose the most feasible place to look is down toward the mouth of the Columbia.

He mentioned desalinization plants in Mexico to pump water back up to Imperial Dam. He apparently means a plant desalting the waters of the Gulf of California and pumping them, with relatively

low pumping lifts, to get them back up to Imperial Dam. An arrangement would have to be made with Mexico.

But the sources from which water might be actually imported into the Colorado would probably be from northern California streams, or from the mouth of the Columbia, or if agreement could be reached to keep the powerplants on the Columbia whole, then from points upstream on the Columbia. That, in general, is the spectrum.

As Mr. Saylor indicated before, the Secretary would take a look at many possibilities, but these seem to be the ones having reality.

Mr. ROGERS. The assurance of the availability of 2½ million acre-feet of water, Mr. Ely, would probably have been prompted by looking to the Columbia and northern California, you think, rather than desalinization?

Mr. ELY. Speaking as a layman, I would say "Yes." But I am not saying that the Secretary is wrong in putting into the inventory the possibility of building desalting plants in Mexico and pumping water a short distance to get it up to Imperial Dam.

Mr. ROGERS. If the Secretary has that in mind he has some information he has not revealed to this committee about the possibilities of reducing the cost of this desalinization process and we would be glad to have that.

Do you have the engineer's report that made this reassurance, General Lynch?

Mr. LYNCH. No, I do not.

Mr. RORERS. Were those Bureau of Reclamation engineers?

Mr. LYNCH. I assume so.

Mr. ELY. I think, Chairman Rogers, that this problem divides into two parts. First, is the water in the Colorado River sufficient to justify the construction of the central Arizona project, pending importations? The assurance upon that point, if you can call it assurance, on the reasonable probability that this is so, came from California engineers and now Arizona engineers who have studied this matter. Mr. Steiner and Mr. Maughan will testify on this later. This is a calculation based upon reasonable probability. Second, is the problem of where the importation shall come from. This is anybody's speculation until the Secretary makes his feasibility studies. Nobody has given or received any assurances about the answer.

Mr. ROGERS. I was wondering from the language of the bill, and I guess we will get into it further in the hearings, as to whether or not the probability of this importation also anticipated further participation by the Federal Government in projects to make it possible to import, whether it would be imported without Federal participation.

Mr. ELY. I think everybody assumes Federal participation. The Secretary and the Budget Bureau do, when they say that portion applicable to the Mexican Water Treaty shall be, in effect, nonreimbursable, because that is a national obligation.

Mr. ROGERS. The thing that I wanted to get clear, Mr. Ely, and I think all facets of this have to be brought out, because I think we are getting into an area now in our national policy, that they are going to have some very big decisions made with regard to water quality control and that sort of thing, which I hope to go into tomorrow with the Secretary.

Mr. Saylor?

Mr. SAYLOR. Mr. Chairman, just to make sure that the record is correct, I used in a hypothetical question to witnesses before us the year 1934, and I said at that time that the Hoover Dam was not in operation.

Just to make sure the witnesses were not misled, I have asked for a verification, and I find that the dam, the Boulder Canyon Dam Act was passed in 1929 and the 1930 construction was started and legal attempts by the State of Arizona to stop the construction failed and the dam started to operate in February 1935.

Mr. FOLEY. General Lynch, perhaps this question is best directed to Mr. Ely. Mr. Ely, a moment ago you mentioned the possibility of studying diversions of the Columbia above the mouth. That is the first time, to my knowledge in these hearings, that any statement has been made relating to any diversions of the Columbia River other than at the mouth.

A little earlier you also mentioned the studies that had been made on the Columbia River diversion by Los Angeles—the Los Angeles Department of Water and Power. Have those studies, to your knowledge, examined the possibility of diversions of the Columbia River other than at the mouth of the river?

Mr. ELY. I believe they have, Mr. Foley. I don't have them in mind enough to give you details. I think that is true, to compare the cost of importing from a point upstream as against the cost of having to make downstream interests whole because of the diminution.

Mr. FOLEY. Is it the position of the State of California that in addition to studying the possible diversion of water at the mouth of the Columbia, studies should also be made of the feasibility of possible diversions upstream?

Mr. ELY. I just assume, speaking as an individual now—I can't speak for the State of California, obviously—that the Secretary will look over the whole spectrum of possibilities.

Speaking as a layman, my expectation is that he would come to the conclusion that the mouth of the Columbia is the place on the Columbia where he should settle.

Mr. FOLEY. The Secretary did not mention any of these areas other than the mouth, and I will take that matter up with him.

I would like to ask you this. You stated a moment ago that it was the opinion of California engineers that, pending importation, there was sufficient water in the Colorado River Basin to supply the needs of the central Arizona project.

Mr. ELY. On the basis that Mr. Udall has indicated earlier, that there would be a full supply until some time, probably in the last decade of this century, tapering off thereafter.

Mr. FOLEY. Pending importations, do you have any knowledge of what their judgment would be?

Mr. ELY. The answer, as I understand you, is this: without any importations at all, the supply of the Colorado River would be adequate to yield a full aqueduct to central Arizona, 1,200,000 acre-feet, while respecting the safeguards to existing projects contained in the bill, until a date in the last decade of this century. Thereafter, if

no importations came at all, the supply for the central Arizona project would gradually dwindle. The Secretary indicated that it would ultimately fall to 400,000 acre-feet. This is altogether without importations. He further stated that even if that should happen, the project is still feasible.

Mr. FOLEY. Economically feasible but not in the sense of hydrology as presently anticipated by this authorizing legislation.

Mr. ELY. Arizona needs more than that, of course, but let me amplify one point. If only 400,000 acre-feet went into central Arizona from the main stream, this is adequate to supply the municipal and industrial requirement of a population of 2 million people. Now, in addition, central Arizona has a local supply in the Salt, Verde, and Gila Rivers. Those are capable of sustaining 500,000 acres of agriculture permanently, without any overdraft on the underground water supply. So the water supply in central Arizona could then permanently sustain a very sizable agricultural economy to the extent of 500,000 acres, and a population of 2 million, without any drawdown on the underground basins.

In addition, geologists tell us that these underground basins in Arizona have perhaps a hundred million acre-feet in them. Not all of it can be extracted at present prices, but the resource is there. So if worst came to worst, and they had to "mine" water for some time to supplement the surface supplies, they could do it, at a price, until imported water arrived. We are talking, therefore, about an economy in central Arizona that would be viable for several decades, and indeed permanently, even if they ultimately got as little as 400,000 acre-feet. One million two hundred thousand acre-feet is water for 6 million people.

Mr. FOLEY. In other words, your understanding of the experts is that the project is feasible in terms of water supply, whether or not there are importations into the Colorado River?

Mr. ELY. That's correct.

Mr. ROGERS. Thank you, gentlemen, for your contribution at these hearings.

The subcommittee cannot meet in the morning, but we anticipate meeting tomorrow afternoon at 2 o'clock, at which time we expect to hear Secretary Udall and Mr. Dominy again to be followed by Mr. Pat Head representing the Governor of Nevada, Governor Sawyer.

The subcommittee will stand adjourned until 2 o'clock tomorrow afternoon.

(Whereupon, at 5:40 p.m., the subcommittee was recessed, to reconvene at 2 p.m., Wednesday, August 25, 1965.)

(Wednesday afternoon, August 25, 1965, following the completion of testimony from Secretary Udall and Commissioner Dominy.)

Mr. ASPINALL. At this time, the Chair wishes to call to the witness table Mr. Pat Head, administrator of the Colorado River Commission of Nevada, to hear his testimony in behalf of Gov. Grant Sawyer, who is unable to be here.

May the Chair state that we shall recess the hearings for today at 5 minutes after 5.

STATEMENT OF HON. GRANT SAWYER, GOVERNOR OF NEVADA, AS PRESENTED BY PAT HEAD, ADMINISTRATOR, COLORADO RIVER COMMISSION OF NEVADA

Mr. HEAD. The Governor has asked me to express his regret, Mr. Chairman, at his inability to be here today. This is his statement, and I shall read it as the Governor's statement.

Mr. Chairman, members of the committee, it is a pleasure for me to present a statement to you today in support of legislation being considered here to authorize the Lower Colorado River Basin project. I presented a statement to your committee on July 27 in support of H.R. 2020, legislation to authorize our urgently needed southern Nevada water supply project, which project is also included in section 306 of the legislation before you today. As the legislation to authorize the southern Navada water supply project separately has been favorably considered by the Senate and is now before your committee for consideration I will not address myself directly to that project in my presentation today, except to express my deep appreciation on behalf of the people of the State of Nevada for the consideration given our urgent water problems by your committee.

In many areas in the West our economy is being maintained by the depletion of our underground reserves. The supplies are dwindling very rapidly. Favorable consideration of the legislation before you will provide a program for further development of the water resources of the Lower Colorado River Basin and, most important, will provide the basis for importing additional adequate water supplies for use within the basin. The central Arizona project should move forward to construction and operation at an early date to alleviate to the extent possible the depletion of the underground basin in the Salt River Valley, which in turn will alleviate a grave danger to the econmy of central Arizona. This must be only the beginning, however, to what must be done to meet the water needs of the expanding economy of the Southwestern United States.

It was my privilege and my honor, as chairman of the Western Governors' Conference, to call the representatives of the 11 Western States to the first Western States Water Council meeting at Lake Tahoe. As I stood before that group of outstanding engineers, lawyers, economists, and politicians, I gained great hope that at long last the Western States were going to work together to help solve their water problems. The enactment of H.R. 4671 and its companion bills will go far in setting the stage for a water resource development program in the West that will meet all the foreseeable needs of the Western United States.

On August 17 I transmitted a memorandum to Chairman Aspinall which set forth the evaluation by the three lower basin States of the ability of the Colorado River to meet the central Arizona project water demands, the demands of our own southern Nevada water supply project, the demands of California to 4,400,000 acre-feet, and meet the present uses and rights in the lower basin. In essence, this memorandum demonstrates that prior to the year 2000 facilities must be constructed to meet additional demands for water beyond those which can be met from the Colorado River. Our experts are of the opinion that somewhere around the year 2000 all of the waters of the

Colorado River will be used by the upper and lower basins. At this time, not only the lower basin will need additional water but the water allocated to the upper basin States under the Colorado River compact will be insufficient to meet the needs of those upper basin States.

We become more encouraged all the time over the exciting prospect that desalinization of our sea waters and our brackish waters will provide a good share of our ultimate requirements for water. In the meantime, however, we must initiate planning immediately to augment the inadequate supplies of the Colorado River to meet the needs of the Southwest at the turn of the century.

Section 304 of H.R. 4671, and its companion bills, I understand, are designed to limit the diversions to the central Arizona unit until certain other uses are satisfied when insufficient Colorado River water is available to satisfy 7,500,000 acre-feet of water in Arizona, California, and Nevada. I wish to make it clear that Nevada agrees to share with other users a shortage proportionate with Nevada's entitlement to the 7,500,000 acre-feet. We cannot accept an interpretation of section 304 that would limit diversions to the southern Nevada water supply project to assure 4,400,000 acre-feet for users in the State of California. We will share with California, and with Arizona, on an equitable basis any shortages that occur on the river.

Mr. Chairman, it has been a pleasure for me to present to you Nevada's views regarding further water developments on the Colorado River and to urge your favorable consideration of legislation to authorize the Lower Colorado River Basin project. We wish to impress upon you we feel that the time is now for getting on with westwide planning for a westwide water project to meet the needs of all of the West.

That is the completion of the Governor's statement.

Mr. ASPINALL. The committee's time will be equally divided among the six present here.

The chairman recognizes the Congressman from Nevada.

Mr. BARING. Mr. Chairman, I do not have any questions at this time. I want to welcome our friend, Pat Head, officially to the committee. I know that he is a very well-versed man on this issue.

Mr. ASPINALL. The Chair recognizes the gentlemen from Pennsylvania.

Mr. SAYLOR. Mr. Head, I welcome you here in behalf of yourself and the Governor. It is always a pleasure to have you before our committee.

On page 2 of the Governor's statement, he says that when he called the conference, he hoped that at long last they were going to work together to help solve their water problems. Then he says that this bill and its companion bills will go far toward setting the stage for a water resources program in the West that will meet all the foreseeable needs of the Western United States. I am willing to concede that these bills might solve Arizona's problems, but I want to know where these bills are going to meet all the foreseeable needs of the Western United States.

Mr. HEAD. Congressman Saylor, he does not say they will meet it. The Governor says they will go far in setting the stage for meeting it. In other words, this is the first step, or the first that we have seen,

where the States together are presenting legislation which will initiate the studies which this bill calls for, studies pointing to importation into the Southwest, to begin to meet the Southwest's water problems. This is just a beginning, as I say, because I personally feel, and the Governor feels that the only way we are going to solve this whole problem that we have discussed the last 2 or 3 days, and I have been sitting here listening to a lot of these discussions, is to devise water resource programs that meet the needs of all of the States, not just the needs of southern California, not just the needs of Arizona, not just the needs of Nevada. This is the meat of the statement.

Mr. HOSMER. I ask unanimous consent to yield my time to the gentleman from Pennsylvania.

Mr. ASPINALL. Without objection, it is so ordered.

Mr. SAYLOR. Mr. Head, I appreciate the statement that you have on the bottom of page 3, the last two sentences. It is my understanding that it is your interpretation of section 304 that if there is a shortage, California is guaranteed by this section 4.4 million acre-feet and the rest of you will take what is left, if any?

Mr. HEAD. Yes, after satisfying the 4.4 present perfected rights and those that are being served by existing diversion works.

Mr. SAYLOR. Is it the position of the Governor of Nevada that he is perfectly willing to take his chances with the other States in the lower basin?

Mr. HEAD. That is correct.

Mr. SAYLOR. And share proportionately if there is a choice?

Mr. HEAD. That is correct. We made the same statement before your committee when we were here on H.R. 2020.

Mr. SAYLOR. But you were not willing to do that if California gets 4.4 million acre-feet?

Mr. HEAD. No, I can do a little arithmetic real quick to demonstrate why. Say we had 6.5 million available for diversion, we had a million acre-feet of rights in Arizona, and satisfied 4.4 in California, this gives a use of 5.4—I estimate another hundred thousand acre-feet of other perfected rights or uses. This 5.5 million of the 6.5 million is already taken. The way I interpret this language, it would leave the central Arizona project and the southern Nevada water supply project a million acre-feet to be divided between the two of us. Their project is 1.2 million and ours is 300,000 acre-feet. This is why we cannot buy the language.

Mr. ASPINALL. The gentleman from Arizona?

Mr. UDALL. I am happy to have you before us. I want to compliment you and Governor Sawyer for the constructive approach you have taken toward this problem. We in Arizona are pleased to be associated with you and are pleased with the way we are all going forward with some long-range plans to meet the needs of all of our States.

You indicate in your statement that the Governor has transmitted a memorandum to the chairman of this committee setting forth the evaluation of the three lower basin States on water supply in the Colorado River. Who signed that for your State?

Mr. HEAD. I did.

Mr. UDALL. Did you participate in the study and the discussions that led up to it?

Mr. HEAD. I did

Mr. UDALL. And in your judgment, is this a sound and realistic study?

Mr. HEAD. Yes.

Mr. ASPINALL. The Chair believes we should receive no testimony on the memorandum referred to until that document goes into the hearing. It is not in the record of the hearing yet.

Mr. UDALL. I understand that.

Mr. ASPINALL. He stands on his statement. I do not want any evidence or any testimony offered except what is in it and why.

Mr. UDALL. I had not intended to go into that, Mr. Chairman. I simply wanted a general statement that he participated in the formulation of it and that he stands on it professionally and personally.

Mr. HEAD. Yes, sir.

Mr. ASPINALL. The gentleman from Idaho?

Mr. HANSEN. Mr. Chairman, one question.

On page 2, in your statement, you state something with regard to the Western States Water Council meeting at Lake Tahoe. Was there any agreement at this particular meeting that there would not be any action taken toward resolving water problems, water transportation problems from one basin to another, or any of these things, until a study could be made and approved among the representatives of the 11 States that participated?

Mr. HEAD. It was the intent of all the participants that the first item of business is for each of the States to evaluate its resources and its needs in order that we can form a basis for giving guidance and evaluating plans that are proposed for regional diversion, transbasin diversion, transstate diversion.

Mr. HANSEN. Do you feel that the legislation that is before us and which we are hearing your testimony on today violates any agreement you made at Lake Tahoe?

Mr. HEAD. No, it does not, to my knowledge.

Mr. HANSEN. Thank you, Mr. Chairman.

Mr. ASPINALL. The gentleman from California?

Mr. REINECKE. I would like to make sure I understood one thing, Mr. Head, at the bottom of page 3, where you indicate you cannot accept diversions to assure California's 4.4. Do I understand you will accept diversions until all of the perfected rights are satisfied?

Mr. HEAD. Of course, perfected rights come before any shortages. They take no shortages until there is no other water to satisfy their needs.

Mr. REINECKE. Thank you. I have no further questions.

Mr. ASPINALL. Thank you very much, Mr. Head, for being willing to stay until this late hour to give the Governor's testimony.

Mr. HEAD. It was a pleasure.

Mr. ASPINALL. The committee stands adjourned until tomorrow morning.

(Whereupon, at 5:05 p.m., the committee recessed until the following morning, Thursday, August 26, 1965, at 9:45 a.m.)

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

THURSDAY, AUGUST 26, 1965

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. The Subcommittee on Irrigation and Reclamation will come to order for the further consideration of pending business, and the Chair will recognize the distinguished gentleman from Colorado, Mr. Aspinall, chairman of the full committee, to introduce the first witness.

Mr. ASPINALL. Thank you very much, Mr. Chairman, because I do want to have the honor and privilege of presenting the next witness and the gentleman who accompanies the next witness.

I think that following through with what was said here in committee yesterday about the contributions of the upper basin States to the proposed central Arizona project, I would just like to put into the record at this time a few figures. If we figure the entitlement under the compact to the upper basin States to be 6.3 million acre-feet of wet water, Colorado's entitlement under that would be 3,260,000 acre-feet of water. Colorado is presently using 1,782,000 acre-feet of water. Accordingly, Colorado has unused at the present time 1,480,000 acre-feet of water.

The State of Utah has an entitlement of 1,449,000 acre-feet of water, and present uses of 579,000 acre-feet of water, leaving unused in Utah 870,000 acre-feet of water.

Wyoming has an entitlement of 882,000 acre-feet of water, using at the present time 265,000 acre-feet of water, leaving unused in Wyoming 617,000 acre-feet of water.

So it can be readily seen from these figures just what the contribution of the upper basin will be during the first years of the operation of the Arizona project.

The only reason for putting these figures into the record at this time is to bring to the attention of this committee what the Governors of the upper basin States must be thinking when they present their statement before this committee.

We have as our Governor at the present time a man who is certainly knowledgeable in the matter of Colorado's responsibilities in natural

resources and especially in the field of water resources, and he is very understanding of his duty to the people of Colorado.

May I say, Governor, that you have been most cooperative with me as the chairman of this committee and my responsibility on natural resources development in Colorado and the West, and especially in water matters having to do with all of the West, and I appreciate it very, very much. No one could be more cooperative than you have been.

The Governor is accompanied by Felix Sparks, who is known to all of us, a personal friend of mine. He is also a lawyer, former Supreme Court judge of Colorado, and knowledgeable in matters having to do with water resources.

My friend from Arizona has just brought to my attention that I did not put New Mexico into the water picture here, and, of course, the reason I did not put New Mexico figures in the record is because, under presently expected water conditions, New Mexico has under authorization and construction at the present time facilities to use every drop of water to which the State of New Mexico is entitled.

So, Mr. Chairman, it is my personal privilege to present a personal friend, a dedicated servant of the people whom he has the honor to represent as Governor, the Honorable John Love, Governor of the State of Colorado.

STATEMENT OF HON. JOHN A. LOVE, GOVERNOR OF THE STATE OF COLORADO; ACCOMPANIED BY FELIX L. SPARKS, DIRECTOR, COLORADO WATER CONSERVATION BOARD

Governor LOVE. Thank you very much, Congressman Aspinall, and I appreciate more than I can tell you those words. I would like to say in return that I am sure that in my experience, particularly the people of the Western States join with Colorado in gratitude to you for the many years of fine service you have given to the resources of the West.

Mr. Chairman and gentlemen of the committee, I appreciate the opportunity to express the official views of the State of Colorado on the pending legislation which would authorize the construction of the Lower Colorado River Basin project. I wish to emphasize at the outset that we in Colorado comprehend the urgent need for developing additional water supplies in those areas which are dependent wholly or in part upon the lower Colorado River and its tributaries. The seven States of the Colorado River Basin throughout their history have struggled with the challenging problem of how to deliver adequate water supplies to points of need. The passage of time, together with phenomenal population increases, has burdened us all with water supply problems of unparalleled magnitude.

The current water supply crisis of the State of Arizona is symptomatic of a general ailment which afflicts all Colorado River States. The flow of the river is not now sufficient for all the demands being put upon it. Almost 50 years ago it was recognized that this situation would become a fact. Since destructive competition among the affected States would have been injurious to all, the Colorado River compact was signed in 1922 to achieve an equitable apportionment of the river's waters.

The heart of the legislation now pending here is the construction of the central Arizona project. The project is needed. I propose to attempt an analysis of that project in the light of the Colorado River compact and the available water supply, from the viewpoint, of course, of the State of Colorado. This analysis is based on information supplied me by the Colorado Water Conservation Board and independent experts who have been employed to prepare the details of these analyses.

A continuing analysis of the problems of the Colorado River has been a major objective of our Colorado Water Conservation Board for almost the past 30 years. That board was established by the Colorado Legislature to recommend policy on water matters affecting our State. With me here today, as the Congressman has said, is Mr. Felix L. Sparks, director, and career employee, of the State water board.

I would also, Mr. Chairman, like to take this opportunity briefly to indicate that also with me with knowledge and vital interest in the matters which you are considering are other representatives of Colorado, Mr. J. R. Barkley, who is the secretary-manager of the Northern Colorado Water Conservancy District; Mr. Richard Shannon, president; Mr. Glen Saunders, chief counsel; Mr. Robert Fisher, water supply engineer; and Mr. Jack Ross, attorney, all of the Board of Water Commissioners, City and County of Denver; Mr. Frank E. Maynes, attorney, Southwestern Colorado Water Conservation District; Mr. Philip P. Smith, secretary-engineer, and Mr. Kenneth Balcomb, attorney, both of the Colorado River Water Conservation District; and Mr. J. Sid Nichols, president of the Southeastern Colorado Water Conservancy District.

The comments that I make here are based upon an exhaustive research of both private and official opinion in the State of Colorado. They are based upon a desire to further the water resource development of the entire Colorado River Basin. Nothing in our comments was or is designed to preclude the construction of the central Arizona project.

It is therefore the position of the State of Colorado that it approves and supports the proposed Federal participation in the further development of the Lower Colorado River Basin, provided, and provided only, that certain principles are incorporated into any authorizing legislation. These principles and brief explanations are as follows:

Principle No. 1: That any and all Federal projects within the Lower Colorado River Basin, whether heretofore or hereafter constructed shall be planned and operated to the end that diversions from the main stream of the Colorado River below Lee Ferry shall be limited when necessary so as not to prejudice, impair, or preclude the future Federal authorization, or other development, of projects which will be required for the annual consumptive use of water from the Colorado River system in the upper division of States of 7.5 million acre-feet after delivery of 75 million acre-feet at Lee Ferry in any period of 10 consecutive years.

As for the explanation of the principle: When the Colorado River compact was negotiated it was believed that the dependable flow of the Colorado River and its tributaries exceeded 20 million acre-feet of water annually. Based upon this assumption, there was appor-

tioned in perpetuity to the upper and lower basins respectively the consumptive use of 7.5 million acre-feet of water annually. The lower basin was given the additional right to increase its annual uses by 1 million acre-feet. It was recognized at that time that the United States would probably enter into a treaty with the Republic of Mexico by which Mexico would be guaranteed the delivery of a part of the riverflow. Subsequently, the United States did enter into such a treaty and guaranteed to the Republic of Mexico the annual delivery of 1.5 million acre-feet of water. The net effect of all allocations was then to place a draft upon the Colorado River System for 17.5 million acre-feet annually.

Nature has now destroyed the calculations of 1922. Based upon the longest period of record, 1896–1964, it is now obvious that the average flow of the Colorado River and its tributaries is barely equal to the total allocation of 17.5 million acre-feet. When there is deducted from this figure the river and reservoir losses, then there is not sufficient water to supply the total allocation already made, if such allocations are considered in terms of river diversions.

Upon the assumption that there would be sufficient water to amply provide for all allocations, the States of the upper basin by the terms of the compact agreed to deliver 75 million acre-feet of water in any consecutive 10-year period at Lee Ferry. It is now apparent, based upon the historic riverflow, that the States of the upper division cannot make this delivery and still retain the consumptive use of the 7.5 million acre-feet of water allocated to those States in perpetuity.

For over 50 years the flow of the Colorado River and the uses made therefrom have been continuously analyzed by a succession of competent engineers and hydrologists in both basins. At this point in history the conclusion is inescapable that the water available to meet the allocation made to the upper division States is deficient by over 1 million acre-feet annually.

At the present time in the upper basin of the Colorado River there are water resource projects now in use, under construction, or in the active planning stage which will consume an estimated 6,900,000 acre-feet of water annually. Nature and the compact have decreed, however, that the dependable water supply available to the upper basin will not exceed 6.3 million acre-feet. This means that the upper basin, as well as the lower basin, is in need of supplemental water.

During the past several months, the Upper Colorado River Commission has engaged the services of Tipton & Kalmbach, Inc., a consulting engineering firm of Denver, Colo. This firm enjoys both national and international recognition in the field of water resource development. Mr. Tipton has over the many years participated in almost every line of study involving the water resources of the Colorado River. A recent report prepared by him will be presented to you at a later point in these hearings. I wish to observe at this time that the staff of our State water board has followed the course of the Tipton studies and concurs in the results thereof. These results confirm the continuous studies made by our staff over the years.

A reasonable interpretation of existing facts and future predictions, based upon these studies, is that there will not be sufficient water available from the mainstream of the Colorado River to supply the full requirements of the central Arizona project later than 1995.

Under the most severe conditions, as shown by recorded history, shortages could occur to the project as early as 1975.

We believe that it is unwise to assume that there will be any water available for the project after the year 2000, unless the main stream supply of the river is augmented.

The imminent and foreseeable needs of the upper basin should not be minimized. The rate of upper basin water resource development during the decade 1960–70 will exceed the cumulative development of the previous hundred years. As I have pointed out, we already have in existence, under construction, or in the active planning stages, both public and private, projects which will more than utilize all of the remaining water available to the upper basin.

We are assuming that there is no dispute about the fact that the central Arizona project, if constructed, will be utilizing water supplies which were apportioned in perpetuity to the upper basin. We accept the use of this water by any entities in the lower basin, as long as it is used with appropriate guarantees that it must be relinquished to us at the times and in such quantities as our future needs dictate. We are confident that such guarantees can be accomplished if there is a complete and unequivocal understanding at this time, expressed in the language of the authorizing legislation.

I wish to observe at this point that there appears to be an assumption on the part of some lower basin users that the Colorado River compart allocated to them in perpetuity the annual use of 7.5 million acre-feet of water from the main stream of the Colorado River. This is not a fact. The Colorado River compact, without ambiguity, apportions water from the Colorado River system. The compact defines the system at that portion of the Colorado River and its tributaries within the United States of America. Our pointed reference to these compact provisions arises from the assertion of the State of Arizona in the recent case of *Arizona* v. *California* that the waters of the Gila River are not subject to the terms of the compact.

If anyone in the lower basin is seriously contending that any tributaries of the Colorado River should be excluded from the compact provisions, then we in the upper basin will likewise assert that the Green, the Yampa, the San Juan, the Gunnison, and other tributaries of the Colorado River in the upper basin be also excluded from the provisions of the compact.

Any suggestion that the upper basin is attempting to modify or change the compact provisions is erroneous. We insist that the clear intent of the compact be observed.

Because a challenge has been made to the terms of the Colorado River compact by the State of Arizona, and because the State of Arizona is now proposing the construction of the central Arizona project, we earnestly ask this committee to consider the question at this time. We recommend that the pending legislation provide for one of two things: either an accounting of all the waters of the Colorado River system, in accordance with the intent of the compact, or that the obligation of the upper basin to deliver water at Lee Ferry be recognized as limited to 75 million acre-feet in any consecutive 10-year period.

Mr. SAYLOR. Governor, at this point, would you permit me to interrupt you?

Governor LOVE. Yes.

Mr. SAYLOR. I can't stay.

Mr. Chairman, I ask unanimous consent that a letter which I received from the Bureau of Indian Affairs with regard to coal leases which I questioned the Secretary on yesterday be placed in the record.

Mr. ROGERS. Is there objection?

Mr. SAYLOR. This is relative—I asked the Secretary yesterday relative to coal leases and application for coal leases which were in the Bureau of Indian Affairs. This is the letter which I received pursuant to my inquiry.

Mr. ROGERS. Is there objection?

The Chair hears none, and the letter will be inserted at the appropriate place. Will be found on p. 219.)

You may proceed.

Governor LOVE. Thank you. I will proceed to the second principle that the State of Colorado feels must be incorporated.

The principle is stated: That concurrently with any congressional authorization of the Lower Colorado River Basin project, or any of its component parts, there also be authorized a project or projects to import water into the Colorado River Basin from sources outside the natural drainage area of the Colorado River system, in such quantities as will—

(*a*) Meet, as a national responsibility, the obligation to deliver water to the Republic of Mexico pursuant to the terms of the Mexican Water Treaty of 1944.

(*b*) Supply the lower basin States with that amount of water required for the consumptive use of 7½ million acre-feet per year as was intended by article III(a) of the Colorado River compact.

(*c*) Supply the upper basin States, by exchange or otherwise, with that amount of water required for the consumptive use of 7½ million acre-feet per year as also was intended by article III(a) of the Colorado River compact.

Explanation: It will be obvious from these hearings that all seven Colorado River States are in complete agreement on the necessity of augmenting the natural water supplies of the river system. Shortages are occurring on the river today. They will increase with the passage of each succeeding year. Within the foreseeable future, every State depending on the Colorado River will be faced with major water shortages.

Since this is a known requirement, we feel that it is appropriate for the Congress to consider a concurrent authorization of a project or projects to augment the Colorado River supplies. It is only in this manner that the future problem of the Colorado River can be alleviated. We believe that it is entirely feasible and proper to authorize the Secretary of the Interior to augment the supplies of the river upon a finding of economic feasibility.

We feel that such augmentation should be part and parcel of the Lower Colorado Basin project, and that such augmentation should be considered as being available to the central Arizona project in the future.

We propose that such augmentation first go to the satisfaction of the Mexican Treaty requirement, and in further sequence to supply the compact requirements of the Lower and then Upper Colorado River Basins respectively. Without a reasonable assurance of timely and

adequate augmentation of the natural flow of the Colorado River, it would be responsible for me or any other official of the upper basin States to assure our citizens the return of our waters which will be diverted by the central Arizona project.

Principle No. 3: That the primary purpose of the Colorado River storage project is to implement beneficial consumptive use of water in the upper basin and that Glen Canyon Reservoir will not be drawn below its rated head, except as may be necessary to comply with article III(d) of the Colorado River compact and except as may be approved by the Upper Colorado River Commission.

Explanation: At the time the compact was signed, it was recognized that the upper division States could not deliver 75 million acre-feet of water in every consecutive 10-year period at Lee Ferry and still have adquate water remaining for its use without the construction of holdover storage facilities above Lee Ferry. The flow of the river is too erratic to permit any type of uniform deliveries without holdover storage. Based upon this premise, the Congress in 1956 authorized the construction of the Colorado River storage project. This project is now virtually completed and capable of storing water. However, for reasons not clearly understood by us, storage in the project reservoirs has been delayed by the Secretary of the Interior to maintain a rated power head at Hoover Dam.

We in the upper basin have no control whatsoever over the operation of the lower basin facilities. If the lower basin entities wish to operate their facilities so as to maintain a rated power head, then such operation is solely at their discretion within the limitation of their apportioned share of water. No demand should be made for such lower basin utilization out of water apportioned to the upper basin in contravention of the terms of the Colorado River compact. Lake Powell must be maintained at least at its rated power head, in order that we may have some reserve to draw upon when our deliveries at Lee Ferry would otherwise be deficient. We ask for this reserve only so long as our deliveries at Lee Ferry equal or exceed the specified compact requirement of 75 million acre-feet in any 10-year period.

Under the proper conditions and safeguards, of course, it is to the advantage of the upper basin to release the greatest possible amounts of water through Glen Canyon Dam. The criteria that we herein propose would permit us to approve such releases. I will not dwell on this point further, since I am sure that one of our foremost water authorities, former Senator and former Governor Ed. C. Johnson, will have more to say on this subject.

Principle No. 4: That the diversion of money from the Upper Colorado River Basin fund to the Colorado River dam fund as payment for the so-called Hoover Dam deficiencies, pursuant to the Glen Canyon filling criteria, be terminated forthwith; and that all expenditures made from the Upper Colorado River Basin fund to meet deficiencies in generation at Hoover Dam, pursuant to the Glen Canyon filling criteria, be reimbursed to the Upper Colorado River Basin fund in full.

Explanation: The criteria to govern the filling of Glen Canyon Reservoir, promulgated by the Secretary of the Interior on April 2, 1962, over the objection, I might state, of the upper basin States, provide that the United States will make an allowance for Hoover Dam power-

plant deficiencies occasioned by the filling of Glen Canyon Reservoir. Although the filling criteria do not so specifically state, it was intended that this allowance be made from appropriations to the Upper Colorado River Basin fund and through the delivery of power generated from Colorado River storage project powerplants.

The filling criteria contain a provision that the Upper Colorado River Basin fund may be partially reimbursed after 1987 from Hoover Dam powerplant revenues, if so authorized by the Congress. An explanation of the criteria, as submitted to the Congress, indicates that the reimbursement to the Upper Colorado River Basin fund will be limited to the amount of dollars actually diverted from that fund for the purchase of Hoover substitute energy. The proposed repayment does not include either the value of the energy diverted from the upper basin powerplants or the additional interest which will be imposed against the upper basin fund because of the impairment of the ability of that fund to repay on schedule the reimbursable Federal investment in the upper basin projects. These latter two items will undoubtedly exceed the actual amount of dollars diverted.

We are unable to find any authority either in law or by contract for this diversion of upper basin funds for the benefit of Hoover Dam power contractors. As a matter of fact, the Hoover Dam power contracts expressly contemplated future upper basin development and contained a provision that the United States did not guarantee any certain quantity of energy. Lower basin power contractors even made statements that it would be absurd for the United States to make such guarantees. Absurd or not, moneys have already been diverted from the Upper Colorado River Basin fund for the purpose of purchasing substitute energy at Hoover Dam.

It appears to us that it is extremely unwise to let this matter rest until after 1987. The Secretary of the Interior has already indicated that it is his intention to make only a partial reimbursement to the upper basin fund, and only then if so authorized by Congress. We feel that this matter should be resolved now. The drain on the Upper Colorado River Basin fund, because of this Hoover Dam power allowance, will exceed $20 million.

In addition to the return of money already expended, we request that future expenditures be terminated. The Boulder Canyon Project Adjustment Act established a fund known as the Colorado River development fund, to which there is appropriated from Hoover Dam revenues the sum of $500,000 annually. This fund, in the discretion of the Secretary of the Interior, is divided among all seven States of the Colorado River Basin for the purpose of general investigations. The money so appropriated is nonreimbursable to the Federal Government. It is our opinion that the Colorado River development fund is no longer needed for its original purpose and that it should now be utilized, if necessary, to take care of the so-called Hoover Dam power deficiencies, and if insufficient for that purpose the remaining obligation be charged to the Colorado River Dam fund.

We have reviewed the contents of H.R. 4671. The staff of our State water board, working in conjunction with the staff of the Upper Colorado River Commission, has proposed a number of amendments to that bill. I have enumerated here only the principal objectives of the requested amendments. A copy of H.R. 4671, as revised to in-

clude the proposed amendments, will be presented by Mr. Ival V. Goslin, executive director of the Upper Colorado River Commission.

If I have by this presentation unduly imposed upon the time of the committee, I ask your indulgence. The future welfare of the State of Colorado is synonymous with the available water resources of the Colorado River. The pending legislation is therefore of surpassing importance to us. I am informed that our distinguished Colorado Congressman, Chairman Wayne N. Aspinall, will introduce statements from various Colorado agencies and individuals which will bear out my last observation.

May I close with the request that the resolution of the Colorado Water Conservation Board, adopted on August 11, 1965, on the subject of the pending legislation, be included as a part of my statement, as though read in full.

Mr. ROGERS. Governor Love, without objection, the resolution will be included as a part of your statement.

(The resolution referred to follows:)

RESOLUTION

Whereas the States of the Lower Colorado River Basin need the construction of major additional facilities to provide an adequate water supply for a growing and nationally important area; and

Whereas numerous bills have been introduced in the Congress to authorize a federally financed project to accomplish this end; and

Whereas the State of Colorado as a part of the Upper Colorado River Basin is faced with identical problems, and desires to cooperate with the States of the lower basin and to support necessary Federal legislation, provided that such legislation adequately protects the continuing growth of Colorado and the other States of the Upper Colorado River Basin: Now, therefore, be it

Resolved by the Colorado Water Conservation Board in special session assembled at Denver, Colo., this 11th day of August 1965, That it approves and supports the proposed Federal participation in the further development of the Colorado River Basin: *Provided,* and *provided only,* That when and if the following principles are incorporated into any authorizing legislation:

1. That the Secretary of the Interior shall be directed and required to plan and operate any and all Federal projects within the Lower Colorado River Basin, whether heretofore or hereafter constructed, to the end that diversions from the main stream of the Colorado River below Lee Ferry shall be limited when necessary so as not to prejudice, impair, or preclude the future Federal authorization or other development of projects which will be required for the annual consumptive use of water from the Colorado River system in the upper division States of 7,500,000 acre-feet of water, or such part thereof as may be physically available after delivery of 75 million acre-feet at Lee Ferry in any period of 10 consecutive years.

2. That concurrently with any congressional authorization of the Lower Colorado River Basin project, or any of its component parts, there also be authorized a project or projects to import water into the Colorado River Basin from sources outside the natural drainage area of the Colorado River system, in such quantities as will—

(*a*) Relieve the States of the Colorado River Basin from any obligation to deliver water to the Republic of Mexico pursuant to the terms of the Mexican Water Treaty of 1944.

(*b*) Supply the lower basin States with that amount of water required for the consumptive use of 7½ million acre-feet per year which is not supplied in accordance with article III(a) of the Colorado River compact.

(*c*) Supply the upper basin States, by exchange or otherwise, with that amount of water required for the consumptive use of 7½ million acre-feet per year which is not supplied in accordance with article III(a) of the Colorado River compact.

3. That the primary purpose of the Colorado storage project is to implement beneficial consumptive use of water in the upper basin and that Glen

Canyon Reservoir will not be drawn below its rated head, except as may be necessary to comply with article III(d) of the Colorado River compact and except as may be approved by the Upper Colorado River Commission.

4. That the diversion of funds from the Upper Colorado River Basin fund to the Colorado River Dam fund as payment for the so-called Hoover Dam deficiencies, pursuant to the Glen Canyon filling criteria, be terminated forthwith.

5. That all expenditures made from the Upper Colorado River Basin fund to meet deficiencies in generation at Hoover Dam pursuant to the Glen Canyon filling criteria, be reimbursed to the Upper Colorado River Basin fund in full, such reimbursement to include, but not be limited to, the cost of deficiency energy purchased, the cost of energy impairment, and the cost of capacity impairment; be it further

Resolved, That in order to carry out and implement the intent of this resolution the staff of the board is authorized and instructed to—

(*a*) Maintain close and continuous liaison with the Governor of the State of Colorado, the members of Colorado's congressional delegation, and Colorado's member of the Upper Colorado River Commission.

(*b*) Negotiate with representatives of the Lower Colorado River Basin States.

(*c*) Present for the consideration of this board any draft of legislation which is prepared as a result of the negotiations authorized herein.

CERTIFICATE

I certify that the foregoing is a true and correct copy of a resolution adopted by a unanimous vote of the members of the Colorado Water Conservation Board in special session assembled at Denver, Colo., on the 11th day of August 1965.

FELIX L. SPARKS, *Director and Secretary.*

Mr. ROGERS. The Chair recognizes the gentleman from Colorado, Mr. Aspinall, for such statement as he may wish to make.

Mr. ASPINALL. Mr. Chairman, may I first commend the Governor and his staff for what I consider to be a very constrained, very clear, very constructive, and very knowledgeable statement of what is involved in the legislation now before us as it relates to the State of Colorado.

I would ask unanimous consent that the following statements, seven in all, the last being a resolution, be placed in the record at this place:

A statement by the Southeastern Colorado Water Conservancy District, by Mr. Charles Boustead, general manager.

Is Mr. Boustead in the room?

(Mr. Boustead stood up.)

Mr. ASPINALL. A statement by the Board of Water Commissioners, City and County of Denver, by Glenn G. Saunders, chief counsel.

Is Mr. Saunders in the room?

(Mr. Saunders stood up.)

Mr. ASPINALL. A statement of the Grand Valley Irrigation Co., by Eugene H. Mast, attorney for the company.

Is Mr. Mast in the room?

(Mr. Mast stood up.)

Mr. ASPINALL. A statement by the Southwestern Colorado Water Conservation District, by Frank E. Maynes, attorney for the district.

Is Mr. Maynes in the room?

(Mr. Maynes stood up.)

Mr. ASPINALL. A statement by the Northern Colorado Water Conservancy District, by J. R. Barkley, secretary-manager of that district.

Is Mr. Barkley in the room?

(Mr. Barkley stood up.)

Mr. ASPINALL. A statement by Colony Development Co., Oil Shale Corp., that is building the oil shale plant at Grand Valley, by E. F. Morrill, president.

Is Mr. Morrill in the room?

The resolution of the Colorado Water Congress.

I have these documents here in my possession and these gentlemen are present, and I would ask unanimous consent that they be placed in the record at this point.

Mr. ROGERS. Is there objection?

The Chair hears none.

The statements referred to by the gentleman from Colorado, Mr. Aspinall, will be included in the record at this point.

(The statements and resolution referred to follow:)

STATEMENT OF CHARLES BOUSTEAD, GENERAL MANAGER, SOUTHEASTERN COLORADO WATER CONSERVANCY DISTRICT

I am Charles Boustead, general manager of the Southeastern Colorado Water Conservancy District, 900 North Main Street, Pueblo, Colo.

This district is a legal entity created under the laws of the State of Colorado for the purpose of contracting with the Federal Government for the development of the Fryingpan-Arkansas project, presently under construction. When completed, the project will divert from the Colorado River system in Colorado approximately 70,000 acre-feet annually for supplemental municipal, industrial, and irrigation uses within the Arkansas River Valley in southeastern Colorado.

The perpetual diversion of Colorado River water through this project is absolutely vital to the operation of the project and the welfare of the Arkansas Valley.

For these reasons the Southeastern Colorado Water Conservancy District strongly supports the position of the Colorado Water Conservation Board as set forth in its resolution dated August 11, 1965, regarding the Lower Colorado River Basin project currently identified as H.R. 4671.

AUGUST 26, 1965.

Re hearings on H.R. 4671.

HOUSE INTERIOR AND INSULAR AFFAIRS COMMITTEE,
89th Congress, 1st Session.
(Attention of Hon. Wayne N. Aspinall, Chairman).

GENTLEMEN: I am Glenn G. Saunders, chief counsel for the Board of Water Commissioners of the City and County of Denver, Colo. I have occupied this position for the last 25 years.

The Denver Water Department deals with a commodity so valuable and fundamental to our existence that the department is established as an independent agency of Denver under control of a five-man board. Board members' terms overlap to provide for the necessary continuity for the long-range planning and development which has provided a substantial and adequate waterworks system to supply practically the entire Denver metropolitan area. More than half the people in Colorado live in this area, and the Denver Water Department serves two-thirds of these people.

The nature of the aquifers underlying the Denver area makes it impractical to depend upon wells for creating a municipal water supply. As a consequence, Denver's water system was started and grew in its early years on the basis of water derived from a fluctuating stream called the South Platte River which flows through the city. This stream also supplies many other users.

Under our system of law, Denver's use of the Platte is limited not only by the limitations on the river supply itself, but by confinement to its lawful priorities of right to take water for its use out of the stream. Under these limitations, Denver can only derive about half of its presently needed water supply from the South Platte River.

The remaining half of Denver's current water supply must come from the tributaries of the Colorado River, a river basin less intensively developed than the Platte River Valley. Some of the Colorado River tributaries have been reached by Denver, at great expense, through three transmountain tunnels. The

first of these tunnels is the well-known Moffat Tunnel, the next, the Williams Fork Tunnel or Jones Pass Tunnel. The last is the Roberts Tunnel, just completed, 23 miles in length, considered to be one of the world's great engineering feats.

In addition to supplying half of Denver's present water needs, the Colorado River must supply practically all of the water for the continued growth of the Denver metropolitan area. Further extensions and improvements of Denver's present water collection system to reach additional waters of the Colorado River tributaries are underway. These will require large expenditures by Denver water users in addition to the $70 million investment recently made for the just completed Roberts tunnel, and Dillon Reservoir. The reservoir is a major storage facility of the Denver system located at the inlet of the Roberts tunnel.

Denver has an extensive system of reservoirs to hold water impounded during good supply years for use during periods of severe droughts. These reservoirs control almost all surplus waters which occur in years of heavy precipitation with only one major reservoir site remaining for development, which is now being coordinated with flood control and reclamation activity of the U.S. Government.

The now well-known fact that the Colorado River is producing substantially less water than the supply attributed to it when the Colorado River compact was made presents a potentially serious detrimental effect on the future growth of Denver. With less water available than contemplated in 1921 when the Colorado River compact was agreed to, Denver's available Colorado River water resources would be drastically curtailed by development in the lower basin which placed burdensome requirements on the upper basin's deliveries at Lee Ferry.

The close communication between the people of Colorado and the people of the lower basin makes us in Colorado well aware of the urgency of additional water supply for full development there, and the importance to that area of the enlargement of the volume of water available to the Colorado River Basin.

The same considerations apply to the Denver metropolitan area. Sufficient water must be imported into the Colorado River so as to assure the growth and economic development of the States of the lower basin under circumstances such that they will never have to make a call on the upper basin States for water at Lee Ferry. Since the major portion of the water of the entire Colorado River is derived from the very tributaries in Colorado upon which Denver's growth is dependent, the future growth of Denver would be assured by such an importation. Without a current clear guarantee of as high a priority for such importation as for completion of planned lower basin water projects, we in the Denver metropolitan area suffer the same kind of water shortage problems as the lower basin is trying to solve.

No reason appears to lead to an assumption that the water importation work will be any less time consuming than other work sought to be authorized by H.R. 4671. To us there is every reason that the two phases should be scheduled together and their ultimate completion equally assured, even though the importation work might take a little longer to finish.

By careful long-range planning, the Denver Water Department has met the need for an adequate water supply for the metropolitan area during the half century of city ownership. This planning includes studies of the characteristics of water supply of the Colorado River, and the application of those characteristics to Denver's specific problems, which are solved at the local level. Denver's familiarity with the Colorado River flows permits me to report that Denver's necessities are identical with the general necessities of the State of Colorado and the resolution setting forth the basic principle adopted by the Colorado Water Conservation Board and the Colorado Water Congress. In our opinion, the resolutions represents a necesary and realistic approach to the solution of the Colorado River water supply problem for both upper and lower basins. We believe that the solution of the problem of substantial increases of water to the Colorado River Basin is largely a scientific matter, to be handled without emotion by those competent to analyze the facts involved and develop them into realistic programs to provide and distribute water where needed.

Any legislation should make provision that the Congress will be given the advantage of the vast amount of knowledge which has been assembled in the solution of what is not at all an insurmountable problem when we consider the skills and magnitude of the Federal and State agencies whose talents can be brought to bear upon the solution of the problem. We believe the solution is well within the easy grasp of this Nation. We suggest that the Congress, in its legislation, should apply the principles of the resolution of the Colorado State Water Conservation Board so as to implement a program for the importation

of enough water into the Colorado River Basin so that its full development can be realized.

Respectfully submitted.

GLENN G. SAUNDERS.

STATEMENT ON BEHALF OF GRAND VALLEY IRRIGATION CO. BY EUGENE H. MAST, ATTORNEY FOR THE COMPANY

The Grand Valley Irrigation Co. is one of the major and older users of water out of the Colorado River. This company holds decree No. 1 for 520 cubic feet of water out of the Colorado River and a junior decree for 120 feet. Any diminution of the availability of water out of the Colorado River is a matter of grave concern. This company and two Bureau of Reclamation projects known as the Grand Valley Water Users Association and the Orchard Mesa Irrigation District, are all centered at Grand Junction in Mesa County, Colo. 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 the company and projects mentioned comes out of the Colorado River. Over 75,000 acres of land is irrigated from the Colorado River; another large portion of the area is irrigated from water derived from the Gunnison River, which is tributary to 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. The area supports public schools, colleges, churches; light manufacturing, the distribution of commodities and services provides employment for many citizens. All of this is dependent upon the Colorado River which is already overworked. More water is adjudicated or committed for use out of the river than the river ordinarily contains.

Green Mountain Reservoir, the important installation in connection with the Colorado-Big Thompson project, is most important to western Colorado users of Colorado River water. By agreement with the United States and other water users in Colorado, certain transmountain diversions were made, which made less Colorado River water available for use in western Colorado. This is compensated for by the Green Mountain 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, Colo., 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.

The oil shale industry is being rapidly developed in western Colorado. Without adequate water, the great natural resources of petroleum products contained in the oil shale cannot be made available for usage by the United States, either in peace or in war.

The Colorado River is now overused. Any increase demands on the lower Colorado River will be made at the expense of the existing social and economic structures and prevent further development of important natural assets in the upper basin.

For the foregoing reasons, it is strongly urged that no attempt be made to further deplete the flow of the Colorado River in the lower basin unless there is simultaneous authorization for importation of water to the Colorado River Basin in adequate quantities to fully protect the upper basin, particularly insofar as our already existing rights are concerned.

STATEMENT OF THE SOUTHWESTERN WATER CONSERVATION DISTRICT OF COLORADO PRESENTED BY FRANK E. MAYNES, ATTORNEY FOR THE DISTRICT

The Southwestern Water Conservation District of Colorado is an agency of the State of Colorado responsible for the conservation, use, and development of the water resources of the San Juan and Dolores Rivers and their principal tribu-

taries in the San Juan Basin in southwestern Colorado. As such, the Southwestern Water Conservation District is vitally concerned with the legislation now pending before this committee as H.R. 4671 and what effect this legislation may have on the proposed Animas-La Plata, Dolores, and San Miguel irrigation projects in southwestern Colorado.

A recent report made for the Upper Colorado River Commission by Tipton & Klambach, Inc., consulting engineers, on the water supplies of the Colorado River indicates that the available water from the Colorado River will be insufficient in the very near future to supply both lower basin and upper basin needs. Nevertheless, it is the judgment of the Southwestern Water Conservation District of Colorado that the proposed Federal participation in the future development of the Lower Colorado Basin as embodied in H.R. 4671 deserves the support of all the States. This judgment, however, is based upon the assumption that the Congress will at all times and in every manner fully protect the vital interests of the water users of the State of Colorado. This protection can be guaranteed the citizens of Colorado only by requiring that any Federal legislation authorizing construction of additional projects in the Lower Colorado River Basin contains adequate safeguards to insure a plentiful supply of water, by importation or otherwise, to the lower and upper basin States in the future. The recommended safeguards necessary for this protection have been concisely stated by the Colorado Water Conservation Board and the Colorado Water Congress in their "Statement of Position," copies of which have been introduced into the record of this hearing.

Southwestern Water Conservation District of Colorado adopts the recommendations as set forth by the Colorado Water Conservation Board and the Colorado Water Congress and recommends favorable action on H.R. 4671 with these safeguards fully incorporated into the legislation.

STATEMENT OF NORTHERN COLORADO WATER CONSERVANCY DISTRICT BY J. R. BARKLEY, SECRETARY-MANAGER

I am J. R. Barkley, secretary-manager of the Northern Colorado Water Conservancy District, a quasi-municipal corporation of the State of Colorado, and the agency which contracted with the United States for the construction, operation, and maintenance of the irrigation, municipal, and industrial water distribution facilities of the Colorado-Big Thompson project.

The primary function of the project, as this committee knows, is the conservation of supplies produced on the extreme headwaters of the upper Colorado River and their transmountain diversion for beneficial application within the South Platte River Valley of northeastern Colorado.

The district is responsible for the allotment and distribution of the project's annually produced water supplies, averaging about 260,000 acre-feet per year. Close to 80 percent of the imported waters are utilized by some 125 mutual ditch companies for supplemental irrigation supply. The remainder has been allotted by the district to municipalities, rural domestic water supply districts, and industrial corporations. Our district contains almost 750,000 acres of highly developed, irrigated lands which use, in varying degree, the supplemental waters imported from the Colorado River.

Additionally, of course, district water supplies are supplementally utilized by the Great Western Sugar Co. in its several refineries and by the commercial cattle-feeding operators of the South Platte Valley.

As an example of municipal usage, your committee should be interested in knowing that the city of Boulder, Colo., holds an allotment contract with the district in the amount of 13,700 acre-feet. Utilizing this along with that city's locally owned water supplies, the municipality furnishes its treated water to the several sizable Federal Government facilities in or adjacent to the city. The major installations thus supplied are the Bureau of Standards and the National Science Foundation's National Center for Atmospheric Research.

Continued diversion and use of imported water is vital to the economic welfare of irrigated agriculture and to the municipal, domestic, and industrial water users of Northern Colorado Water Conservancy District. It is also vital that the district's capability to supply supplemental water be fully protected in order that the revenues therefrom will be adequate to meet the district's construction repayment obligations to the United States for the water supply and distribution facilities of the Colorado-Big Thompson project.

Records clearly show that the annual flows of the Colorado River since the 1922 compact have been less than those contemplated by the negotiators of the compact. Thus, the proposal for sizable project developments in the Lower Colorado River Basin constitutes a potential threat of limited usage in the upper basin. An extended period of drought in the Colorado River Basin, following any extensive development in the lower basin, might well create delivery demands at Lee Ferry which could act to diminish the otherwise divertible waters of the district.

Therefore, in the judgment of the board of directors of the district, the States of the upper division, the State of Colorado, and the district itself can only be protected by inclusion of specific safeguards in any legislation which authorizes the construction of major water using facilities in the lower basin. While it is recognized that the lower basin urgently needs further development, the participation of the Federal Government in such development should be provided only after assured protection to the upper basin. Hence, the district strongly supports the position taken by the Colorado Water Conservation Board in the resolution adopted by that agency on August 11, 1965.

Specifically, it is the position of Northern Colorado Water Conservancy District that any Federal legislation which authorizes the construction and development of major water use facilities in the lower basin must contain the following requirements:

1. Federal projects within the lower basin shall be so operated that the required deliveries of water to the lower basin, measured at Lee Ferry, shall never exceed 7.5 million acre-feet per year.

2. Whenever a major water use project within the lower basin is authorized by Federal legislation, such authorization must include the simultaneous authorization of a project or projects for importation of water to the Colorado River Basin in sufficient quantities to guarantee—

(*a*) That the United States can meet, in full, the obligation to deliver waters from the Colorado River under the treaty with Mexico;

(*b*) That the upper basin, through exchange or otherwise, may make an annual consumptive use of 7.5 million acre-feet;

(*c*) That the lower basin may make an annual consumptive use of 7.5 million acre-feet and, in addition, supply sufficient water for such projects as are authorized for construction and operation within the lower basin.

AUGUST 23, 1965.

Re hearings on H.R. 4671.

HOUSE INTERIOR AND INSULAR AFFAIRS COMMITTEE,
89th Congress, 1st Session
(Attention: Hon. Wayne N. Aspinall, Chairman).

GENTLEMEN: My name is Edward F. Morrill. I am the president of Colony Development Co., with offices in Denver, Colo. Colony Development Co. is an agency company representing Sohio Petroleum Co., the Cleveland-Cliffs Iron Co., and the Oil Shale Corp. Colony Development Co. has constructed a prototype plant for the production of oil from shale. The plant is located on Parachute Creek, north of the town of Grand Valley, in Garfield County, Colo., designed to produce approximately 800 barrels of oil per day, and is now in the startup phase. Our vital interest in the matters now before this committee arises from the absolute, basic necessity for water for the production of oil from shale and attendant essential water-using facilities.

Our interest and commitments have caused us to make an investigation of water resources available for this development. Such water must be supplied by the Colorado River and its tributaries. Our studies indicate that the Colorado River system will be hard pressed to supply existing demands in the upper basin States, present commitments to the lower basin States under the Colorado River compact, and estimated water requirements of an oil shale industry. In general, we concur with the conclusions of the various water studies made by public and private hydrologists regarding the magnitude of those water needs. If anything, these estimates are conservative. Any further major inroad into the water supply of the already deficient Colorado River without concurrent definite procedures for adequately improving the volumes of water available to the Colorado River Basin would, in our opinion, have a serious and adverse effect upon the development of oil shale in Colorado.

The energy potential of the oil shale deposits of the Green River formation have been well publicized. This great natural resource has major significance for the economy of the Nation.

These facts require that substantial quantities of water of the Colorado River arising within Colorado be impressed with the duty to serve the oil shale industry. Only such water can perform this service to the Nation. Alternate sources of water are available to meet other needs, but there are no substitutes for the Colorado River in the development of an oil shale industry.

Respectfully submitted.

E. F. MORRILL.

STATEMENT OF POSITION BY THE COLORADO WATER CONGRESS

It is the considered judgment of the Colorado Water Congress that the greatest protection for the water users of the State of Colorado and of the Upper Colorado River Basin can be achieved by embodying specific requirements within Federal legislation which would authorize costruction of any project within the Lower Colorado River Basin in the operation of which would affect upper basin deliveries at Lee Ferry. Such specific requirements are stated as follows:

1. Operation of Federal projects within the Lower Colorado River Basin shall be so conducted that deliveries of water to the lower basin, measured at Lee Ferry, Ariz., shall never exceed 7.5 million acre-feet each year or 75 million acre-feet for any period of 10 consecutive years reckoned in continuing progressive series.

2. With the authorization of a project within the lower basin which would affect Lee Ferry deliveries, there must be simultaneous authorization of a project or projects for importation of water to the Colorado River Basin in such quantities as will—

(*a*) Guarantee to the upper basin, by exchange or otherwise, the consumptive use of 7.5 million acre-feet per year in accord with article 111(a) of the Colorado River compact.

(*b*) Supply to the lower basin the consumptive use of 7.5 million acre-feet per year in accord with article 111(a) of the Colorado River compact and, in addition, supply sufficient water for such projects as may be authorized for construction and operation within the Lower Colorado River Basin.

(*c*) Supply sufficient water to meet, in full, the obligations of the United States to deliver Colorado River water under the Mexican Treaty.

CERTIFICATE

I hereby certify that the foregoing is a true and correct copy of a resolution adopted by the executive committee of the Colorado Water Congress at a regular meeting on August 11, 1965; and

Further, that the same was submitted to members of the rules committee for vote by written ballot, and said resolution was, thereby, fully adopted as of August 19, 1965.

J. R. BARKLEY, *Chairman.*

Mr. ROGERS. The Chair recognizes the gentleman from Colorado.

Mr. ASPINALL. I reserve the balance of my time so that the other members of the committee may ask questions, and if they do not ask them, I have three or four questions I will ask later.

Mr. ROGERS. Mr. Skubitz?

Mr. SKUBITZ. Mr. Chairman, I have no questions, but I do want to join our chairman in commending the Governor on his excellent statement today. The people of Colorado are fortunate in having a man like you, Governor Love, to represent them within the State and have a man of the caliber of our present chairman to represent them here in Washington.

Mr. ROGERS. Mr. Johnson?

Mr. JOHNSON. No questions, Mr. Chairman.

Mr. ROGERS. Mr Burton?

Mr. BURTON of Utah. Mr. Chairman, I would just like to associate myself with the remarks of the chairman of the full committee in commending Governor Love on an excellent statement, well prepared and clearly defining the position of all the upper basin States. We appreciate your attendance here today.

Mr. ROGERS. Mr. Udall?

Mr. UDALL. Mr. Chairman, I do not know what it is in the soil or the atmosphere in Colorado that produces the kind of fine people you have up there. But I thought your statement was most constructive and well presented and well thought out.

Last week I had the great honor of being asked to preside over a group of informal sessions at which representatives of the several States were present, and I want to say in the presence of Mr. Sparks, who is with you today, the kind of people you had at that meeting, particularly Mr. Sparks, was a real credit to your State, and the constructive, positive attitude that was presented there at those meetings, as has always been presented by these gentlemen, is an encouraging thing to me.

I want to say in the same connection that the spirit that has been shown by the people that you have sent to Congress, people like the chairman of our committee, augers well for the West and augurs well for the resolution of these very difficult and troublesome and thorny problems that afflict the entire area as you set forth in your statement.

At the meetings we had last week, we were all agreed we ought to try to emphasize the points of agreement between us, and I think your statement is in this spirit. It is very easy for a State or region or an area to be selfish, to be parochial, to cling entirely to its own needs and refuse to look beyond and look at the needs of other people, and I was very proud and pleased that on pages 1 and 2 you recognize the critical situation in Arizona, that you do not oppose a central Arizona project if the safeguards and protection that you feel are necessary to your State are provided for.

I commend you for this. You know, your State and mine, looking over the figures that Chairman Aspinall gave earlier today, we are in somewhat the same position. Here is California using its full entitlement and then some more; here is New Mexico, which has been fortunate enough to put to use all of its water, and yet we find your great State with an unused allotment of 1.4 million—and we have something unused of that order. On paper both our States are entitled to more water but have not yet put it to use. So that, from this standpoint, we are in somewhat the same position.

In this same spirit, since you have constructively recognized our needs—you are not going to block our progress if you are properly protected—on behalf of myself and I think I can speak for Arizona, I accept in substance your principle No. 1, which appears on page 2, that any Federal projects within the lower basin hereafter constructed shall be planned and operated to the end that diversions from the main stream of the Colorado River shall be limited when necessary so as not to prejudice, impair, or preclude the future Federal authorization or other development of projects which will be required for the annual consumptive use of water from the Colorado River system in the upper division States of 7,500,000 subject to your compact burden. We accept that. We want to protect you. We think you are

entitled to protection, and we want you to put to use your water just as soon as you reasonably can.

I was further impressed along these same lines with the statement on page 5 on a matter that has been at the heart of these hearings. There is an indication from the figures given by Chairman Aspinall that there is now something in the order of nearly 3 million acre-feet to which the upper basin is entitled, but is not yet using, and one of the questions that has troubled us is: Does the upper basin insist that this 3 million acre-feet flow out to sea and be wasted in the intervening 15, 20, or 25, or 30 years until all of it can be put to use by you people? Or will you as an act of faith, with proper safeguards, let us use that water in the interim to salvage what we can of our economy and our civilization? I am pleased by the paragraph at the bottom of page 5, where you say:

> We accept the use of this water by any entities in the lower basin, as long as it is used with appropriate guarantees that it must be relinquished to us at the times and in such quantities as our future needs dictate.

Mr. ASPINALL. On two or three occasions you have talked about the water going out to the sea or down into the gulf. California puts it pretty well to use, doesn't it, at the present time?

Mr. UDALL. Yes, they do; and let me say this illustrates another example of the same thing. I think we in Arizona, I don't know where we would get, but if we wanted to we could stand on our paper rights and insist that the use of water by California in this fashion somehow prejudices our future rights. We have never done that. We do not want to do it. We think water is a national resource, and it should be used. People can have faith with each other and permit this kind of interim use until such time as the party having the right to the water can fully put it to use.

It has been an old thing in these hearings and in all of our discussions—I do not have to emphasize it again, except in passing—Colorado has worked with Arizona on our problems. I take it your statement today is in the spirit of wanting to continue to work with us. I simply remind you that the leaders we have had in Congress, men like Carl Hayden and my good friend John Rhodes over here, a leader in your party, Senator Barry Goldwater, and my predecessor in this position, have worked for your Fryingpan-Arkansas project—I made a speech for it, as I recall, when you attempted to round up votes—even though this was a project that took water out of the Colorado Basin, so that you could use it in other areas.

We are pleased with your attitude this morning, that you are willing to work with us and help us to resolve our problems.

On page 9 of your statement, Governor Love, you make what I thought was a significant point that was developed here yesterday briefly on some questions by Mr. Tunney. While it is to our advantage, of course, and to California's advantage, in the interim between the time of full development in the Upper Colorado, to use this water that you can't take, I know you concede from your statement there that there is also an advantage to the upper basin, that this water flow on down the river, because the studies, the figures, of Mr. Dominy as were given to Congress in 1955 and 1956, in justifying the upper basin project which had a big cash register to provide development of all the big and small projects the area needed, this project was based on a payout

schedule on which the whole regional plan was financially feasible. It was indicated yesterday that the Bureau's figures at that time indicated that between 1966 and 1975 it planned to release an average of 8.8 million acre-feet, that from 1975 for some years, if the reservoirs were filled, there would be as much as 9.5 released, declining in 1985 to about 8.8, and that thereafter there would be a further decline leveling out in the range of 8¼ million acre-feet. You do concede, do you not, that the advantages in power generation to the upper basin fund would be substantial and would be to your advantage as well as ours, if you did not need this water during those periods?

Governor LOVE. There is certainly no doubt that the generation of power at Glen Canyon, and the sale of that power is to the benefit of the upper basin States for repayment of their project in the upper basin, but I think it also needs to be stated that I also emphasize in my statement that power is wonderful, but the main purpose of the Colorado River compact is the division of the water for consumptive use between the upper and lower basins.

Mr. UDALL. Of course, and it is the power which makes possible the construction of these great diversion projects and storage projects to put the water to use. Power is simply a means to put this water to use rather than being a primary end in and of itself. Do you agree with that?

Governor LOVE. I agree with that, yes.

Mr. UDALL. I would take not sharp issue, but issue with the statement on page 6 of your statement down at the bottom which indicates that Arizona has challenged the terms of the Colorado River compact. Our chief counsel in the Arizona-California litigation was here with our Governor on Tuesday, and he made quite clear—and I want to emphasize to you in a friendly spirit—that it was our position in this Arizona-California lawsuit on the theory we argued to the court and the theory the court adopted in the opinion, as I understood it, that when the Congress laid its hands on the river in 1928 and authorized the Hoover Dam, that by this act of Congress under the commerce power, it made a division of water as between Arizona, California, and Nevada. We did not argue that Arizona necessarily was trying to exclude from the compact the tributaries of the river and particularly the Gila River.

I want to make it clear to you that Arizona ratified this compact; we stand by the compact.

Now, there is a question of interpretation of the compact. You have lawyers, and we have lawyers. California has very able lawyers. And on this subject, as on every other subject known to man, lawyers can come up with differing opinions, and we may have some honest differences, legal differences with you on the interpretation of the compact.

Governor LOVE. May I say that——

Mr. UDALL. Go ahead.

Governor LOVE. Pardon me. This is fine news. We are always interested in what Arizona and California do, but certainly the relationships between you are relationships that we would not presume to enter into, and we are delighted to hear that at least at this moment Arizona has not taken a position that the Gila is not subject to the Colorado River compact, if I understand you correctly. [Laughter.]

Mr. UDALL. Well, I don't think I will go that far. The compact is a very short document. It is a document that has been haggled over for years, and we can haggle over it further if need be, but we, in Arizona, have learned some lessons on this point. Arguing over paper water rights is a rather futile thing to do. We have the finest set of legal water rights of any State in the basin. Our water rights are just perfect. We have gone through courts. We have had a great victory, and we challenged the Goliath, California, and came out rather well. There is only one thing wrong. We do not have any water. We have found that as between paper water rights and wet water, we would rather have wet water, and I am afraid that this might well be the case with some other States if we end up in futile court fights arguing over who is going to share a shortage instead of working together to eliminate that shortage.

Mr. HALEY. Will the gentleman yield?

Mr. UDALL. Yes.

Mr. HALEY. I suggest if the gentleman will withhold the payment of these lawyers' fees, you might get some water. [Laughter.]

Mr. UDALL. The gentleman from Florida is a keen observer of the habits of lawyers, and he often gives me good advice, and this might well be a suggestion. We could pay them on a contingent basis for the water.

Mr. HALEY. You will get some water if that is done, I assure you.

Mr. UDALL. In this same vein and in conclusion of the observations I have to make, Governor Love, my father used to tell the story of a fellow who was always defending his right-of-way on the highway. He was much more interested in having the right-of-way than in being safe, and he would always end with a little limerick which says:

> Let's drink a toast to Jonathan Gray,
> Who died defending his right-of-way.
> He was completely right as he sped along,
> But he is just as dead as if he had been wrong.

This is the sort of way we feel about lawsuits and legal haggling over the interpretation of compacts. We want to work with you and make this river whole, and it is to your advantage and to ours to do so, and I thank you, again, for a very fine, constructive approach.

Governor LOVE. I thank you for those comments, Mr. Udall.

Mr. ROGERS. Mr. Wyatt?

Mr. WYATT. Governor, I am from the Northwest, Oregon, and I first would like to compliment you upon the very clear position, and I think your statement has clarified the position of probably the entire upper basin States, certainly that of Colorado, to me. And I frankly think this is a much more honest approach to this whole problem than to present this project in the light that augmentation is not necessarily involved directly flowing from this.

Now, I take it that your position, the position of the State of Colorado, is that you would oppose the present bill, the present project, unless there is provision for at least contingent authorization of augmentation; is that correct?

Governor LOVE. Yes. I do not think that the word "contingent" is as strong. Our position is that the principle of concurrent authorization of an augmentation project into the basin must be a part of it in order to protect our situation.

Mr. WYATT. Well, now, Governor, I wonder if you realize—I suppose probably you do, but I ask you this for the record. We have had witnesses from the Bureau of Reclamation, Department of the Interior, and the Secretary himself and the Commissioner of the Bureau of Reclamation, who have testified here at these hearings that augmentation, and any opinions that exist as to the feasibility or the cost of augmentation are just off the top of their heads, of necessity, and a project of that magnitude is undoubtedly going to take a number of years to have the planning done and engineering done and cost estimates done.

Do you have any quarrel with this being the state of facts relative to planning for augmentation?

Governor LOVE. We would wish that it were further along, but we realize that it isn't. As you know, as I hope I made clear in my statement, we think that there will be water in the Colorado River for a period of time that is unknown to us—but for some time.

Mr. WYATT. Governor, now we have had presented to us by the Bureau and by the Department figures and also their conclusions of their witnesses that this project standing by itself, that the cost-benefit ratio is favorable, and the project is economically feasible without having any regard to possible augmentation.

Now, do you have any opinion as to the feasibility of this project without any prospects of augmentation?

Governor LOVE. Well, as I understand it, the economic feasibility would not be dependent on augmentation, because it is dependent in substantial part, at least, upon the sale of power revenues to be generated by proposed dams; is that correct?

Mr. WYATT. I think this is correct. The first of it, at least, Governor.

Governor LOVE. The problem is that even though it could be economically feasible over perhaps even a short period of time with high value water, we point out that at some point in time, and whether it be the most extreme position we can take, 1975, or a more reasonable time looking at the facts, 1995, certainly beyond the year 2000 there will not be water available for the central Arizona project.

Mr. WYATT. I think the testimony of the witnesses for the Department and the Bureau—it is a fair conclusion to say that they concluded there will be sufficient water in the system to pay it out through power revenues and water revenues without augmenting the water supply.

Well, I appreciate your candor and your frankness, and I think that you have helped the members of this committee and have made a very substantial contribution to this record.

Thank you, Mr. Chairman.

Governor LOVE. May I say to you on this problem of augmentation, I was interested and encouraged that at the last meeting of the western regional Governors conference, we did, as western Governors, institute an organization made up of representatives of each of our States who are beginning to work on looking at the possibility of interbasin transfer waters, and may I say that the Governor of your State has been farsighted enough that, as I understand it, he has provided for an inventory of Oregon's present supplies and probable future needs, and so on, and I think this is a statesmanlike approach.

52-850—65——24

Mr. WYATT. Governor, for your information, the Oregon Legislature at this last session appropriated $332,000 for the study of the water needs of Oregon and all of the complexities in connection therewith for the next 100 years. We anticipate it will be 1970 before this study will be completed.

Thank you again, Governor.

Mr. ROGERS. Mr. White of Idaho.

Mr. WHITE of Idaho. Thank you, Mr. Chairman.

I would like to join my colleague, Governor, on the manner in which your statement has been prepared and delivered here and I thought the presentation was excellent.

My exposure to it is by—I have been rapidly trying to peruse it here since I came into the committee room.

In your answer to the question from the gentleman from Oregon, would you support this legislation if it did not include a provision for study of augmentation of water into the Colorado?

Governor LOVE. I would go even further than that. It is not a provision simply for study. The position of the State of Colorado is that we will not support it unless there is provision for authorization of a project upon a finding by the Secretary of the Interior of economic feasibility. We want the power given to the Congress to give the power to the Secretary of the Interior to go ahead with a program to augment the Colorado River Basin supplies from outside the basin upon a finding of economic feasibility.

Mr. WHITE of Idaho. I think you have almost answered my next question. You anticipate positive action in this area if this legislation is passed by this Congress.

Governor LOVE. Yes, we certainly do. That is our belief.

Mr. WHITE of Idaho. And when you are talking about safeguards here for the upper basin over the lower basin, in deference to the central Arizona project, you have in mind one thing that rather than the return of this water to the upper basin, that it will be furnished by sources of water outside of the basin, isn't that correct?

Governor LOVE. We basically have two things in mind. One, that if the safeguard is written into the legislation that the obligation of the upper basin is 75 million acre-feet over any 10 consecutive year period at Lee Ferry, authorization of agumentation, those two things, plus—those are the two central things in my opinion that safeguard the State of Colorado.

Mr. WHITE of Idaho. The gentleman from Arizona makes a very—speaking about my colleague to my right, Mr. Udall—makes a very eloquent plea for the use of this water during the interim period prior to the time that the upper basin can use it and he suggests that we in the northwest are wasting water to the sea. I think in reality most of the water of the Colorado is going into the State of California. The position you are taking is, if you accept this legislation, protection must be guaranteed to the State of Colorado either by augmentation or recall of Colorado water, and you have assumed in your previous remarks that it would probably be augmentation that would keep the upper basin whole; is that correct?

Governor LOVE. Instead of saying either-or, I still would rather say both. That is, we want to be assured that the obligation of Colorado

or the upper basin States will never be greater than that provided in the compact itself.

Mr. WHITE of Idaho. In other words, you are saying the compact should be maintained intact no matter what happens as to supplies of water.

Governor LOVE. No.

Mr. WHITE of Idaho. Returned from the central Arizona project or agumentation.

Governor LOVE. The compact should be maintained.

Mr. WHITE of Idaho. There is only one thing I would like to say to you, Governor. In your very excellent statement where you have explained on page 7, principle No. 2, you have the Mexican Treaty, the Colorado compact, in both sections (b) and (c), I would like to have had you put in at that point also that the Northwest would have its protection under any augmentation program and that your cooperation would extend not only to the States below you which have the immediate grasp of this water but also that the States to the northwest of you, which feel a strong kinship with the State of Colorado, would be protected in the event that this importation authorization becomes reality, and with that, Governor, I would again like to compliment you on your statement and for your very forthright answers to the questions.

Governor LOVE. I certainly agree, and we in the West, knowing the value of water, would certainly endorse any statement of policy that makes as the first requirement, as a matter of fact, this language or something similar was in the action we took at the Western Regional Governor's Conference, that the State of source of supply has first priority on protection, that is, it is not the intent of any of these to rob States of surplus if there is surplus.

Mr. WHITE of Idaho. Well, the thing that bothers me, Governor, is that it is not necessary that we have an excess of water in the Pacific Northwest, admittedly there is water ending in the Pacific Ocean that is not put to consumptive use in great amounts.

Governor LOVE. That is true.

Mr. WHITE of Idaho. And anyone who would deny this I think would be taking an improper position. However, the point of diversion becomes the controversial thing.

Governor LOVE. Becomes vital.

Mr. WHITE of Idaho. When we look immediately north of the Colorado Basin and the area that is using the great amount of water and saying that this is the point of diversion and this is why yesterday I felt somewhat relieved when the Secretary very definitely said the point of diversion would be at the mouth of Columbia and that would be the limit of the study that he was proposing at this time.

Governor LOVE. We understood and we hope that if this project can be determined to be feasible, that it will not only not hurt the States which originate the source of supply but if the diversion is made low enough down, the project as such, it should create advantages for the less well watered eastern parts of some of the States that are involved.

Mr. WHITE of Idaho. This again enters into another area where we can hold out a little bit for everyone on the way down to the Colorado Basin and this again increases the amount of possible diversion.

Governor LOVE. That is right.

Mr. WHITE of Idaho. Thank you very much, Governor.

Mr. ROGERS. Mr. Hansen?

Mr. HANSEN. No comments, Mr. Chairman.

Mr. ROGERS. Mr. Tunney.

Mr. TUNNEY. I want to thank the Governor for having come so far and given such an informative statement. I don't have any questions.

Mr. ROGERS. Mr. Reinecke.

Mr. REINECKE. Governor, I likewise would like to compliment you on I think one of the clearest statements that has been made here.

You brought up a point that has not been mentioned before; namely, the transfer of funds from the upper Colorado, funds to make up for Hoover Dam power deficiencies while Lake Powell is filling.

Inasmuch as this is not in the record at this point, would you clarify that or expand on that just a bit?

Governor LOVE. Well, I will make a few general statements and then I perhaps will call on Mr. Sparks to talk in the technical details, but when Glen Canyon Dam was completed, the problem of filling, the many millions of acre-feet that requires, I think about 8 million acre-feet at the present time, it obviously had an effect on the dam downstream from it, Hoover Dam.

The Secretary of the Interior, as I said, over the objection of the upper basin States established certain filling criteria, how it could be done, and so forth, and in establishing those criteria, it was provided that in retaining the water at Glen Canyon and Lake Powell behind Glen Canyon, this would let less water go into Hoover Dam and create less power and they charged that loss of power against the upper basin States, against this fund that is created by Glen Canyon Dam.

We believe that this is improper. The rule of the—the law of the river, the flow of the water down the river is governed by the Colorado River compact, not by the creation of power at any one point. We believe that if the lower basin States wish to maintain a power head at Hoover Dam with their water, that is their business. But that we should not be charged with it. If you would like more detail, Mr. Sparks is thoroughly familiar with it.

Mr. SPARKS. Mr. Congressman, when the power contracts at Hoover Dam were entered into, it was clearly understood by all parties that the United States did not guarantee the presence of a given amount of water at Hoover Dam. This was based upon the premise and the knowledge that the upper basin would at some future date begin a major storage upstream. So when the Boulder Canyon Project Adjustment Act was entered into, there were a number of hearings held on this particular problem. At the meetings held down at the Interior Building, power contractors were, of course, well represented. The spokesmen for the power contractors made a statement at the hearings in 1941, that it would be obviously absurd for the United States to guarantee the presence of water in any given amount at Hoover Dam.

So the Boulder Canyon Project Act was enacted and changed from the original act to provide that in the event the revenues were insufficient to pay it off by 1987, the Secretary could make an adjustment and extend the payout period. This was to satisfy the power contractors in

the event that the water was not there to generate water in the required amounts and therefore pay off the project.

So we were quite amazed at a late stage here now to find out that the United States is guaranteeing in effect the delivery of power at Hoover and the Secretary has not exercised his authority to extend the repayment period which was given to him for that specific purpose in the Adjustment Act.

We actually were led to believe that all of the money that was diverted from our funds would be returned to us. Somebody was under a misunderstanding because now we find out that the accounting procedure does not even contemplate the return of the dollars diverted, only a small portion of it, and this has been a rather sore point with us because all of these things were understood when the power contracts were entered into.

Mr. REINECKE. Do I understand, then, because Hoover did not generate its full contract obligation, power was purchased from other sources and that the cost of that power was charged against the upper basin funds.

Governor LOVE. That is correct.

Mr. REINECKE. Thank you.

Mr. HANSEN. I would like to ask one question of the Governor while he is here. Before I do, however, I would like to say I am very happy to see you here, Governor Love, representing our chairman of the full committee's home State.

There was a recent meeting of the water conference at Lake Tahoe, of which I am sure you are aware, Governor. Do you feel there is anything in this legislation that is a violation of the agreement at Lake Tahoe concerning further studies to be made before action is taken? Do you feel there is any violation by this legislation of that particular agreement?

Governor LOVE. No, I don't. I think that the legislative provision which Colorado requests as a precondition for approval on this project, that the Secretary of the Interior be authorized to go ahead upon a finding of economic feasibility, is parallel to the efforts being made by the Western States first at their meeting in Lake Tahoe and then I think Corvallis, wasn't it?

Mr. REINECKE. Governor, in the contemplation that there will be no water available for the central Arizona project by at the latest 1995, have your people made any economic feasibility studies to see whether or not the project will still be able to pay itself out without the use of irrigation water after that date?

Governor LOVE. I have not made such a study. Have our people made such a study?

Mr. SPARKS. I think we should clarify the statement, water supply after 1995. We say a full water supply. There will be some water we think available after 1995 but we say that is the cutoff date for a 100-percent water supply and it will diminish rapidly. We have not gone into the feasibility studies because we consider that to be the prerogative of Congress to determine whether or not a project is feasible.

Mr. REINECKE. Thank you. No further questions, Mr. Chairman.

Mr. ROGERS. Mr. Roncalio.

Mr. RONCALIO. No questions. Glad to have Governor Love here.

Thank you, Mr. Chairman.

Mr. ROGERS. Mr. Aspinall, do you have any questions?

Mr. ASPINALL. Mr. Chairman, the questions which I had have been asked by others and I would like to get the other witnesses as soon as possible. I wish to again commend the Governor and Mr. Sparks for their presentation.

Mr. ROGERS. Mr. Haley.

Mr. HALEY. Governor, are you a lawyer?

Governor LOVE. Yes, sir.

Mr. HALEY. I wondered.

Governor LOVE. I was a little concerned about your attitude toward the profession.

Mr. HALEY. You needn't be, Governor, because I realize that lawyers are necessary. I don't know why but they are. [Laughter.]

Mr. HALEY. Governor, I want to apologize for not being here when you started the presentation of your statement. I glanced over it hurriedly, however. You have apparently done your homework and apparently have a great deal more knowledge of what is involved here than some of the other Governors, I will say that, and I just want to comment on the sermon and the prayer that was given by our colleague here from Arizona, Mr. Udall. I think with that powerful sermon and prayer that you people in the other States now should forgive him for past transgressions and receive him into the flock, so to speak, and tell him to sin no more. [Laughter.]

Mr. UDALL. Would the gentleman yield?

Might we have as our text this morning, "forgive us our diversions as we forgive those who divert against us." [Laughter.]

Mr. HALEY. This is about all that is involved here, Governor. I said the other day all I want to find out was who was stealing from whom. [Laughter.]

Mr. ROGERS. Does the gentleman from Florida have any further questions?

Mr. HALEY. No.

Mr. ROGERS. Governor Love, it is nice to have had you before the subcommittee, and you, Mr. Sparks. Thank you for your testimony.

Governor LOVE. Mr. Chairman, I hope to see you in Colorado again soon.

Mr. ROGERS. I look forward to it.

Off the record.

(Discussion off the record.)

Mr. ROGERS. The Chair will now recognize the gentleman from Wyoming, Mr. Roncalio, to introduce our next witness.

Mr. RONCALIO. Mr. Rogers of the subcommittee, Mr. Chairman Aspinall of the full committee, my colleagues on the subcommittee, my colleagues in Congress, and others at this hearing, I am particularly pleased to present to you this morning a man who is Wyoming's dedicated, hard-working Governor. Governor Hansen is native to the soils of my State and understands the uniqueness of my State, Mr. Chairman, which is an area of the good Lord's earth that has its waters flowing out in every direction.

Our rivers contribute without diversions and without much consumptive use, because of low population, to the downstream benefits of all the other States around us; the Missouri River Basin in Mon-

tana to the north, Belle Fourche in the Dakotas to the east, Platte in Nebraska to the east, our Laramie and Green in Colorado to the south and our Snake to Idaho and to California, to the west.

Governor Hansen, before becoming Governor, served as a member of the Snake River Compact Commission and is thoroughly familiar with water and its precedence in the West.

Governor Hansen has also been a member of the Columbia River Interstate Compact Commission and has a ranch in the very shadows of Wyoming's Teton Mountains. As I said before, gentlemen, I am particularly proud and pleased that he is here and will present the official position of the State of Wyoming regarding this legislation.

Mr. ROGERS. Thank you, Mr. Roncalio. And the subcommittee welcomes you, Governor Hansen, as a witness in this hearing.

STATEMENT OF HON. CLIFFORD P. HANSEN, GOVERNOR OF THE STATE OF WYOMING; ACCOMPANIED BY FLOYD BISHOP, ENGINEER; AND THOMAS CAHILL, OFFICE OF THE ATTORNEY GENERAL

Governor HANSEN. Thank you very much, Mr. Chairman. May I say that Wyoming is particularly proud to have as its representative in the Congress Mr. Roncalio, a man who brings this job considerable understanding and experience in water matters himself, having served as chairman of the American Section of the International Joint Commission involving the nations of the United States and Canada. And we appreciate particularly the experience that he has had in that capacity and which has made him knowledgeable and understanding of such matters as are now before this very important committee.

Mr. Chairman and members of the committee, thank you for this opportunity to present testimony on behalf of the State of Wyoming with respect to H.R. 4671, the Lower Colorado River Basin project bill.

In Washington with me representing the State of Wyoming are Floyd Bishop, State engineer, and Tom Cahill of the attorney general's office.

I would like to commend Governor Love for the excellent presentation he made. Wyoming endorses the statement of position as spelled out so clearly and in some detail by the State of Colorado's great Governor.

There is a great deal of interest in my State regarding this legislation and because of this interest, and concern, Floyd Bishop, State engineer for Wyoming and a member of the Wyoming attorney general's staff took part in the lengthy, and fruitful, discussions held last week between informed and experienced representatives of the seven Colorado River Basin States here in Washington.

I am pleased to be able to inform this subcommittee that Wyoming is basically in agreement with the objectives set forth in the Lower Colorado River Basin project bill—H.R. 4671.

We recognize the need for and the desirability of the central Arizona project. Arizona desperately needs and certainly deserves to have the water allocated to her by the 1963 decree of the Supreme Court of the United States.

However, the State of Wyoming has a vital interest at stake in this matter, and we feel that our rights to the use of water of the Colorado River system, pursuant to the terms of the Colorado River compact of 1922 and the Upper Colorado River compact of 1948, must be guaranteed and reaffirmed in the authorizing legislation now being considered by your subcommittee.

Development and utilization of water resources in the Wyoming portion of the Colorado River drainage has progressed more slowly than in many of our sister States downstream.

Our development, however, has followed a steady pattern of growth; we are confident that this growth will continue, and even accelerate, in the future.

Prospects for expansion in agricultural, industrial, municipal, and recreational use of water in the Green River Basin of Wyoming are bright indeed, and the availability of adequate quantities of water is the key to all this future development. Consequently, it is imperative that our right to the use of the water of the Green River be protected and maintained.

Our approval of the legislation now being considered by your subcommittee is necessarily conditioned upon the incorporation into this legislation of certain principles which we feel are necessary for our protection.

These principles are:

1. That the Secretary of the Interior shall be directed and required to plan and operate any and all Federal projects within the Lower Colorado River Basin, whether heretofore or hereafter constructed, to the end that diversion from the main stream of the Colorado River below Lee's Ferry shall be limited when necessary so as not to prejudice, impair, or preclude the future Federal authorization or other development of projects which will be required for the annual consumptive use of water from the Colorado River system in the upper division States of 7,500,000 acre-feet of water, or such part thereof as may be physically available after delivery of 75 million acre-feet at Lee's Ferry in any period of 10 consecutive years.

2. That concurrently with any congressional authorization of the Lower Colorado River Basin project, or any of its component parts, there also be authorized a project or projects to import water into the Colorado River Basin from sources outside the natural drainage area of the Colorado River system in such quantities as will—

(*a*) Relieve the States of the Colorado River Basin from any obligation to deliver water to the Republic of Mexico pursuant to the terms of the Mexican Water Treaty of 1944.

(*b*) Supply the lower basin States with that amount of water required for the consumptive use of 7½ million acre-feet per year which is not supplied in accordance with article III(a) of the Colorado River compact.

(*c*) Supply the upper basin States, by exchange or otherwise, with that amount of water required for the consumptive use of 7½ million acre-feet per year which is not supplied in accordance with article III(a) of the Colorado River compact.

3. That Glen Canyon Dam shall be operated so that it will not be drawn below its rated power head, except as may be necessary to comply with article III(d) of the Colorado River compact, and except

as may be authorized otherwise by the Upper Colorado River Commission.

4. That the diversion of funds from the Upper Colorado River Basin fund to the Colorado River Dam fund as payment for the so-called Hoover Dam deficiencies, pursuant to the Glen Canyon filling criteria, be terminated immediately.

5. That all expenditures made from the Upper Colorado River Basin fund to meet deficiencies in generation at Hoover Dam, pursuant to the Glen Canyon filling criteria, be reimbursed to the Upper Colorado River Basin fund in full.

The incorporation of the foregoing principles into the legislation now before your subcommittee will be necessary before Wyoming can approve and support this legislation.

Title VI, section 601, of the present bill provides for the creation of the Colorado-Pacific Regional Water Commission. It is noted that representation on this commission is proposed for each of the States of the Colorado River Basin with the exception of Colorado and Wyoming. In view of the major contributions to the water supply of the river made by each of these States, it must be assumed that this omission was an oversight.

Obviously Wyoming and Colorado deserve representation on any such commission and the bill should be revised accordingly.

Additional suggestions as to the specific wording which might be used in order to implement these changes will be submitted in later testimony by Mr. Ival Goslin, executive director of the upper Colorado River Commission.

Thank you again for this opportunity to appear before your subcommittee to present testimony on this most important subject. I certainly appreciate your courtesies and your attention to Wyoming's position on this bill. Let me urge that the subcommittee provide the necessary amendments to the bill, before reporting it to the full committee, to insure that the terms of the compacts are guaranteed and reaffirmed.

Thank you very much.

Mr. ROGERS. Thank you, Governor, for your statement.

The Chair recognizes the gentleman from Colorado, Mr. Aspinall.

Mr. ASPINALL. Mr. Chairman, I, too, wish to commend Governor Hansen and his staff for a concise, clearcut, and constructive statement of the views of the State of Wyoming which furnishes an appreciable amount of water to the Colorado River Basin system.

I only have one question at this time for Governor Hansen, and that has to do with your statement on your second page where you suggest that the State of Wyoming has a vital interest at stake—

> We feel that our rights to the use of the Colorado River system * * * must be guaranteed and reaffirmed in the authorization legislation now being considered by your subcommittee.

Is it the position of Wyoming that a legislative act alone such as the act we have before us, together with amendments, will be sufficient to guarantee to the upper basin States the future development of their water resources now unused, or is it your position that perhaps there should be another compact which the States themselves, representatives of the States themselves, recognizing this kind of inflow in the river, the uses on the river, and what is involved, might determine to

be necessary in order to have a compact that could not be abrogated except by the mutual consent of the States involved?

Governor HANSEN. Mr. Aspinall, if I understand your questions, let me say first of all that Wyoming's position is that that the terms of the compact on the Colorado in 1922 should constitute the law of the river and we take exception to administrative interpretations that have since been made that I am sure are familiar to all of us here, so that I inserted the language that was included here to reassert Wyoming's strong interest in seeing that there be no diminution of the guarantees that were made under section 3—I think it is section 2, subtitle (a), wherein there are certain rights extended to the lower basin States and certain rights extended to the upper basin States.

Now, I would not presume to second-guess your great good judgment as to how best to protect the upper basin States. Let me say to you that Wyoming is delighted, as is Colorado, to have you in the position of eminence on the full committee that you occupy, and I am sure that you will be able to give us the guidance and direction needed and required in order to assure that our rights will be protected because as you so well know, there is——

Mr. HALEY. Will the gentleman yield?

Mr. ASPINALL. Let me answer the Governor first. This, of course, puts a rather heavy responsibility on the shoulders of the chairman and his colleagues on this committee. We have all the confidence in the world in our colleagues at the present time from the lower basin, in the other body and in this body, too. We have no doubt but what they intend to follow through with what they suggest. All that I wanted to have in your answer was whether or not you have enough confidence in the future to suggest that a legislative pronouncement in this bill would be sufficient or do you think that there should be another compact which cannot be abrogated by legislative act itself?

That is all that I was asking you.

Governor HANSEN. Well, I would favor a definite clear spelling out and perhaps a compact is the way that this could best be accomplished, because I have had sufficient exposure to the interpretations of legislative history to have misgivings about our ability at some later date to try to determine what was at this present moment intended, and we are concerned and I would favor the suggestion that I think is inherent in your question, that these rights be spelled out in a fashion by compact so that there can be no question at a later date about the abrogation of it.

Mr. ASPINALL. I yield to my friend from Florida.

Mr. HALEY. Governor, I thoroughly say "Amen" to what you said about the distinguished chairman of the full committee. The only thing I would like to find out now is would you be willing to come up into the great State of Colorado some time between now and November 1966, especially if the chairman has opposition, to make a series of speeches?

Governor HANSEN. I would be very happy to, and I would like to get together with the chairman to compare some dates. I anticipate a little problem in Wyoming about that time, and I am sure his presence in my State will be very helpful.

Mr. HALEY. Lord bless you and may your numbers increase.

Mr. ROGERS. Mr. Skubitz?

Mr. SKUBITZ. No questions.

Mr. ROGERS. Mr. Haley.

Mr. HALEY. Governor, I just have one question. I do want to compliment you on the statement you made. On page 3 of your statement, No. 2, you say:

> That concurrently with any congressional authorization of the Lower Colorado River Basin project, or any of its component parts, there also be authorized a project or projects to import water into the Colorado River Basin from sources outside the natural drainage area of the Colorado system in such quantities as will—

And then you go ahead, of course, and list them.

Where, Governor, in your opinion could this water be obtained outside of the——

Governor HANSEN. Where could it be obtained?

Mr. HALEY. Yes.

Governor HANSEN. I have heard several proposals made as to possible sources of supply. I would say this, as representing one of the upper basin States on the Colorado and as representing a State that sits on the headwaters of the Columbia, I am quite cognizant of the problems of diverting waters from any of these streams in the headwater sections. I understand that the Secretary suggested yesterday that this water might be taken from the mouth of the Columbia and were it to be taken at that point, now, without any implication as to the feasibility of it, if that problem can be resolved, I would say that it would seem to me that the Secretary's observation yesterday was not without merit when he said that waters might be taken from the mouth of the Columbia. At that point obviously all consumptive uses will have to be met.

That would be one possible source.

Mr. HALEY. Well, actually there are only two sources of water that would be able to supply in the quantity necessary, and that would be the Missouri.

Governor HANSEN. It would be what?

Mr. HALEY. The Missouri, which is about a thousand miles away, and the Columbia River. It would have to come from one of those sources. It would be quite a project; would it not?

Governor HANSEN. I agree that it would be.

Mr. HALEY. Thank you very much.

Mr. ROGERS. Mr. Burton.

Mr. BURTON of Utah. Governor, are you a lawyer?

Governor HANSEN. No, I am not.

Mr. BURTON of Utah. I didn't think you were because you have been able to read this compact and understand exactly what it means.

[Laughter.]

Mr. BURTON of Utah. That is all.

Mr. ROGERS. Mr. Johnson.

Mr. JOHNSON. Thank you, Mr. Chairman.

I have no questions. I just want to say, Governor Hansen, you have submitted here a very fine and forthright statement of Wyoming's position. It is hoped that we can work out a solution to this bill and receive some of that fine Wyoming water down in the State of California.

Governor HANSEN. You are welcome to come up and drink some of it right on the ground.

Mr. JOHNSON. You have a very beautiful State and I hope to go home through there. That is all.

Governor HANSEN. Thank you.

Mr. ROGERS. Mr. Hansen.

Mr. HANSEN. Thank you, Mr. Chairman. I don't want this to appear like collusion, so I will say that the Governor and I are not related so far as I know except by heritage: we come from the same area.

The Governor hails from the Wyoming side of the Teton Mountains and I from the Idaho side. This very beautiful range is where a good share of the waters that we have talked about originate, and I appreciate the Governor's statement here and the forthright manner in which he presented it. I might say that I have admired what you have done for your State.

Thank you, Mr. Chairman.

Governor HANSEN. Thank you, Mr. Hansen. May I say that both my mother and father happen to be Wyoming immigrants having come from Idaho. My dad was born in Soda Springs.

Mr. HANSEN. I certainly appreciate knowing that.

Mr. ROGERS. Mr. Udall.

Mr. UDALL. Governor, I thank you for an excellent statement. The other "minister" up here on the bench who has been helping with the needs of the congregation here this morning, the gentleman from Florida——

Mr. HALEY. Amen.

Mr. UDALL (continuing). Suggested I have been trying to save souls through sermons and a couple of things have come up that I think perhaps I should comment on and those who wish to make a decision can come forward after the meeting and be saved.

Mr. HALEY. I would say you have got a broad field to cover. Have you got any holy water that we could use?

Mr. UDALL. We are fresh out in Arizona at the moment.

As the author of one of the bills before us, I wanted to comment specifically on the one point you raised. The reason the bill was drafted with only New Mexico and Utah represented on this commission from the upper basin is that technically and nominally, at least, New Mexico and Utah as you well know are in the lower basin. They have small areas that drain below Lee Ferry and we were simply trying to have a counterpart of your fine upper basin commission with all the lower basin States represented. But since this bill has now been discussed in a context suggesting it affects the vital interests of upper basin, I would certainly have no objection to naming specifically representatives from Colorado and Wyoming on any such commission and I wanted you to know that.

Governor HANSEN. Thank you, sir.

Mr. UDALL. We had over in the other body here not too long ago a Senator who introduced a little old bill to provide for national little league baseball week and the next thing he knew, this had been jacked up and turned into a constitutional amendment which is about the most controversial thing that we have had in this Congress. We in Arizona feel a little bit like that as these hearings progress and I am a little alarmed and disturbed about the suggestion just made by my friend from Colorado. When the San Juan-Chama project, New Mexico, was before us, for example, in the upper Colorado project, no

one suggested that we needed a new compact, constitutional amendment or all of these studies that have been talked about. And now when I go back home to farmers in Pinal County, some of whom are here and see their fields drying up and homes abandoned and pumps dry and I have to explain to them that, "well, we can't pass this little project that everyone agrees is badly needed for Arizona until we have 5 year studies about Lake Erie, complete studies in Washington and Oregon," and now when it is suggested that perhaps we need a time-consuming revision of the whole Colorado River compact which requires approval by Congress, a process taking years at best and in the meantime, the whole development of the Colorado Basin and in Arizona are stopped until all of these things are resolved, I get a little troubled.

We recognize the very basic interest that you and our upper basin friends have in this legislation. We want to go a mile and an extra mile to meet your objections and to satisfy your needs and your legal rights.

But I certainly hope that we wouldn't wait to authorize the central Arizona project until every last one of these things are done when everyone knows and everyone recognizes there are very desperate needs in Arizona and the lower basin.

Mr. ASPINALL. If my colleague would yield at that point, I want my colleague to understand that as I ask questions, I am asking questions in order to get the feeling of the people in the area. Now, this is not the time and place to argue with your colleague on the bench as to what has been proposed.

It is not the time and place to defend or to support an answer made by Governor Hansen to my question. I was asking him, in light of his statement, how far he wanted to go. If the gentleman from Arizona will stay with asking questions we will proceed a lot faster.

Mr. UDALL. I think there is no misunderstanding between the gentleman from Colorado and myself on this point. I simply wanted to make Arizona's position clear on this suggestion. We will negotiate as some other leader of our country has said, with anybody at any time at any place and we want to resolve these difficulties and we hope they can be resolved as soon as possible.

Governor, I commented when Governor Love was on the stand just before you that I was in general agreement with his principle No. 1, and I wanted to say that I am in general agreement with your principle No. 1 on page 3 of your statement. But let me point out again the futility, as I see it, of wasting our time on these legal and technical questions when we all know we have a river that is deficient.

Let me simply point out without arguing the matter that when you use, in your principle No. 1, the delivery of 75 million acre-feet every 10 years at Lee Ferry as the obligation of the upper basin, that our lawyers and some of the California lawyers take the view that the burden of the upper basin is somewhat more than that. Under the compact, section 3(c), in times of shortage, the upper basin as we read it is required to share one-half the Mexican burden, under 3(b) the lower basin is given the right to increase its beneficial consumptive use by a million acre-feet per annum and this is a matter of some controversy. And of course, section 3(e) of the compact is in the very spirit of the things that you have said and Governor Love said, that

you are perfectly agreed that we can use surplus and unneeded waters until such time as your development proceeds to its full use, because it 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.

So that I think the idea of the central Arizona project using this water on an interim basis until you need it is in accordance with the spirit of the compact.

Other than that, I simply wanted to thank you for a constructive statement and to thank specifically the people from Wyoming who sat in these informal and very fruitful meetings that we had last week. We are happy to have you here.

Governor HANSEN. Thank you, Mr. Udall. Just in an effort not to be misunderstood, let me say this: We don't propose to find as many stumbling blocks to put in your way as we can to delay or withhold the adoption of any project which would obviously be in the interests of a great many people.

On the other hand, we are quite cognizant of the fact in Wyoming that we have not had sufficient time to develop our full potential to the waters which were accorded us under the terms of the Colorado River compact, and if we now take steps in support of legislation which could preclude our full development at a later date, it is of very vital interest to Wyoming, and that is the interest we have here and that is why we think some of these matters must be resolved and why there must be some more information established which will help guide us and why there must be some assurances that are not subject to later equivocation, that will guarantee us the rights we feel that we now have, because it is not we who are trying to get the central Arizona project, it is you.

And I think the responsibility properly lies with the State of Arizona to satisfy the questions that are before the upper basin States. So I would say only that we are sympathetic, we want to be helpful. We would like to be good neighbors. At the same time we don't want to take action now which will jeopardize the full development of these great upper basin States at a later date.

Mr. UDALL. I wholly agree with you and I commend you very much for the attitude you have taken here today.

Thank you, Mr. Chairman.

Mr. ROGERS. Mr. Reinecke.

Mr. REINECKE. Thank you.

Governor, you have indicated that you are in favor of concurrently authorizing the importation works along with the central Arizona project. I presume you are aware that this committee does not have a habit of authorizing any works that are not firmly designed, that is, there are no open end authorizations made by this committee as a general rule.

In view of that fact, in view of the fact that the plans for importation are not complete at this point, this would by necessity delay any construction either upper or lower, until such plans were complete, until the authorization could be made by this committee.

Is that your intention, that if necessary this whole project be delayed until that time?

Governor HANSEN. I think that, Mr. Reinecke, Wyoming must have better assurance as to our ability at a later date to make full development of our water and I am thinking specifically about this. Though there is spelled out in the Colorado River compact now our right to that—to make full development of the water at a later date, I can anticipate that by the year 1990 or 1995 the States of California and Arizona might find all kinds of reason to question the feasibility of projects in Wyoming or in Colorado or in Utah or in New Mexico, and as a consequence, it is my position that it is either/or. Either we must have assurances that there will be other waters made available to fill in this shortage that we anticipate probably by 1990 on the basis of the best estimate we now have, or that there be further steps taken as were indicated by Chairman Aspinall's question, that we can be assured of legal rights which we now think would be placed in jeopardy or in question by the authorization of this central Arizona project.

Mr. REINECKE. Thank you Governor. No further questions.

Mr. HANSEN. I would ask the gentleman to yield.

Mr. ROGERS. Yes. Do you yield?

Mr. REINECKE. Yes.

Mr. HANSEN. In light of the question posed by Mr. Reinecke, Governor, do you feel in this legislation that there is at this time adequate assurance that at some later date when you might come before the Congress to ask for authorization of some project in Wyoming that this might not be put off, particularly if at that time there was not yet a plan designed or declared feasible for importation of water into the Colorado basin? Do you feel it is possible that you might then be declined or at least not favorably looked upon or be delayed on some such project?

Governor HANSEN. I do indeed, Mr. Hansen.

Mr. HANSEN. When do you feel that these assurances should be made, I might ask?

Governor HANSEN. Well, frankly I want the assurances made one way or the other before this central Arizona project is authorized.

Mr. HANSEN. Do you feel that you have the assurances in this legislation now?

Governor HANSEN. I don't think that they are adequate at the present time.

Mr. HANSEN. Thank you.

Mr. ROGERS. Mr. White of Idaho.

Mr. WHITE of Idaho. No questions, Mr. Chairman.

Mr. ROGERS. Mr. Burton.

Mr. BURTON of California. No questions.

Mr. ROGERS. Mr. Tunney.

Mr. TUNNEY. No questions.

Mr. ROGERS. Mr. Foley.

Mr. FOLEY. Governor Hansen, it is a pleasure to welcome you to the committee.

I notice that in speaking for the State of Wyoming, you take the same position as Governor Love earlier this morning in feeling that concurrently with any congressional authorization of the Lower Colorado River Basin project or any of its component parts provision should be made to import water into the Colorado River Basin from outside its natural drainage area.

Do you regard the present legislation as sufficiently detailed in its references to importation to satisfy that requirement or are you specifically interested in conditional authorizations?

Governor HANSEN. I think my answer would be that we don't regard the present bill as being in sufficient detail to give us the assurance that we feel we should have.

Mr. FOLEY. In making your statement I assume you are aware that conditional authorizations generally have not been in the tradition of this committee of the Congress.

Governor HANSEN. Yes, I think that is my general understanding.

Mr. FOLEY. Do you have or does the State of Wyoming have a conclusion as to from where water should be imported from into the Colorado Basin?

Governor HANSEN. I am certain that we do not. I don't think that we have before us sufficient information to make such a judgment. There have been several important people speculate at the national level as to possible sources of supply and I would not discredit at all some of those sources that have been indicated. I mentioned earlier that I understand the Secretary has suggested that water might be taken from the Columbia River system at the mouth of that great river and I would not certainly discredit the possibility of that source.

Mr. FOLEY. Would the State of Wyoming consider that as the most likely source or——

Governor HANSEN. I don't think the State of Wyoming has taken a position on that. I think we would like to have more information before we take a position.

Mr. FOLEY. Do you have a position on the recommendation of the Bureau of the Budget that any studies as to augmentation of water be handled on a national basis?

Governor HANSEN. It has been my position throughout the years in which I have been more or less involved in water matters that there is great merit in a regional approach rather than a national approach to the solution of water problems. I say that because I think that the conditions vary so greatly from one section of the country to another that there is likely to be carved out a more specific answer to the problems by being approached from a regional basis rather than from a national basis. I think we are likely to impose criteria, national criteria, that would hopefully be assumed to answer all problems but which in fact would not answer any specific problem anyplace.

So I should like to see the States of the West and of the Southwest get together, as Governor Love indicated, in trying to resolve these problems. I certainly do think that some very valuable assistance could be given from the national level and obviously there is a very real national interest, but I think at the same time that a regional approach might be more helpful.

Mr. FOLEY. In view of that, would you feel that it would be more logical to first study available water in the entire Colorado Basin and in California as a whole before going outside of the Colorado River Basin and California for possible study?

Governor HANSEN. Well, I suspect, if I am not misinformed, that there have been a great number of studies already undertaken and perhaps some reports made on that very question.

Mr. FOLEY. You have information that those studies are complete now, involving northern California and California as a whole in the Colorado River Basin?

Governor HANSEN. No. I certainly do not. I don't think that they are complete. I understand that there is no consensus within the State of California and I am not in a position to address myself on this subject, as you can appreciate, but I don't think that these studies are conclusive yet. I think that we are becoming more aware of the magnitude of the problem and at the same time we are more imaginative in our vision as we contemplate possible solutions. I think we are becoming more and more aware that we can reach out far distances and seek sources of water that not too many decades ago would have been beyond the comprehension of any of us and now we even talk about bringing water from Canada, from water that froze into the Arctic Circle, just to illustrate the points that I make, that we are on the one hand becoming more acutely aware of the problem and on the other, we are more imaginative in our thoughts as to ways of solving the problem.

Mr. FOLEY. Well, because of your testimony that there should be concurrent authorization, the question comes to my mind as to whether you would favor deferring this project until studies are made, either on a national basis or regional basis, or whether you feel that there should be contingent authorizations which would pass out of this committee a blank check, so to speak.

Can you enlighten me as to which——

Governor HANSEN. Well, insofar as we are concerned and insofar as my duty here today is concerned, I say this, that my job is to see that Wyoming does not run short of water after the year 1990. Now, I don't want to hurt and I don't want to delay the development of any project in Arizona. I don't want to help withholding solutions being found of their acute water shortage problems, nor do I want to hurt California.

But I want to be certain that what is done here, if it has the sanction and support of Congressman Roncalio, will see that the State of Wyoming is adequately protected. We have a great State. It is largely an undeveloped State. It is a State filled with many varied natural resources and every one of these important resources can be developed only if we have adequate water with which to assure its development, and my position here today is not—I am not adamant in saying what must be done.

I say either we must do this or we must do that to be certain that Wyoming's rights will be guaranteed and assured without any possible chance of questioning at a later date.

Mr. FOLEY. Thank you, Governor.

Mr. ROGERS. Mr. White of Texas.

Mr. WHITE of Texas. No questions.

Mr. ROGERS. Mr. Roncalio?

Mr. RONCALIO. Thank you, Chairman Rogers.

Governor Hansen, I want to state publicly my pleasure and concurrence and appreciation for your excellent statement. You have stated our position and I am happy that it sustains the sense of my cross-examination of Attorney General Lynch, of California, several days ago. We cannot afford jeopardy to the development of our resources.

I am grateful to you for an articulate and splendid statement in a nonlegalistic, clear manner.

Mr. ROGERS. Mr. Wyatt?

Mr. WYATT. Governor, I appreciate your statement and your appearance and I followed your questioning very carefully. Am I correct in assuming that the State of Wyoming would oppose the present legislation unless there were specific authorizations contained in it for building the augmentation facilities to the system?

Governor HANSEN. May I say, Mr. Wyatt, that I am not as familiar with every facet of the bill as are all of the representatives of the State of Wyoming jointly, so that my position generally is this. I want to be assured after consultation with the attorney general's staff, after consultation with the State engineer's staff, our natural resources board, and other interests whose position is valid in the State of Wyoming that this bill as it may come, may come out, there may have been amendments made to it or proposed that I am not familiar with, and I am sorry that I can't speak as specifically as I would like to be and I am not trying to be cagy, I am just saying that we want to be sure as I tried to point out a moment ago that we would hope that what is done, if it receives our support, does either one of two things. Either it nails down unequivocally and without any possibility of jeopardy at a later date the rights of Wyoming to make full use of the 14 percent of the upper basin share of its water, so that we can come before the Congress with projects and that we will be assured that they will not be turned down, or that there be assured supplies of additional water being put into this Colorado River system so as to obviate any question about future shortage that could jeopardize Wyoming's position and development at a later date——

Mr. WYATT. Perhaps this would be a better question of you. I gathered from your statement that you would not be satisfied with the bill containing only the provision that is in it now providing for studies on imports of water.

Governor HANSEN. I would not be satisfied with that assurance, Mr. Wyatt. That is right.

Mr. WYATT. Thank you very much, Governor. I appreciate your appearance.

Mr. ROGERS. Governor, thank you very much for your presentation to the committee.

Governor HANSEN. Thank you, Mr. Rogers.

WYOMING EXECUTIVE DEPARTMENT,
Cheyenne, September 10, 1965.

Hon. WAYNE ASPINALL,
Chairman, House Interior and Insular Affairs Committee,
U.S. House of Representatives, Washington, D.C.

DEAR CONGRESSMAN ASPINALL: At the hearings before the House Interior Subcommittee on Irrigation and Reclamation concerning H.R. 4671, you asked me if I thought that another compact was necessary to protect Wyoming's right to future use of Colorado River water apportioned under the two Colorado River compacts.

I answered that Wyoming's position was that the terms of the compact on the Colorado in 1922 should constitute the law of the river.

I understand that later in the hearings you asked Mr. Northcutt Ely, representing the power interests, if he felt that the compacts could be amended or repealed by unilateral legislative action by Congress, to which he answered that he would like time to prepare an answer to this question.

Taking the two questions together, I would appreciate it a great deal if the record could reflect the position of Wyoming. Wyoming's position is: Compacts deal with regions, like the Southwest clustering about the Colorado River, or the States who are dependent upon the Delaware for water, which are organic units searching for the common need of a water supply.

These regions are less than the Nation but are greater than any one State. There mechanisms of legislation must therefore be greater than that at the disposal of a single State. National action seems the ready alternative, but it is either unavailable or excessive.

With all our unifying processes, nothing is clearer than that in the United States there are regional interests, regional cultures, and regional interdependencies. Despite all mechanical invention and depressing forces for standardization, the United States by virtue of its size, reveals distinct regions with differences of climate, geography, economic specialization, and social habits. These differences produce regional problems, calling for regional solutions. Unequivocally national problems demand all of Congress time, and preclude effective Federal legislation on these strictly regional problems. Regional interests, regional wisdom, and regional pride offer the solutions. The inventive powers exacted from modern State legislatures must be allowed to grapple with the problems whose stage is an interstate region. Collective legislative action through the instrumentality of compact by States constituting a region furnishes the answer.

The States along the Colorado River accepted this answer when they drafted the Colorado River compact. The compact and the subsequent upper Colorado River compact were entered into by following procedures set out in article I, section 10, of the U.S. Constitution. Congressional consent to these compacts has been given and they have been accepted as the "law of the river."

To suggest that Congress may, by unilateral action, amend or repeal these compacts immediately raises many questions, not the least of which are sanctity of contractual obligations; expenditures made by the States and the United States in reliance on the validity of the compacts; promissory estoppel; and the entire range of contractual principles, both legal and equitable.

It is hard to believe that the U.S. Supreme Court, which only recently said in *Petty* v. *Tennessee-Missouri Bridges Comm'n*, 359 U.S. 275 (1959):

"* * * we must treat the compact as a living interstate agreement which performs high functions in our federalism, including operation of vast interstate enterprises."

would ever hold that one of the powers specifically granted to Congress by the Constitution would override the above considerations.

However, the above principles are not the only protection that the signatory States of the upper Colorado River compact have against unilateral congressional action to deprive them of waters allocated under the two Colorado River compacts.

The Colorado River compact gave the upper basin "in perpetuity * * * exclusive beneficial consumptive use of 7,500,000 acre-feet of water per annum * * *." This gave to the upper basin States collectively claims upon this water. The upper Colorado River compact apportioned these claims among the individual signatory States.

These claims to the water are the vested property of the States and as such are protected from congressional defeasement by the last clause of article IV, section 3, U.S. Constitution, which states:

"* * * nothing in this Constitution shall be so construed as to Prejudice any claims of the United States, or of any particular State."

Therefore, for the above-stated reasons, it is the position of the State of Wyoming that the Colorado River compacts cannot be amended or repealed by unilateral action of the U.S. Congress.

Kind regards,

Sincerely,

CLIFFORD P. HANSEN,
Governor of Wyoming.

Mr. ROGERS. Now, the next witness appears to be Mr. Steve Reynolds, State engineer, representing Governor Campbell of New Mexico, who will be accompanied by Mr. Claud Mann, attorney, New Mexico Interstate Stream Commission.

Now, Mr. Reynolds, I am sure we are not going to have time to get through with your testimony before noon. Were you planning on reading your entire statement?

STATEMENTS OF STEVE E. REYNOLDS, SECRETARY, NEW MEXICO INTERSTATE STREAM COMMISSION; AND CLAUD S. MANN, LEGAL ADVISER, NEW MEXICO INTERSTATE STREAM COMMISSION

Mr. REYNOLDS. No, sir.

Mr. ROGERS. I think perhaps at this time it would be best if we recessed until 2 o'clock.

Mr. REYNOLDS. All right, sir.

Mr. ROGERS. And without objection, your statement, Mr. Reynolds, will be included at this point in the record and you may proceed to discuss it at 2 o'clock when we reconvene.

Mr. REYNOLDS. Thank you.

(The document referred to follows:)

JOINT STATEMENT BY CLAUD S. MANN, LEGAL ADVISER, NEW MEXICO INTERSTATE STREAM COMMISSION, AND S. E. REYNOLDS, SECRETARY, NEW MEXICO INTERSTATE STREAM COMMISSION

The Central Arizona project, as it would be authorized by H.R. 4671 and identical bills, includes the Hooker Dam and Reservoir on the Gila River in New Mexico as a unit of the project. This unit would provide flood control, outdoor recreation, fish and wildlife benefits, and a firm water supply through river regulation for municipal, industrial, and agricultural uses.

The Secretary of the Interior's report on the Pacific Southwest water plan proposes a comprehensive water resources development program to meet the growing needs of the Pacific Southwest region. The report recommends the central Arizona project as an principal unit of the water plan and recommends the authorization of the Hooker Dam and Reservoir unit in New Mexico as an integral part of the central Arizona project.

The Gila River system drains about 5,600 miles in New Mexico. It rises at about 11,000 feet in timbered and mountainous terrain and descends to about 3,600 feet as it flows into Arizona. A major portion of the basin in New Mexico is included in the Gila and Apache National Forests.

The economy in the Gila and San Francisco River areas in New Mexico is sustained by small, irrigated acreages combined with cattle grazing operations and supplemented by seasonal timber operations, and other nonfarm employment; fishing, hunting, and other recreation activities are of growing economic importance.

Historically, the mining of gold, silver, and copper contributed substantially to the economy of the area. This segment of the economy has declined since the turn of the century but the Kennecott Copper Corp. still carries on a large copper mining and milling operation just outside the Gila River Basin near Silver City. This activity employs about 1,400 people.

Most of the Gila River Basin in New Mexico is an area of chronic economic depression. Catron and Grant Counties which include most of the basin in the State have been placed within classifications 5(b) of the Area Redevelopment Act of May 1, 1961. This classification signifies that the depressed conditions could be the result of low per capita income, unemployment, or low farm income or production factors.

The Bureau of Reclamation using funds provided by the State of New Mexico has made a reconnaissance investigation of the potentialities for improved and more intensive utilization of the land and water resources of the Gila River Basin in New Mexico (Memorandum Report: Upper Gila River Investigations in New Mexico, January 1963). The Bureau's study shows that there is an obvious need for area redevelopment and that such redevelopment could be substantially advanced and the general economy of the area enhanced and stabilized through land and water resource development programs described in the report on the studies.

The Gila and San Francisco Rivers are erratic, silt-laden streams that fluctuate widely both on a seasonal and annual basis. Floodflows cause damage in the area and deposit silt in irrigation structures and on the fields. Permanent diversion structures are not presently practical because of the fluctuating flows.

Reservoirs on the Gila River system would provide flood protection and yield additional water in New Mexico for future requirements for irrigation, municipal, industrial, and recreational purposes and power development.

The fact that a major portion of the Gila River Basin in New Mexico is included in national forests and wilderness areas suggests the important recreational potential of water resources development. The recreation potential of the area is substantial because of its proximity to the population centers at Albuquerque, El Paso, Phoenix, and Tucson.

There is attached to this statement a copy of Gov. Jack M. Campbell's April 6, 1964, letter to Senator Clinton P. Anderson. In this letter Governor Campbell expresses the hope that the central Arizona project will not be authorized unless and until Arizona, New Mexico, and the United States have entered a stipulation which would modify the decree in *Arizona* v. *California, et al.*, to permit consumptive use of water in New Mexico in excess of the present uses set forth in the decree. Governor Campbell's letter also points out that representatives of Arizona have taken the position that there is no legal or moral basis for New Mexico's proposal that the decree be amended to allow increased uses of Gila River system water in New Mexico under the central Arizona project.

The plan of New Mexico to increase its uses of water in the future in the Gila River system for irrigation, municipal, and industrial purposes is not one just recently conceived. The 8th biennial report of the State engineer discloses a study made of Hooker Damsite and its potentialities between the years 1926 and 1928. On May 14, 1958, in San Francisco before the Honorable Simon H. Rifkind, special master, in the Case of *Arizona* v. *California et al.*, No. 9 Original in the Supreme Court of the United States, New Mexico began its presentation of evidence. On May 16, 1958, while New Mexico witness S. E. Reynolds was on the stand the 8th biennial report, above referred to, was identified and admitted in evidence as exhibit No. 600 (transcript, p. 17363). New Mexico witnesses Philip B. Mutz and S. E. Reynolds both testified at that hearing relating to plans for future uses in New Mexico of water of the Gila River system for irrigation and municipal industrial purposes (reporter's transcript, vol. 34). Briefly, the testimony submitted was to the effect that by construction of Hooker Dam in New Mexico and the Buttes Dam and others in Arizona, New Mexico could increase its uses of Gila River system waters in the future without reducing the amount of water that was being presently used in Arizona. (See also New Mexico's Requested Findings of Fact 18–21.)

After the evidence of all parties in the case before the master had been completed he issued and circulated his draft report on May 5, 1960.

With reference to the Gila River system and uses of water therefrom in New Mexico this draft report dealt first with "Present Uses" under that specific heading (pp. 289–292) and secondly with "Future Uses" under that specific heading (p. 293). Under the heading of "Present Uses" in the draft report, we quote the following:

"New Mexico seeks a confirmation of *existing uses* in that State from the Gila River system. Despite the fact that many of these uses are junior in time to uses downstream in Arizona, I conclude that they should not be disturbed.
* * *

"The New Mexico uses which are confirmed regardless of priority, therefore, are those *present uses* on the Gila River system in New Mexico which are not subject to the Gila decree, *viz.*, *all present uses* except those in the Virden Valley.

"As noted above, there is a controversy as to the extent of *presently irrigated acreage* on the Gila River system in New Mexico." [Emphasis ours.]

Thereafter in the draft report (pp. 300–302) the master set forth his proposed findings as to the exact acreage presently being irrigated in the Gila River system in New Mexico (findings 14–26).

The draft report on page 293 under the specific heading "Future Uses" states, as follows:

"New Mexico also claims the right to water for future requirements. It is here, however, that priority of appropriation has its greatest effect. It would be unreasonable in the extreme to reserve water for future use in New Mexico

when senior downstream appropriators in Arizona remain unsatisfied. It was so held as to Colorado's claim in *Nebraska* v. *Wyoming*, *supra*. New Mexico seeks to mitigate the effect of her claim by attempting to establish that, should additional water storage facilities be constructed sometime in the uncertain future, increased uses in New Mexico would not diminish the supply for downstream Arizona users. To formulate a decree on the basis of such hypothetical facts would not be prudent. In *Nebraska* v. *Wyoming*, *supra*, at 620, Mr. Justice Douglas said:

" 'There is no reliable basis for prediction. But a controversy exists; and the decree which is entered must deal with conditions as they obtain today. If they substantially change, the decree can be adjusted to meet the new condition.'

"Of course, the decree will provide for modification should a change of condition warrant it."

After a careful study of the draft report, New Mexico filed its "Comments on the Special Master's Draft Report, May 5, 1960."

As to the question of present uses in New Mexico, I quote from New Mexico's comments on the draft report (pp. 38–39) as follows:

"If the proposed decree is not to be modified, New Mexico should be allowed to present additional evidence concerning present uses.

"As the hearings at San Francisco proceeded it became clear that New Mexico, and only New Mexico, had been placed in such a position that it was necessary for her to prove present uses; the proposed decree binds only New Mexico to strict proof of present uses as accepted by the special master. New Mexico's position became apparent so late in the trial that it was necessary to undertake a 'crash program' to produce evidence of present uses.

"The fact that this was a crash program in which all of the best evidence could not be accumulated and presented in a precise manner, may account for the fact that the special master found much of New Mexico's evidence as to present uses unconvincing. The net result, we sincerely feel, is that the proposed decree would result in drastic reductions of actual present uses with a profound effect on the going economy of the Gila River Basin in New Mexico.

"In view of what has been said under this heading we urge that, if the proposed decree is not to be modified to substantially increase the present uses allowed New Mexico, an opportunity be given for New Mexico to present further evidence of actual present uses. Such evidence would be in the form of a hydrographic survey, including aerial photographs and engineering field checks, presented as the special master may direct. The State has already asked for bids for aerial mapping of the Gila and San Francisco River drainage areas in New Mexico, and can be prepared to present evidence of the nature described within a year."

Thereafter under date of July 1, 1960, the special master sent a letter to "all counsel" in the case portions of which are quoted as follows:

"*New Mexico has requested an opportunity to present further evidence of actual present uses in that State of water from the Gila River system.* I shall meet with attorneys for New Mexico, Arizona, and perhaps also, the United States on July 11, 1960, to *discuss the question of the extent of New Mexico's present use of water* from the Gila River system, and my decision on New Mexico's request is, pending that meeting, deferred." [Emphasis ours.]

Attorneys and engineers representing New Mexico and Arizona met with Judge Rifkind in New York on July 11, 1960, and on that day began negotiations solely on the question of present existing uses in New Mexico from the Gila River system. An entire week was consumed in trying to arrive at an agreement as to the exact present uses. Other meetings of the parties eventually culminated in a stipulation between New Mexico and Arizona. This stipulation involved present uses only, and resulted in increased uses from the river system in New Mexico over and above those "present uses" as specified in the master's draft report.

The special master's final report was dated December 5, 1960, and thereafter circulated to the parties to the case. In this final report with reference to the Gila River system uses in New Mexico the master again used the specific heading "Present Uses" (report pp. 325–330).

Under this heading on page 327 of the report the master stated:

"The presently irrigated acreage figures for lands in New Mexico outside the Virden Valley, set forth in the findings of fact and recommended decree, represent a compromise between Arizona and New Mexico to which the United States has interposed no objection. This compromise has been adopted in the decree."

The findings of fact in this report (Nos. 13–26) then set forth the exact acreage

presently being irrigated and the present annual consumptive uses of water from the Gila River system in New Mexico as was agreed upon by the two States in said compromise or stipulation.

The master's report also contined a "Recommended Decree." Under paragraph IV thereof the State of New Mexico was enjoined from diverting or permitting the diversion of water from the various areas of the Gila River system in New Mexico except as specifically agreed upon between the States of Arizona and New Mexico in said compromise (pp. 354–358).

In addition the master's final report had a specific heading entitled "Future Uses." Under this heading the master repeated verbatim the matter heretofore quoted that appeared under that same heading in his draft report. We wish to repeat here for emphasis only the last sentence appearing in the final report under this heading of "Future Uses," to wit: "Of course, the decree will provide for modification should a change of condition warrant it."

The case was finally argued before the Supreme Court of the United States during the second week in January 1962.

I will quote a few excerpts from the oral argument presented before the Court on behalf of New Mexico. ("Oral Argument," *Arizona* v. *California*, 1962, vol. 4, pp. 535–538). First, as to present or existing use, the following statements were made:

"New Mexico, after it had been brought into this case involuntarily, did request equitable apportionment as to its uses on the Gila River and the tributaries in New Mexico. The master, in his report, did make his decision with reference to the uses on the Gila River between New Mexico, Arizona, and the United States, on the theory of equitable apportionment, with which ruling we are very much pleased.

"However, it is true that we felt, in the draft report, that there had been considerable limitation of the actual uses in the Gila, on the New Mexico side of the line, and we were unhappy with that result and filed our comments to the master's report with him on that matter.

"Subsequently, representatives of Arizona and New Mexico entered into negotiations to attempt to compromise as to the actual uses on the Gila and its tributaries within the State of New Mexico. After considerable negotiations, that compromise was effected, and a stipulation was filed with the special master.

"The special master adopted in full the findings of fact, conclusions of law, and even provisions of the decree dealing with these uses in accordance with the stipulation between the parties.

"As a result, although New Mexico did improve its situation, we were not completely happy, as is true in most cases in negotiation and compromise, and we did improve our situation, and we are here to request this Court at this time to adopt in full the findings of fact and conclusions of law, and the provisions of the decree insofar as it applies to New Mexico and its uses."

Still having in mind the possible authorization and construction of the central Arizona project including Buttes Dam in Arizona and Hooker Dam in New Mexico, in the oral argument before the Supreme Court, New Mexico counsel stated:

"Now, as to one other matter I would like to request at this time—that is specifically the provisions of article IX of the proposed decree be incorporated in the final decree of this Court. We feel it is very important to New Mexico, as well as to the other parties to this case, that the Court retain its jurisdiction, and if future circumstances should warrant, New Mexico, for example, to come in and ask for an additional relief, that it be permitted to do so. We think that is of extreme importance, and we respectfully request this Court that that article be retained in full."

The decree of the Supreme Court dated March 9, 1964, in paragraph IV thereof (decree pp. 8–11) contained the identical provisions relating to present or existing uses from the Gila River system in New Mexico as did the "Proposed Decree" of the special master's report to the Court.

The last paragraph of the Court's decree is No. IX which is the same as in the master's proposed decree, and is as follows:

"IX. Any of the parties may apply at the foot of this decree for its amendment or for further relief. The Court retains jurisdiction of this suit for the purpose of any order, direction, or modification of the decree, or any supplementary decree, that may at any time be deemed proper in relation to the subject matter in controversy."

Since the special master's draft report was circulated among the parties to the case in May 1960, New Mexico has consistently and conscientiously felt and maintained that under the provisions of article IX of the decree above quoted it could legally and equitably seek and obtain a modification of the decree to permit new and additional uses from the Gila River system should new conditions arise such as the authorization and construction of the central Arizona project; this project by additional storage facilities on the Gila River would increase the supply from this source for those presently using water from the Gila River in Arizona and would bring an additional supply to such users from the main Colorado River.

There are reliable sources independent of New Mexico that clearly seem to feel that if a project can be developed that would add to the water supplies of the Gila River it would furnish sufficient grounds to warrant reopening of the case.

Under date of June 2, 1961, in reply to a letter addressed to the Director of the Library of Congress from the Honorable Thomas L. Morris, New Mexico Representative in Congress, the Director, Hugh L. Elsbree, replied in part as follows:

"This is in reply to your letter of May 26, 1961, asking that a study be made of the effect of the special master's report in the case of *California* v. *Arizona* on the development of the water resources of southwestern New Mexico, specifically, Hooker Dam on the Gila River, and on the existing water rights of the present water users in that area."

The letter also states, as follows:

"With respect to future uses, the special master states, 'It would be unreasonable in the extreme to reserve water for future use in New Mexico when senior downstream appropriators in Arizona remain unsatisfied.' Elsewhere, he states that the stream is over appropriated, and he refers to claims of the United States for water for Indian reservations, national forests, parks, memorials, and monuments, and public lands administered by the Bureau of Land Management, which do not come within the purview of his proposed decree. Thus, he concludes that additional uses of water in the Gila River system, over and above those specified, should be enjoined, and that uses recognized on particular streams may not be transferred to justify additional uses on other streams.

"On this basis, it appears that the special master's report might have an adverse effect on the plans for the Hooker Dam, which we understand from your office would form a proposed conservation reservoir in the vicinity of Silver City, N. Mex., and is intended to serve lands in New Mexico and Arizona. The recommended decree would, in fact, enjoin the State of New Mexico, after 4 years from the date it is adopted by the Supreme Court, from diverting or permitting the diversion of water for other than the lands specifically mentioned in the report. However, provision is made in the decree for any of the parties to apply for its amendment, and *if a project can be developed that would add to the water supplies of the Gila River, this would appear to be sufficient grounds for reopening the case.*" [Emphasis supplied.]

On page 35 of the January 1962 "Appraisal Report Central Arizona Project," U.S. Department of Interior, Bureau of Reclamation, region 3, appears the following:

"The coordination of conservation and control facilities involving surface water supplies would be essential to realization of the optimum benefits from the introduction of an import supply. The construction of the Maxwell, Buttes, Charleston, Hooker, and Camelsback, or alternative reservoirs, *would provide operational and regulatory control of surface water above the upstream places of use and make exchanges possible.* The additional regulation obtained would make possible higher utilization efficiencies in the conveyance and distribution systems. Control of stormflows and improvement of irrigation practices could provide an additional usable water supply." [Emphasis ours.]

At page 67 of the record of the August 28, 1963, hearing before the Senate Subcommittee on Irrigation and Reclamation on S. 1658, a bill to authorize the central Arizona project, there is the following exchange between Senator Clinton P. Anderson, Commissioner of Reclamation Floyd Dominy and Mr. C. A. Pugh, area engineer of the Bureau of Reclamation, Phoenix office:

"Senator ANDERSON. On page 13, you say: 'The benefits of import water to the central Arizona area could be extended to many other areas of Arizona and western New Mexico through exchange arrangements.'

"I don't necessarily wish to have you testify on that here, but would you indicate for the record at least so I might transmit it to the interstate stream com-

mission in my State what sort of exchange arrangements you are talking about, or would you want to indicate now?

"Mr. DOMINY. To the extent that we are bringing in Colorado River water, present uses on other streams low down on the river could be moved upstream by exchange. In other words, without harming anybody, you can hold more water back, even though it is now appropriated for use lower down on the river, because the lower use would get water directly from the Colorado River system in this project, thus permitting upstream exchanges.

"Senator ANDERSON. In the Gila River system, we have this location for Hooker Dam. We would like to use some water under it.

"Mr. DOMINY. Exactly.

"Senator ANDERSON. But somebody has the theory that the Indians have prior rights to it and therefore the San Carlos Indians might get all the water that might be used in New Mexico. Is there any way of exchanging water from the San Carlos Indians in this project? Don't just nod your head. Say 'yes.' I want it in the record.

"Mr. PUGH. That would be not the San Carlos Indians necessarily; the San Carlos project. The Gila Indians have immemorial water rights on the water downstream. Their rights have to be satisfied first.

"Now, if Colorado River water is brought in, it can be delivered to the Indians downstream in exchange for withholding water upstream. In other words, the people in New Mexico then would not have to release their water, because the project would provide replacement water to the Indians from the Colorado River."

At page 65 of the record of the August 28, 1963, hearing Senator Anderson during the questioning of the Bureau witnesses stated:

"Now we have this problem and there ought not to be any dispute between the States. I am trying to find out if you desire to have this bill enacted into law before these States have a chance to agree how they will divide up what little is left after the Supreme Court got through with us."

Immediately thereafter the record of the hearing discloses the following:

"Mr. PUGH. I do not think I am competent to comment on that.

"Senator KUCHEL. You are going to have to be, my friend, because the Supreme Court puts that right in the lap of the Congress or the Department of the Interior and that is going to be basic to anything that the Federal Government does. That is one regrettable feature of that Supreme Court decision.

"Is that not a fair statement, Commissioner, that this kind of a problem has to be decided either by the Secretary of the Interior or by the Congress?

"Mr. DOMINY. I think so. I agree. I certainly agree that we have to have an understanding between New Mexico and Arizona with regard to the Hooker Dam and the benefits to each area that will result from the Hooker Dam. I would propose that it be done. I am satisfied it can be done."

At this point the equities of the situation should be briefly discussed. The decision in *Arizona* v. *California* did not grant to Arizona future or additional water on the Gila River for Arizona uses. The Supreme Court decree did recognize Arizona's right to consumptively use 2,800,000 acre-feet of main stream water if sufficient water is available, according to the Secretary of the Interior's determination to satisfy 7,500,000 acre-feet of consumptive use in Arizona, California, and Nevada. After the upper basin puts to use its entitlement under the compacts, the average annual amount of water available from Lake Mead could be about 5.5 million acre-feet rather than 7.5 million acre-feet (Jan. 21, 1964, letter from Assistant Secretary Kenneth Holum to Secretary Udall forwarding January 1964 report, Pacific Southwest water plan) and the Supreme Court decree provides that if there is less than 7.5 million acre-feet the water available may be apportioned among the States of Arizona, California, and Nevada as the Secretary may decide. The decree did not grant to Arizona a guarantee of 2,800,000 acre-feet, the enjoyment of her "right" being conditioned upon two very important contingencies: (1) the method of apportionment selected by the Secretary of Interior (final decree, art. II(B)(3)); and (2) the construction of projects making possible the use of Arizona's allocation. The decree did specify present uses on the Gila in New Mexico and enjoined additional use. However, under the provisions of article IX the decree may be modified to permit additional uses in New Mexico in the future should new conditions warrant. While it is true the State of New Mexico has no right to put additional water to use until such time as the final decree is modified under article IX, it is also true that Arizona does not have a "right" to the amount of water required for the central

Arizona project until such time as the Secretary or the Congress determines the amount available to Arizona under the decree.

In order to obtain an additional water supply for use on the Gila in Arizona that State is now asking the Congress of the United States to authorize and construct at Federal expense, the central Arizona project, which would be of great economic value to that State. This project would bring 1,200,000 acre-feet of water into central Arizona from the main stream of the Colorado River. A part of this imported water would be allocated to the San Carlos project which presently depends solely upon the Gila River system for its supply. In addition the Buttes Dam and Reservoir on the Gila River is proposed as a unit of the central Arizona project. This unit would make an additional 50,000 acre-feet of Gila River system water available for use on the San Carlos project by controlling the floodflows of the San Pedro River.

The Bureau reports on the central Arizona project are the basis for Arizona's request for authorization. As previously shown herein those reports contemplate additional uses in New Mexico. New Mexico is in good faith seeking only some small relief for its citizens by obtaining the benefits of additional supplies of water to the Gila River system in event the central Arizona project is authorized. Certainly we are not being unreasonable in asking the Congress to refuse to authorize the central Arizona project unless and until Arizona agrees to cooperate with us in obtaining a modification of the Supreme Court decree which will allow New Mexico to increase uses of Gila River system water in the future.

Our position in this regard is entirely and completely consistent with any and all agreements heretofore made with Arizona and also with the provisions of the Supreme Court's decree by which we are legally bound.

We sincerely appreciate the opportunity to appear before the committee to present New Mexico's position on this vital water project.

STATE OF NEW MEXICO,
Santa Fe, April 6, 1964.

Hon. CLINTON P. ANDERSON,
U.S. Senate,
New Senate Office Building,
Washington, D.C.

DEAR SENATOR ANDERSON: By letter dated March 24, 1964, Senator Henry M. Jackson, chairman of the Senate Interior and Insular Affairs Committee advised me that the Subcommittee on Irrigation and Reclamation has scheduled a public hearing on April 9 and 10 on the Pacific Southwest water plan and on S. 1658, a bill to authorize the central Arizona project.

You will recall that by letter dated July 12, 1963, S. E. Reynolds, New Mexico State engineer, advised you that the New Mexico Interstate Stream Commission acted to recommend that you not support S. 1658 unless certain amendments were made. These amendments would have had the effect of deferring the construction of central Arizona project works other than Bridge Canyon Dam, reservoir, powerplant and electrical power transmission facilities, until agreements satisfactory to the Secretary of the Interior were concluded between the States of Arizona and New Mexico regarding the uses of Gila River water and operating criteria for the Hooker and Buttes Reservoirs that would be constructed in New Mexico and Arizona as a part of the project. In the same letter Mr. Reynolds advised you that the interstate stream commission recommended similar amendments to S. 1360, a bill to authorize the Buttes Dam and Reservoir as a unit separate from the central Arizona project.

On July 9, 1963, I addressed a letter to Secretary Udall with copies to Governor Paul Fannin, Governor Edmund Brown, and Governor Grant Sawyer. In this letter I discussed New Mexico's interest in the development of the central Arizona project, including the Hooker Dam and Reservoir and other potential water use projects in New Mexico. I pointed out that the central Arizona project would bring Colorado River main stream water to Gila River water users in central Arizona thus making it possible, by exchange, to develop water use projects in New Mexico without detriment to those using Gila River water in central Arizona. I also pointed out that such increased use of the waters of the Gila River system in New Mexico would require amendment of the decree recommended by the special master in *Arizona* v. *California*, and expressed the belief that the necessary amendment to the decree could be agreed to by the States of Arizona and New Mexico and the United States.

In its present form the Supreme Court decree limits New Mexico to the amount of consumptive use required for the present uses stipulated by Arizona and New Mexico and specified in the decree. However, article IX of the decree provides that the parties may apply at its foot for further relief as warranted by changing conditions. The special master proposed article IX of the decree to allow New Mexico to press its claim for water for future requirements should the construction of additional water facilities make it possible to increase uses in New Mexico without diminishing the supply for senior downstream Arizona users.

On October 25, 1963, and again on March 23, 1964, representatives of the New Mexico Interstate Stream Commission met with representatives of the Arizona Interstate Stream Commission to discuss our proposal that the decree be amended to allow increased uses of Gila River system water in New Mexico under the central Arizona project. At these meetings the Arizona representatives took the position that there is no legal or moral basis for New Mexico's proposal, and no progress was made toward a stipulated amendment of the decree in *Arizona* v. *California, et al.* Of course, it is my view that the position of the Arizona representatives is not tenable and I continue to hope that they can be so persuaded.

It appears that it would not be possible to construct and operate Hooker Dam and Reservoir in New Mexico without an amendment to the decree in *Arizona* v. *California* even if no water was taken from the reservoir for beneficial consumptive use in New Mexico. Studies of Hooker Reservoir at various proposed capacities show that reservoir evaporation alone would average 3,000 to 7,000 acre-feet per year. The data presently available from our hydrographic survey of the Gila River system indicates that the consumptive use specified for present uses in the decree in *Arizona* v. *California* will be made by present water right owners and, therefore, that the increased consumptive use of water by evaporation from Hooker Reservoir would be in violation of the decree in its present form.

In view of the foregoing I hope that the central Arizona project will not be authorized unless and until Arizona, New Mexico, and the United States have entered a stipulation which would modify the decree in *Arizona* v. *California, et al.* to permit consumptive use of water in New Mexico in excess of the present uses set forth in the decree; I still hope that such a stipulation can be agreed upon at an early date.

The Bureau of Reclamation's January 1964 report on the Pacific Southwest water plan recommends authorization of the central Arizona project including Buttes Dam and Reservoir and Hooker Dam and Reservoir. Accordingly, I also hope for the reasons set forth above that the Pacific Southwest water plan will not be fully authorized until the United States, Arizona, and New Mexico have reached an agreement concerning future uses in New Mexico.

Sincerely,

JACK M. CAMPBELL,
Governor.

Mr. ROGERS. The subcommittee stands in recess until 2 p.m.

(Whereupon, at 11:45 a.m., the subcommittee was recessed, to reconvene at 2 p.m., of the same day.)

AFTERNOON SESSION

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

Mr. Reynolds, you may proceed.

STATEMENTS OF STEVE REYNOLDS, SECRETARY; AND CLAUD S. MANN, LEGAL ADVISER, NEW MEXICO INTERSTATE STREAM COMMISSION—Resumed

Mr. REYNOLDS. Thank you, Mr. Chairman, and gentlemen of the committee. Our written statement is lengthy, and deals largely with legal matters; therefore, with your permission, Mr. Mann, who participated on New Mexico's behalf in *Arizona* v. *California*, will summarize

that statement. Then, if I may, I would like to add just a few brief supplementary remarks myself.

Mr. ROGERS. Fine. You may proceed, Mr. Mann.

Mr. MANN. Thank you, Mr. Chairman.

The central Arizona project, as it would be authorized by H.R. 4671 and identical bills includes the Hooker Dam and Reservoir on the Gila River in New Mexico as a unit of the project. This unit would provide flood control, outdoor recreation, fish and wildlife benefits, and a firm water supply through river regulation for municipal, industrial, and agricultural uses.

The Bureau of Reclamation using funds provided by the State of New Mexico has made a reconnaissance investigation of the potentialities for improved and more intensive utilization of the land and water resources of the Gila River Basin in New Mexico.

The Bureau's study shows that there is an obvious need for area redevelopment, and that such redevelopment could be substantially advanced and the general economy of the area enhanced and stabilized through land and water resource development programs described in the report on the studies.

Reservoirs on the Gila River system would provide flood protection and yield additional water in New Mexico for future requirements, for irrigation, municipal, industrial, and recreational purposes, and power developments.

There is attached to this statement a copy of Governor Jack M. Campbell's April 6, 1964, letter to Senator Clinton P. Anderson. In this letter, Governor Campbell expresses the hope that the central Arizona project will not be authorized unless and until Arizona, New Mexico, and the United States have entered a stipulation which would modify the decree in *Arizona* v. *California, et al.*, to permit consumptive use of water in New Mexico in excess of the present uses set forth in the decree.

Governor Campbell's letter also points out that representatives of Arizona have taken the position that there is no legal or moral basis for New Mexico's proposal that the decree be amended to allow increased uses of Gila River system water in New Mexico under the central Arizona project.

In the trial of the case of *Arizona* v. *California*, when New Mexico presented its testimony, the biennial report of the State engineer for the years 1926–28 involving this question was introduced in evidence and became a part of the record. New Mexico also put on evidence as to its potential future uses in New Mexico on the Gila.

Briefly, the testimony submitted was to the effect that by construction of Hooker Dam in New Mexico and the Buttes Dam and others in Arizona, New Mexico could increase its uses of Gila River system's water in the future without reducing the amount of water that was being presently used in Arizona.

After the evidence of all parties in the case before the master had been completed, he issued his draft report in which there was also a draft decree. In his draft report he specifically stated that the New Mexico uses that are confirmed regardless of priority therefore are those present uses on the Gila River system in New Mexico which are not subject to the Gila decree, namely, all present uses except those in the Virden Valley.

As noted above, there is a controversy as to the extent of present irrigated acreage on the Gila River system. In that matter, in the draft report, the special master settled the question of present uses in New Mexico. He further stated:

New Mexico also claims the right to water for future requirements. New Mexico seeks to mitigate the effect of her claim by attempting to establish that, should additional water storage facilities be constructed sometime in the uncertain future, increased uses in New Mexico would not diminish the supply for downstream Arizona users. To formulate a decree on the basis of such hypothetical facts would not be prudent.

He therefore held that:

There is no reliable basis for prediction. But a controversy exists; and the decree which is entered must deal with conditions as they obtain today. If they substantially change, the decree can be adjusted to meet the new condition.

Of course, the decree will provide for modification should a change of condition warrant it.

Thereafter, New Mexico like the other parties to the controversy submitted its comments on the draft report, and after the special master had read those comments from New Mexico, he sent out a letter dated July 1, 1960, to all counsel in the case, portions of which are quoted as follows:

New Mexico has requested an opportunity to present evidence of actual present uses in that State of water from the Gila River system. I shall meet with attorneys for New Mexico, Arizona, and perhaps also the United States on July 11, 1960, to discuss the question of the extent of New Mexico's present use of water from the Gila River system.

As a result of that letter, representatives from the State of New Mexico and the State of Arizona did meet in the New York before the special master and he clearly stated that if we could not agree on the amount of present uses of New Mexico on the Gila, that he himself then would have to reexamine the evidence and render possibly a different opinion that had been set forth in the draft report.

As a result, the representatives of the two States—and during part of the time some of the Federal representatives were there—met for practically a week in New York. We did finally come to an agreement on present uses, and they were specifically set forth in a stipulation between the parties. Arizona was not forced to sign that stipulation nor was New Mexico. Neither party was happy with the stipulation, but we were both morally bound by that stipulation as to the present uses in the State of New Mexico, and became legally bound by that very stipulation when it was incorporated entirely in the final decree of the Supreme Court.

At page 67 of the record of the August 28, 1963, hearing before the Senate Subcommittee on Irrigation and Reclamation on S. 1658, a bill to authorize the central Arizona project, there is the following exchange between Senator Clinton P. Anderson, Commissioner of Reclamation Floyd Dominy, and Mr. C. A. Pugh, area engineer of the Bureau of Reclamation, Phoenix office:

Senator ANDERSON. On page 13, you say: "The benefits of import water to the central Arizona area could be extended to many other areas of Arizona and western New Mexico through exchange arrangements."

I don't necessarily wish to have you testify on that here, but would you indicate for the record at least so that I might transmit it to the interstate stream commission in my State what sort of exchange arrangements you are talking about, or would you want to indicate now?

Mr. DOMINY. To the extent that we are bringing in Colorado River water, present uses on other streams low down on the river could be moved upstream by exchange. In other words, without harming anybody, you can hold more water back, even though it is now appropriated for use lower down on the river, because the lower use would get water directly from the Colorado River system in this project, thus permitting upstream exchanges.

On page 19 of the statement appears an answer also from Mr. Dominy referring to the same question, and in order to save time, I will merely refer to his answer. The question is set forth above, but I will not take the time to read it now.

Mr. DOMINY. I think so. I agree. I certainly agree that we have to have an understanding between New Mexico and Arizona with regard to the Hooker Dam and the benefits to each area that will result from the Hooker Dam. I would propose that it be done. I am satisfied it can be done.

I would like to say that as I understand the decree in *Arizona* v. *California*, it certainly gave California the right to the use of 2.8 million acre-feet from the main Colorado River. However, the users of that right are really dependent upon two conditions: One, of course, is the availability of water, and the second——

Mr. HOSMER. Pardon me; 2.8 million to California or Arizona?

Mr. MANN. Arizona. I beg your pardon if I said California.

The second condition, of course, is the construction of the works so that Arizona may be able to use this water or such portion of it as is available, and that is the very thing that is involved, of course, in this particular legislation.

Certainly, New Mexico, we feel, is not being unreasonable in asking the Congress to refuse to authorize the central Arizona project unless and until Arizona agrees to cooperate with us in obtaining a modification of the Supreme Court's decree which will allow New Mexico to increase uses of the Gila River system water in the future.

You will recall that in the draft report the special master specifically stated as to future uses relating to water in New Mexico, that the decree would be left open in case of any changes in condition so that we could apply to the Supreme Court for such uses.

I might state in concluding my remarks at this time, that I sincerely hope that New Mexico and Arizona can reach a full agreement with reference to these matters and that, as a result, we will be in the position to wholeheartedly support the legislation so badly needed by our neighbor, Arizona.

Thank you.

Mr. ROGERS. Thank you, Mr. Mann.

Mr. Reynolds?

Mr. REYNOLDS. If I may proceed.

Mr. Chairman, the Buttes Dam and Reservoir, which would be authorized by the legislation to increase the water supply of the San Carlos Irrigation District is a matter of some concern to New Mexico. The Gila River decree of the Federal District Court of Arizona establishes the priority, the nature, and the extent of rights to water from the Gila River in Arizona and in the Virden Valley in New Mexico. This decree contains a somewhat unusual provision concerning storage of water in the San Carlos Reservoir. Under this provision, where there is an accretion to storage in the reservoir, the water users upstream from the San Carlos Reservoir may take water out of priority in the amount of the accretion. It is because of this provision that

Buttes Reservoir could be operated so as to give some advantage or to cause some detriment to users above San Carlos Reservoir in Arizona and New Mexico.

Accordingly, we believe there should be an agreement between Arizona and New Mexico on operating regulations for Buttes Reservoir and that this agreement should be reflected in the authorizing legislation.

The Bureau of Reclamation's report on the Buttes Dam and Reservoir project recognizes this problem and recommends that there should be no construction of Buttes Dam undertaken until there is an agreement between New Mexico, Arizona, and the upper and lower valley users.

We hope to reach some agreement on this matter along with an agreement concerning increased uses in New Mexico before the central Arizona project is authorized.

In the course of this hearing, there has been considerable discussion of the controversy over the manner in which the Colorado River compact distributes the Mexican Treaty burden. As we see this problem, it largely comes down to a question of whether uses from the tributaries in the lower basin and evaporation from reservoirs in the lower basin are accountable as beneficial consumptive use allocated to the lower basin. We believe that such uses and such evaporations are thus accountable and it is our view that any legislation authorizing the central Arizona project should resolve this question. We could all then proceed in planning and development with a greater degree of certainty as to what our problems really are.

The seven-State conferences last week indicated that the controversy over the Mexican Treaty burden might be resolved by any one of several approaches. With the hope that the States may yet reach an agreement on the best approach, we offer no specific language on the point at this time.

Governor Campbell has addressed a letter to Chairman Aspinall setting forth the New Mexico position on the water supply for the central Arizona project.

Mr. ASPINALL. Mr. Chairman, what is the date of that letter?

Mr. REYNOLDS. Pardon me. I do not know the date, sir. I am advised that it has gone forward.

Mr. ASPINALL. Do I have a letter that is dated after August 17?

Mr. REYNOLDS. I would think that would be about the date, Mr. Chairman.

Mr. ASPINALL. That letter does not answer the question.

Mr. REYNOLDS. If I may, I would review what is in the letter and perhaps add something to that, Mr. Chairman.

Mr. ASPINALL. You do not need to go into it too far, unless you want to testify to it, because I am going to put it in the record pretty soon.

Mr. REYNOLDS. All right, sir.

This letter states that the Tipton report makes evident three points: One, that the central Arizona project water supply depends upon deliveries from the upper basin in excess of the deliveries required by the Colorado River compact.

Two, that such excess deliveries will be made for a number of years until the upper basin uses are fully developed and three, without importation, a full water supply will not be available for the project for a period of 50 years beyond the projected completion date of 1975.

Also, New Mexico participates in the consensus that water supply prospects are that there will be a full supply for the central Arizona project until sometime during the last decade of this century.

A document presenting this consensus was presented for the record in this hearing by Mr. Ely.

Mr. Chairman, there is a long record of cooperation between the State of Arizona and the State of New Mexico in many matters including water projects, and New Mexico recognizes the dire need of Arizona for the central Arizona project. Governor Campbell deeply regrets, and so de we, that we must appear here today to ask that the central Arizona project not be authorized until agreements have been reached that will give the people of New Mexico a fair share of the waters of the Gila River system. We very much appreciate the opportunity to present our position before this distinguished committee.

Mr. ROGERS. Thank you, Mr. Reynolds.

Mr. Aspinall?

Mr. ASPINALL. I only have one question, Mr. Reynolds.

After reading your statement during the noon hour and listening to your statements and also referring to this letter which you have referred to, the last paragraph of which is as follows:

> New Mexico is making further analysis of the Tipton report which will be presented later on today on the central Arizona project water supply and may wish later to make further reply to your letter and present testimony on this matter to your committee.

With this in mind, then I take it that as far as the State of New Mexico is concerned, it is alienating itself as far as further consideration of upper basin water is concerned; is that right?

Mr. REYNOLDS. I do not think that is right, sir.

Mr. ASPINALL. You do not think that is right?

Mr. REYNOLDS. I do not believe we are alienating ourselves.

Mr. ASPINALL. Where do we have anything in the report, where is there anything in your statement, where is there anything in what you have said, and where is anything in this letter except a reference to the Tipton report that would lead me to believe that you are still interested in the welfare of the upper basin in connection with this unused water?

Mr. REYNOLDS. Well, we are, of course, very much interested in our upper basin problems. We have upper basin interests.

Mr. ASPINALL. But, Mr. Reynolds, you already have authorization for the projects which will use all of the water to which you are entitled under the Colorado River compact, as far as the upper basin is concerned, and under the upper Colorado River compact.

Mr. REYNOLDS. Well, Mr. Chairman, if I may, I think what you have just said is substantially correct. Perhaps I should add just a bit of detail to make this clear.

Mr. ASPINALL. I want you to align yourselves with your sister States in the upper basin States or completely divorce yourselves. That is what I am trying to get you to do.

Mr. REYNOLDS. Of course, Mr. Aspinall, we cannot completely divorce ourselves from these two basins. We are a part of both basins.

Mr. ASPINALL. I can understand your statement as it refers to what is proposed in the lower basin. I can understand your statement so far as that is concerned, but I cannot understand why you do not say

anything definite about your position as a member of the upper basin States.

Mr. REYNOLDS. I think we have. I think we have said that we see the need to resolve this question over the Mexican treaty burden. We do not understand Arizona's position in this matter. We do not agree with their position in that matter, and we think this is the time to resolve it, in this legislation. We offer no specific language at this time, because we are hopeful that all the States can get together on the best approach to the problem. We do see it as something that must be solved.

If I may go on, Mr. Chairman, as to our upper basin uses, it has been said several times that we are using all of our upper basin water.

Mr. ASPINALL. That has not been said; it has been said that you will when you get your projects constructed, which are now authorized, that you will then be using all of your water, and that should be someplace within the next 4, 6, or 8 years.

Mr. REYNOLDS. I do not attribute the statement to you, sir, but actually New Mexico is using about 100,000 acre-feet from the upper basin at this time. We have committed under our planning some 650,000 acre-feet, including those present uses. Included within the 650,000 is some 30,000 acre-feet for the Animas-La Plata project, which is not yet authorized. There remains available at Navajo Reservoir, according to the Secretary of the Interior's findings, enough water to contract for uses that would result in a depletion of some 100,000 acre-feet annually, and none of that water has yet been contracted.

Mr. HOSMER. What reservoir is that 100,000?

Mr. REYNOLDS. That was the Navajo Reservoir, sir. That is just above Farmington on the San Juan River in New Mexico.

Mr. ASPINALL. What do you contend will be the amount of water to which the State of New Mexico—or its users, rather, are entitled under the law of the river which will be deliverable to the central Arizona project?

Mr. REYNOLDS. The water that New Mexico is entitled to that would be deliverable to the central Arizona project?

Mr. ASPINALL. If the central Arizona project is authorized and ready for operation in 1975.

Mr. REYNOLDS. Mr. Chairman, the Bureau of Reclamation has made studies at our request that show that New Mexico could, with construction of Hooker Reservoir, New Mexico could increase uses in amounts sufficient to cause a depletion of about 46,000 acre-feet a year without decreasing the supply to users from the Gila River system between Hooker Reservoir and the San Carlos Reservoir on the Gila in New Mexico and Arizona, and the effects on San Carlos Reservoir can be offset by water imported from the Colorado River or by water made available by Butts Reservoir.

Mr. ASPINALL. We are not talking about the same thing. I have already said that your statement, as far as the lower basin is concerned, is all right. What do you contend will be deliverable from your share of the upper basin water—not lower basin water—from upper basin water after, we will say, 1975? How much are you going to contribute to this amount of water that the State of Arizona or the users in the State of Arizona have to have in order to make their project a successful project?

Mr. REYNOLDS. Yes, sir; now, I understand. And I am unable to give you that number at this moment. I can prepare it.

Mr. ASPINALL. Would you prepare it for us——

Mr. REYNOLDS. Yes, sir.

Mr. ASPINALL. At your convenience?

Mr. REYNOLDS. Yes, sir; I will be pleased to do that.

Mr. ASPINALL. As quickly as possible, and I ask that the statement be placed in the record at this point.

Mr. ROGERS. Without objection, it is so ordered.

(The information requested is as follows:)

AUGUST 27, 1965.

Hon. WALTER ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation,
House Interior and Insular Affairs Committee,
Washington, D.C.

DEAR CHAIRMAN ROGERS: At the hearing on H.R. 4671 and identical bills on August 26, Congressman Wayne Aspinall asked for projections of the amount of the New Mexico allocation of waters of the upper Colorado River system that would be available for use by the central Arizona project. The figures requested are as follows:

Year:	*Acre-feet*
1975	250,000
1990	15,000
2000	0
2030	0

The foregoing figures are based on the estimation that with existing storage facilities New Mexico may deplete the flow of the San Juan River system by 760,000 acre-feet annually.

Sincerely yours,

S. E. REYNOLDS,
New Mexico State Engineer.

Mr. ASPINALL. Thank you very much, Mr. Chairman.

Mr. ROGERS. Mr. Hosmer?

Mr. HOSMER. Is my understanding correct that the State of New Mexico had no objection to the lower basin project but it wants it conditioned on something else?

Mr. REYNOLDS. Yes, sir.

Mr. HOSMER. In essence, you want to hold the lower basin project for ransom, for some water.

Mr. REYNOLDS. I think we want to hold up the progress until there is an equitable apportionment of those waters.

Mr. HOSMER. You call it an equitable apportionment. I call it ransom.

Mr. REYNOLDS. Yes, sir.

Mr. HOSMER. Now, is it my understanding that this ransom amounts to 46,000 acre-feet of water a year?

Mr. REYNOLDS. I think that is about the upper limit, sir.

Mr. HOSMER. And your contention is that this ransom will not come out of any water that Arizona has but can be picked up through some sort of reservoir regulation or something.

Mr. REYNOLDS. No, sir. To be perfectly straightforward about it, it would reduce the amount of water available to the central part of Arizona by that amount.

Mr. HOSMER. You mean the central Arizona project water.

Mr. REYNOLDS. Yes. That is, the central Arizona water, the effect of that on central Arizona would be a supply reduced by about that

amount, somewhat less than that, because of the effect of salvage by use.

Mr. HOSMER. Where is New Mexico going to pick up that water?

Mr. REYNOLDS. The Gila River system in New Mexico. The Gila River system flows at the New Mexico-Arizona boundary about 175,000 acre-feet per year, and we hold up a part of that amount, sir.

Mr. HOSMER. Well, there are people in this central Arizona project service area in New Mexico, and then there are some other people over on the Gila River. Do you expect that water to flow through the central Arizona project to the Gila——

Mr. REYNOLDS. No, sir.

Mr. HOSMER (continuing). By the Salt River?

Mr. REYNOLDS. No, sir; we would hold up the water, as I say, in the headwaters of the Gila River system. The effect of our holding it up would be reflected at the San Carlos Reservoir which serves the San Carlos Irrigation District. Their supply from the San Carlos Reservoir would be reduced, but this reduction in supply could be offset by the water imported to central Arizona by the main aqueduct and by the additional supply made available in central Arizona by the Buttes Reservoir.

Mr. HOSMER. Would it run on to the San Carlos Reservoir, 46,000 acre-feet?

Mr. REYNOLDS. No, sir. It would be held up in New Mexico.

Mr. HOSMER. No physical connection.

Mr. REYNOLDS. It is an exchange, and this, of course, is a very common principle in western water management.

Mr. HOSMER. But somebody is depending over on the San Carlos Reservoir for that water, are they not?

Mr. REYNOLDS. Yes.

Mr. HOSMER. Somebody in Arizona.

Mr. REYNOLDS. The same people that will receive the water from the central Arizona project.

Mr. HOSMER. Now, you said you thought this was an equitable proposition.

Mr. REYNOLDS. Yes, sir.

Mr. HOSMER. I have a little difficulty in following that, when the Supreme Court said that you have so much water and these other States have so much water, and apparenty it was an equitable decision.

Mr. REYNOLDS. Yes, sir.

Mr. HOSMER. So it seems that the present situation is equitable rather than the one you are seeking to achieve.

Can you give us a better feel for your case?

Mr. REYNOLDS. Yes, I will certainly try, Mr. Hosmer.

We think that there was an equitable apportionment as to our present uses.

As Mr. Mann indicated, we attempted in *Arizona* v. *California* to show the Court that with proper regulation of the Gila River, uses could be increased in New Mexico without hurting anybody in Arizona. The master's reaction to that was to say that he could not found his proposed decree on the hypothetical reservoirs and works that might or might not ultimately be constructed, but that he would recommend that the decree be left open at its foot so that if such works were constructed, if there was a change of circumstances, New Mexico

could then come back into the Court and seek relief, and that is what we are doing. We think the authorization of a central Arizona project, the authorization with Buttes Reservoir, is such a change in conditions as justifies our returning to the Supreme Court to be allocated water for our future development.

Mr. HOSMER. Well, there might be another way of handling it. Let's just look at this approach. Suppose we enlarge the capacity of the central Arizona project by 46,000 acre-feet, and then wait until we have the imported water to be exchanged. Don't you think that would be a more equitable way of going about it? Arizona is kind of waiting for the imports. All of the rest of us are kind of waiting for the imports. Why shouldn't New Mexico put themselves in the same category?

Mr. REYNOLDS. Well, Mr. Hosmer, I think if in fact Arizona had to wait for imports to enjoy the benefits of this additional supply, we would have to wait also. But that is not the case. Arizona will enjoy these imports in 1975, and we think we should be permitted to enjoy this increased supply at the same time.

Mr. HOSMER. There is only a small period of time in there until the upper basin uses come up to their allocations, that these benefits are going to exist, and certainly reasonable men would not contemplate leaving the import case unsettled until the last possible moment. Would not New Mexico, if their future and their 46,000 acre-feet were kind of based on this import, would that give it an additional incentive to make this whole project work, a broadened-out line of importation?

Mr. REYNOLDS. Mr. Hosmer, I do not think we need any additional incentive as to importation. We see importation as extremely important to our upper basin interests as well as the lower basin. And certainly we intend to do what we can.

Mr. HOSMER. All the rest of the States will kind of throw themselves into the same position of thirst for this importation, whereas what you are seeking to do would be to kind of get yours first.

Mr. REYNOLDS. No. I think we would get ours along with Arizona, in this connection. We are seeking an equitable apportionment of the Gila River system, in effect. It must depend upon the importation of water from the main stream into central Arizona. Certainly, we understand that. But when the water is brought from the Colorado River into central Arizona, we think we should then begin to enjoy this increased supply.

Mr. HOSMER. How would you contemplate under this scheme having New Mexico pay its equitable share of the costs for these works?

Mr. REYNOLDS. The cost of the works?

Mr. HOSMER. Yes.

Mr. REYNOLDS. As Mr. Dominy has explained this, it is contemplated in the Bureau project, their thinking is that this reservoir would provide flood and sediment control benefits, regulation for existing rights on the stream in New Mexico and Arizona, and, of course, very substantial recreational benefits.

Now, it is our hope that actually there will be——

Mr. HOSMER. To be paid for out of nonreimbursable?

Mr. REYNOLDS. That is the way I understand.

Mr. HOSMER. You are not going to pay for it at all. Somebody else is going to pay for it.

Mr. REYNOLDS. It is my hope, sir, that we would have the opportunity to pay for it. If there would be water stored at Hooker Dam, the Secretary would contract this water, particularly for municipal-industrial purposes, and there would be payment by the users for the waters.

Mr. HOSMER. I do not think anyone is going to make any money off selling water. We know that is why we have to put the power features in.

Well, I think you have a real clever scheme here from New Mexico's standpoint, but I am still not convinced about it being equitable in relation to the other States, nor am I convinced that once having gotten this 46,000 acre-feet of ransom water that New Mexico would have an incentive to be part of the team.

Thank you, Mr. Chairman.

Mr. ROGERS. Mr. Udall?

Mr. UDALL. Mr. Chairman, I have a number of questions.

Mr. ROGERS. Let the Chair make this statement, if the gentleman will yield. That is a straight quorum in the House, and the Chair doesn't plan to go over there. He has already been recorded once today, and I think it is important that we conduct these hearings, because we have some witnesses from out-of-State that we want to try to get this afternoon.

Mr. UDALL. I would say to the Chair that this is far more important to me than making a quorum call, and I have some constituent witnesses here who will testify that I was on business for Arizona when I missed that rollcall.

Mr. ROGERS. If the gentleman will testify for me, I will testify for him. [Laughter.]

Mr. UDALL. Gentlemen, I wanted to say that I have enjoyed meeting you and working with you on our common problems, and the things I have to say and the questions I ask are more in sorrow than in anger, because, as you have said earlier, we do have a common history. We were part of the same territory; have much in common, and we have tried to work together, and we do want to work together with you.

How many people live in this area of western New Mexico which is in the Gila watershed in your State, roughly?

Mr. REYNOLDS. If it may be rough, sir, I would say in the neighborhood of 5,000 to 10,000, and I may be quite a way off on that. I would be pleased to furnish that figure later if that would be helpful.

Mr. UDALL. Well, I am quite familiar with the area, and that was my guess. I just wanted to confirm with you that this was the situation.

How many acres are now under cultivation in this area that would be served by the proposed Hooker Dam?

Mr. REYNOLDS. In the Gila-San Francisco River system, there is a total of about 16,000 acres under cultivation. Along the Gila River, above the Virden Valley, some 7,200 acres are being irrigated, an additional 3,100 acres or so in the Virden Valley itself.

Mr. UDALL. Under the Supreme Court decree, as it was finally stipulated to by New Mexico and Arizona, you received sufficient water to take care of those present uses, did you not?

Mr. REYNOLDS. Yes, that was the intent of it.

Mr. UDALL. Yes.

Mr. REYNOLDS. We may come up a little short, our hydrographic surveys indicate, but I think it will be very close.

Mr. UDALL. And if you are short, we will probably be short in the Safford area, too.

Mr. REYNOLDS. Quite possible.

Mr. UDALL. How many acre-feet does this annual supply amount to for these acres that you just mentioned?

Mr. REYNOLDS. The total amount allocated to us by the Supreme Court, including some small amounts for stock, domestic, and municipal use, is about 31,000 acre-feet, and this includes the usage in the Virden Valley.

Mr. UDALL. Now, then, the present Hooker Dam, as provided in the Department's studies and in this legislation would build, if this bill were passed, a dam at the Hooker site with about 98,000 acre-feet of capacity.

Mr. REYNOLDS. Yes, sir; that is my understanding of the report.

Mr. UDALL. And the construction of this reservoir would provide your people in New Mexico with some regulation of the floodflows so that you would have a more orderly and reliable seasonal supply——

Mr. REYNOLDS. Yes, sir.

Mr. UDALL (continuing). And avoid some of the shortages you now have.

Mr. REYNOLDS. Yes.

Mr. UDALL. It would provide a measure of flood control for the valley there, would it not?

Mr. REYNOLDS. Yes.

Mr. UDALL. The reservoir as now in the bill would give New Mexico an excellent recreational facility?

Mr. REYNOLDS. Yes, sir.

Mr. UDALL. But you are opposed to the construction of the central Arizona project unless additional water is given you and unless the dam is enlarged.

Mr. REYNOLDS. Yes, sir. I think one very important point that I perhaps should make is that if the project is authorized with Hooker as you have described it, New Mexico could not permit the construction of the reservoir because it would result in evaporation which would cause us to exceed the allocation given us by the Supreme Court. The entire 31,000 allocated by the Supreme Court is presently being used, and the addition of a reservoir which caused evaporation of some 2,000 to 3,000 acre-feet would just put us that much in violation of the decree.

Mr. UDALL. Of course, the construction of the larger reservoirs would evaporate still more.

Mr. REYNOLDS. Yes, sir.

Mr. UDALL. Now, with the passage of this bill as it is now written, you would have all the water that the Court decree gave you, and, in addition, you would have the three benefits that I just mentioned.

Mr. REYNOLDS. Well, I think not, sir, because, as I say, we would not be able to permit the construction of this reservoir.

Mr. UDALL. Less——

Mr. REYNOLDS. Unless the decree is amended, we could not permit it.

Mr. UDALL. But less the 2,000 feet evaporation, you would have the benefits of the seasonal regulation, more flood control, and the rec-

reational assets, and all the water the court decree gave you that is stipulated.

Mr. REYNOLDS. I am not sure I understand, but we would not have the 31,000, because some of that would have to be, if you like, divested from present owners, and counted at Hooker Reservoir, so we would not have the full 31,000 if it is evaporating from the Hooker Reservoir.

Mr. UDALL. You are talking in terms of 3,000 acre-feet with the full reservoir. The report I studied from the Bureau was talking in terms of 1,000 to 2,000 based upon the size of the reservoir and the amount that would be contained in it on the average.

Mr. REYNOLDS. Right. It would depend on how the reservoir is operated.

Mr. UDALL. But you do quarrel with my statement that you would have all of your legal rights protected that you described previously in the court's decree and all your present uses protected if the reservoir were built less the evaporation.

Mr. REYNOLDS. Only if we could somehow divest present owners, and I do not see how we could proceed to do that.

Mr. UDALL. Well, I will come back to that, because I think you give us a similar problem, down the road, with your suggestion.

Now, the Colorado River compact fixed the rights as between the two basins, 7,500,000 acre-feet a year, subject to a lot of qualifications, and then out of the Arizona-California lawsuit and the act of Congress in 1928, this water was divided as between Arizona and California, and we have an allocation of 2.8 million acre-feet if the water is there. Out of that we propose to put 1.2 into the central Arizona project, and it is your suggestion that we should give up some 46,000 acre-feet of that 1.2 million of our allocation in the lower basin as a condition of getting this legislation enacted.

Mr. REYNOLDS. As I say, this is something of an upper limit.

Mr. UDALL. Well, I would hope that this is the upper limit.

If we stipulated with you as to somehow finding Arizonans who would be willing to give up this amount of water so that it could be made available for New Mexico for new additional uses over there, you would then support the legislation?

Mr. REYNOLDS. Yes, sir, we would be able to support the legislation with, as I have indicated, some of the upper basin problems requiring some attention in the final language.

Mr. UDALL. I was happy to see that you did recognize, while it was not in the prepared statement—that both of you recognize, frankly and openly—that Arizona is in serious condition in the central part of the State.

Mr. REYNOLDS. Yes, sir.

Mr. UDALL. There is certainly no quarrel with our need for water. And you indicated that eventually when the projects authorized are fully constructed, that New Mexico will be using all of its upper basin allocation—or most of it?

Mr. REYNOLDS. Not just—we still have a project to be authorized, sir, the Animas-La Plata.

Mr. UDALL. But when this is done, you would have your full upper basin allocation.

Mr. REYNOLDS. We would be in a position to use it; yes.

Mr. UDALL. Do you concede that the Arizonans who have served in Congress, men like Carl Hayden, John Rhodes, and all the rest, have supported you, not opposed you, in each one of these efforts?

Mr. REYNOLDS. Yes, sir.

Mr. UDALL. We have had a good working relationship over the years. You concede, do you not, that the central Arizona project is financially feasible subject to the discussion we have had here these past few days on some of the upper basin entitlements until such time as you are fully indulged?

Mr. REYNOLDS. I am not able to reach a conclusion on that. The best information I have is the testimony that Commissioner Dominy has given. We have underway some work of our own on the points, but it is certainly not complete enough to form the basis of testimony.

Mr. UDALL. Well, I can only say that I regret—perhaps, I would feel differently if I were a New Mexican, but I can only regret that you take the position with your neighbor that we can't put our badly needed 1.2 million to work until we find some people in Arizona who would give up 46,000 acre-feet of their water and make it available to you for new uses, for essentially new uses, in New Mexico, when we have existing uses that are in a very desperate situation. And I thought it was a little ironic that on page 5 of your statement you said that one of the things you were going to do with this water, if we were to give it to you, was to attract people from Tucson and Phoenix over to your recreation areas and take their money there.

We have had a lot of negotiations and discussions with New Mexico. Would you agree it would be necessary, not only to reopen the Supreme Court's decree which was the result of some 12 years of litigation, but to open the old Gila decree which involved specific named rights to dozens and dozens of individual farmers up and down the Gila before we could make that additional water available to you, even if we as leaders of Arizona were willing to do so?

Mr. REYNOLDS. It is my hope that that would not be necessary, Mr. Udall. I think that it would be necessary to instruct the water master on the Gila to account differently, but I think it might be handled that simply. You might wish to hear Mr. Maughan further on the question of reopening the Gila decree.

Mr. UDALL. Your suggestion in essence, though, would require Arizona unilaterally to cut down our 2.8 lower basin allocation to, well, by 46,000 acre-feet. When we wind up with this kind of arrangement, we would not have 2.8 million in the lower basin. We would have 2.8 million less than whatever we need to give New Mexico.

Mr. REYNOLDS. I must agree that would be the effect.

Mr. UDALL. You would not be willing at this time to take Mr. Hosmer's suggestion that when we augment the Colorado River and get additional imports, that we make available to New Mexico at that time some additional amounts through this exchange principle.

Mr. REYNOLDS. No. As I have said, I think we should begin to enjoy the advantages of this additional supply when it becomes available by import from the Colorado River.

Mr. UDALL. You know, this committee threw Arizona out of court, so to speak, some 14 years ago because we had a legal dispute with our neighbor, California. You have indicated that there is a legal dispute

here with regard to Arizona-New Mexico. You have also indicated that you could not permit the construction of Hooker Dam as it is now devised and planned by the Bureau of Reclamation.

I wonder as a suggestion if we might take Hooker Dam out of this legislation. It would certainly leave you in the position you are in now, leave us in the position that we are in now, protect everyone's rights and defer this matter until it could be settled separately. Would you object to that?

Mr. REYNOLDS. Yes, sir. I do not think that that would give us incentive to support the project.

Mr. UDALL. Would you oppose it?

Mr. REYNOLDS. Pardon? Yes, sir. I think we would oppose passage.

Mr. UDALL. You feel you have a point of leverage with us now in this situation which you would not wish to give up.

Mr. REYNOLDS. We think that we have a duty to citizens of New Mexico to take advantage of this opportunity to get New Mexico's fair share of the Gila River system.

Mr. UDALL. Well, I appreciate your frankness, and I thank you, Mr. Chairman, for the time.

Mr. ROGERS. Mr. Hansen.

Mr. HANSEN. Mr. Chairman, I have a couple of brief questions. One is in behalf of Mr. Reinecke who had to leave. He was interested in the idea that since there is a difference in cost of the water between the Gila River project and the central Arizona project, he would like to know if New Mexico would pay any difference between the cost of the exchanged water.

Mr. REYNOLDS. I am not sure I understand the premise of the question. It would be my notion, as I understand the legislation, that, for example, if there were municipal-industrial contracts for the water from Hooker Dam Reservoir, this would be at a postage stamp rate, the same rate that others pay for municipal-industrial supply from the works of the project. And this we would be willing to do, of course.

Mr. HANSEN. Not knowing exactly what Mr. Reinecke had in mind, we will let that stand, Mr. Rogers, and I will ask if you feel that you have any upstream water that would be flowing through to New Mexico through this project or any other source of water that has not been discussed on which you would have prior claim that this project would involve or accommodate?

Mr. REYNOLDS. Our position is, and I think that certainly we have tried to make this clear, that we have no legal claim to this water at this time. I think we have an equitable claim to it but I think we must go back to the court and ask Arizona and the United States to go with us in order to get the right to use the water that would be evaporated or taken from Hooker Dam and Reservoir.

Mr. HANSEN. My question was do you have anything beyond, from other streams, other systems, beyond that which you have discussed here today and which would be involved?

Mr. REYNOLDS. No. I think they would not be involved in this project.

Mr. HANSEN. Again going back to Mr. Hosmer's questions, do you feel that the importation considerations in this bill are valid in the immediate future?

Mr. REYNOLDS. Well, I think that we see importation, if you like conditional authorization of importation, at this time as highly desirable and we think that it is almost essential that studies of importation to the Colorado River system be authorized at this time.

Mr. HANSEN. But you do not feel that this is reliable enough for you to retreat on this demand for 46,000 acre-feet and concentrate rather on the importation situation. I presume you want the immediate, water—is this correct?

Mr. REYNOLDS. That is right. We do not think we should be required to hang our hopes on ultimate importation.

Mr. HANSEN. Thank you, Mr. Chairman.

Mr. ROGERS. Thank you very much, gentlemen.

Mr. REYNOLDS. Thank you.

Mr. UDALL. Mr. Chairman, by the formal written statement submitted by New Mexico and the remarks of her State engineer and counsel, this committee has been requested, by the bill it would report out, to "equitably apportion" to New Mexico for new uses on the Gila River, 46,000 acre-feet out of the 1.2 million acre-feet that Arizona, under the central Arizona project, has planned for old uses in Arizona. That 1.2 million acre-feet is, of course, within Arizona's 2.8 million acre-feet main stream entitlement as decreed by the Supreme Court in *Arizona* v. *California et al.*

New Mexico stated that although this request was not based on legal grounds, it was founded on moral grounds. I feel that this committee, to test the "morality" of this request, should have the full background with respect to the litigation between Arizona and New Mexico as to the Gila River, which was an equitable apportionment suit itself—within but separate from the main stream controversy of *Arizona* v. *California et al.*—and the negotiations between the two States which resulted in 1964 in a stipulated judicial opinion and a stipulated judicial decree, being that portion of the opinion and decree in *Arizona* v. *California et al.* pertaining to the *New Mexico* v. *Arizona* equitable apportionment suit.

I, therefore, would ask unanimous consent to have printed as a part of this record a letter from the Arizona counsel who was in charge of the New Mexico litigation and negotiations which contains a narrative summary of that litigation and those negotiations.

(The material referred to follows:)

PHOENIX, *August 26, 1965.*

Re New Mexico demands for Gila River water beyond that provided for in the stipulated opinion and decree of *Arizona* v. *California et al.*

Hon. MORRIS K. UDALL,
House of Representatives,
Washington, D.C.

DEAR CONGRESSMAN UDALL: The following is a narrative summary of the litigation, and negotiations between, the States of Arizona and New Mexico involving the Gila River dispute which led to the stipulated portion of the opinion (June 3, 1963) and to the stipulated portion of the decree (March 9, 1964) of the U.S. Supreme Court in *Arizona* v. *California et al.* which resolved that dispute. As you are aware, this litigation was an equitable apportionment suit which was litigated within, but separate from, the main stream litigation of *Arizona* v. *California et al.* The conclusion is the undersigned's comments re New Mexico's demands for Gila River water beyond that provided for in such opinion and decree.

I. THE LITIGATION

A. Trial

The equitable apportionment litigation between Arizona and New Mexico as to the Gila River began with the New Mexico's entry into *Arizona* v. *California et al.* in 1952 and her request for equitable apportionment. At issue were the comparative rights of the upstream users in New Mexico (and New Mexico's demand for an allotment for future uses) as against the much older appropriative rights of downstream users in Arizona, including the United States. These downstream rights were the subject of, and administered under, an old U.S. district court decree (Globe Equity) to which the United States was a party, and which covered Arizona users as well as users in the Virden Valley of New Mexico.

This dispute was litigated by deposition sessions at Silver City, N. Mex., and Reserve, N. Mex., and during approximately 2 trial days before the master in San Francisco. Two hundred and thirty-four witnesses were heard at the deposition sessions and the transcript thereof extended to 3,742 pages.

B. Draft report

By the draft report of May 5, 1960, the master ruled (draft report, pp. 287–293; 297–304; 313–316):

"The Gila River system is overappropriated: the supply of water presently available and which seems likely to be available in the future is not sufficient to satisfy the needs and demands of existing projects" (p. 288).

"New Mexico seeks a confirmation of existing uses in that State from the Gila River system. Despite the fact that many of these uses are junior in time to uses downstream in Arizona, I conclude that they should not be disturbed" (p. 289).

"This does not mean, however, that priorities as to present uses are entirely without force. On the contrary, the Gila decree (Globe Equity No. 59), which adjudicated priorities on an interstate reach of the Gila River, including the Virden Valley in New Mexico, is not abrogated. Certainly confirmation of present uses requires adherence to the priorities presently being administered under that decree. One justification for refusing to reduce existing junior uses is to avoid disrupting going economies. Since the economy of the Virden Valley is based on the Gila decree, enforcement of that decree will not disrupt the existing economy. Furthermore, the State of New Mexico is bound by that decree to the extent that her citizens, whom she represents parens patriae in this suit, are bound" (p. 291).

"New Mexico also claims the right to water for future requirements. It is here, however, that priority of appropriation has its greatest effect. It would be unreasonable in the extreme to reserve water for future use in New Mexico when senior downstream appropriators in Arizona remain unsatisfied.

"New Mexico seeks to mitigate the effect of her claim by attempting to establish that, should additional water storage facilities be constructed sometime in the uncertain future, increased uses in New Mexico would not dminish the supply for downstream Arizona users. To formulate a decree on the basis of such hypothetical facts would not be prudent. Of course, the decree will provide for modification should a change of condition warrant it" (p. 293).

The master made specific findings as to New Mexico's existing uses on all parts of the Gila River (except in the Virden Valley which was covered by the Gila decree), on a stream-by-stream basis and prohibited future transfer of use from one stream to another.

New Mexico's "Comments to the Master's Report" protested his findings as to existing uses and prayed for the right to "present further evidence of actual present uses." Following conversation between the master and New Mexico's counsel and then between New Mexico's counsel and Arizona's counsel, the master on July 1, 1960, entered the following letter order:

"New Mexico has requested an opportunity to present further evidence of actual present uses in that State of water from the Gila River system. I shall meet with attorneys for New Mexico, Arizona, and, perhaps also, the United States on July 11, 1960, to discuss the question of the extent of New Mexico's present use of water from the Gila River system, and my decision on New Mexico's request is, pending that meeting deferred."

C. Negotiations

Pursuant to the master's order, the engineering and legal staffs of the two States met with the master in New York City on July 11, 1960, and negotiated

thereafter through July 15, 1960. Subsequent negotiations were had on August 4 and 5, 1960, at Santa Fe, N. Mex., and on August 9, 1960, at Phoenix, Ariz. The result was the mailing to the master of the joint letter of the 2 States, enclosing 10 pages of proposed agreed changes to the draft report (on pp. 291–293; 301; 302; 313–315), and advising the master of the parties' continuing disagreement as to 4 specifically described points. The letter concluded:

"On all items as to which there is agreement, including those portions of items 7, 8, 9 and said paragraph IV(A), as to which there is agreement, both States waive argument and agree to acquiescence therein, both before you and the U.S. Supreme Court. As to the areas of disagreement on the above described matters, further discussion is planned during the week of oral argument. If agreement as to these four specific matters cannot be reached the parties will submit their disagreements thereon to you for resolution in the manner you deem appropriate.

"The oral arguments on behalf of Arizona and New Mexico may be directed to any aspect of this phase of the case not covered by the matters agreed upon in items 1 through 10 enclosed herewith. However, should the United States refuse to acquiesce in the agreement between Arizona and New Mexico, New Mexico reserves the right to rebut arguments which may be made by the United States."

The principal agreed-upon modifications to the master's draft report related to (*a*) changes in the findings as to "present uses" in New Mexico; and (*b*) the agreement that New Mexico's present uses were not only to be nontransferable stream to stream, but also, were to be nontransferable valley to valley within a given stream.

The two States met again in New York City on August 16, 1960, the day before final oral argument before the master. At this meeting final agreement was reached as to all matters except as to the grace period within which New Mexico was to comply with the terms of the decision and the decree. The parties delivered to the master their joint letter dated August 16, 1960, advising of the new areas of complete agreement and that the one remaining dispute was as to the grace period:

"This letter supplements our earlier letter of August 9, 1960. Arizona and New Mexico have now reached agreement as to the four areas of disagreement described in that letter.

* * * * * * *

"As with the earlier agreed-upon amendments, subject to New Mexico's reservation to rebut arguments which may be made by the United States, the two States have agreed to acquiesce therein both before you and the U.S. Supreme Court."

On August 18, 1960, the parties met with the master for the purpose of having him resolve the last matter in dispute: the grace period. The master fixed 4 years.

Subsequently, the United States, which had played only a spectator's role in the negotiations, objected to the settlement but was overruled by the master.

D. Final report

The master's final report of December 5, 1960, adopted all changes in the draft report which had been agreed upon by Arizona and New Mexico. The language quoted above from the draft report and all other language of the draft report as to which the two States had not agreed should be changed, was carried into the final report verbatim.

E. Supreme Court action

New Mexico's "exceptions to the report and recommended decree of the special master," as filed with the Supreme Court, read in its entirety (except for a section pointing out a typographical error in the final report):

"Opening Remarks

The findings and conclusions of the special master in his report and recommended decree of December 5, 1960, are generally satisfactory to the State of New Mexico. Insofar as the recommended decree is concerned, article IV, sections A, B, C, and D (report pp. 354, 355, 356, 357) are the result of negotiations between the States of Arizona and New Mexico, and in part, the United States. The United States attended some of these negotiations though it objected to the principle of the compromise. A review of the aforementioned sections of article IV

discloses that the special master has adopted the language agreed upon by Arizona and New Mexico and as submitted to him. As a part of this negotiated compromise, the representatives of Arizona and New Mexico agreed that neither party would further object to the findings of present uses described in the compromise agreement. For this reason, New Mexico does not believe it appropriate for it to further dispute the findings and conclusions incorporated in that portion of the recommended decree.

"Reservation Theory

"Subparagraph E of article IV recognizes the reservation theory as applied to Federal lands. New Mexico does not agree in principle with the Winters doctrine as applied to Indian reservations nor to the extension thereof to include all Federal reservations (report p. 293) and possibly lands administered by the Bureau of Land Management (report, pp. 96, 334). New Mexico believes that an application of these doctrines is generally contrary to the efficient development and use of the water resources of the arid West. However, New Mexico does not take exception to the specific manner in which the reservation theory is applied in the report and recommended decree involving the equitable apportionment of the waters of the Gila River system.

"San Simon Creek

"Since the time of the aforementioned negotiations between Arizona and New Mexico, it has come to our attention that development of the underground waters on the Arizona side of the San Simon Basin is progressing quite rapidly; across the State line, New Mexico has declared an underground basin pursuant to its pertinent statutory authority (sec. 75–11–1, et seq., N.M.S.A., 1953 Comp.) to prohibit any further development of underground waters within the San Simon Basin. Furthermore, at such time as the recommended decree in its present form should become final, New Mexico would be prohibited from developing uses over and above what has been determined to be its present uses. (Report recommended decree, art. IV, sec. A, p. 354; findings 13, 14, p. 338.) Should the development on the Arizona side of the boundary continue at its present uninhibited rate the ground water sources will be depleted and the present uses in New Mexico from this same basin will be seriously encroached upon. Therefore, it appears likely that unless prompt action is taken by Arizona in halting the uncontrolled development of the underground waters in the San Simon Creek area in Arizona, or the recommended decree is amended to require such action, it will become incumbent upon New Mexico at some future time, as permitted by article IX of the recommended decree, to apply to this Court for amendment of the decree for relief to protect present New Mexico uses.

* * * * * * *

"Conclusion

"In conclusion, *New Mexico takes no specific exception to the report and recommended decree dated December 5, 1960, as submitted.*

"In view of the foregoing, New Mexico will not file an opening brief but New Mexico does reserve the right to file briefs in response to exceptions, if any, wherein her interests are affected." [Italic added.]

The inclusion of the "San Simon Creek" section within New Mexico's "Exceptions" and her request for oral argument before the Supreme Court, led to an exchange of letters between counsel for the two States. On December 18, 1961, Arizona wrote New Mexico:

"This is to confirm our telephone conversation of Thursday, December 14, 1961, when I called to inquire as to New Mexico's plans for oral argument before the U.S. Supreme Court. As you are aware, Arizona precedes New Mexico in oral argument and it is of great concern to us that New Mexico might, on final argument, attempt to orally argue matters which we would have no opportunity to rebut.

"As I understand you, New Mexico has no intention of abandoning its agreement with Arizona, as reached before the master, to 'waive argument' and 'acquiesce' (before the master and the U.S. Supreme Court) in the various agreed-to changes in the master's draft report (joint letters to master, Aug. 9, 16, 1960). I further understood you to say that anything that New Mexico will say on oral argument will be limited to the subjects described in 'New Mexico's Excep-

tions to the Report and Recommended Decree of the Special Master, Dated December 5, 1960' as filed with the Court. As to 'San Simon Creek' we understand that you will not seek from the Court any modification of the proposed decree but will merely state, for the record, that which is contained on page 3 of your 'Exceptions.'

"Since your 'Exceptions,' save and except for your comments on the 'reservation theory' and on 'San Simon Creek' amounts to the agreed-upon 'acquiescence,' we assume Arizona need not anticipate any oral argument over the master's resolution of the Arizona-New Mexico controversy and may expect from New Mexico only remarks on the 'reservation theory' and some anticipated comments re 'San Simon Creek.' As to the latter, it is Arizona's position that such comments have no place in oral argument before the Court; that if New Mexico felt compelled to make some sort of a 'record' on 'San Simon Creek' she has already done so; and that for New Mexico to comment further before the Court in the way of assertion of purported facts which Arizona will not be in a position to rebut would constitute a violation of our agreement and be highly improper.

"In our view any oral argument by either Arizona or New Mexico touching on any of the matters covered by their agreement would constitute a breach of their solemn agreement. You, therefore, can readily understand our concern in this matter."

On December 21, 1961, New Mexico replied:

"I have received your letter of December 18, 1961, expressing concern over New Mexico's argument before the Supreme Court in the above case. I cannot understand your concern that New Mexico's argument will violate the agreement between Arizona and New Mexico to waive argument, both before the master and the U.S. Supreme Court, as to matters on which agreement had been reached through negotiation. That agreement as expressed in our joint letter to the special master dated August 9, 1960, provides, and I quote, "the oral arguments on behalf of Arizona and New Mexico may be directed to any aspect of this phase of the case not covered by the matters agreed upon in items 1 through 10 enclosed herewith.' The matter of the continued uninhibited development of water uses in the San Simon area in Arizona most certainly was not the subject of agreement in our negotiations. Nor in fact, was it even discussed. Therefore, we would not consider ourselves bound by the agreement to refrain from arguing this point.

"However, we fully apprecitae that there is no evidence in the present record to show the greatly increased uses in the San Simon area in Arizona nor of the effect such increased uses have upon the waters reserved unto New Mexico. Thus, we do not intend to request the Court to amend the decree in this respect at this time. However, we do intend to present the problem to the Court with emphasis upon the need for retention of article IX within the recommended decree so that in the event Arizona does not get her own house in order, we shall be able to seek to reopen the decree to gain the protection necessary to New Mexico's rights.

"As I mentioned to you over the phone, Mr. Reynolds, our State engineer, has written to Mr. Obed Lassen, commissioner of the Arizona Land Department, relative to this problem. It is our hope that he will find it expedient to declare a 'critical area' of the San Simon drainage in Arizona. This, at least, would help to alleviate the problems. For your information, I am enclosing a copy of Steve's letter together with a copy of Mr. Lasson's response.

"*Let me emphasize again that New Mexico does not intend to breach its moral, if not legal, commitment to Arizona in the areas where agreement was reached. I am certain that we consider the agreement at least as sacred as you in Arizona do. Our exceptions, filed with the Supreme Court, made reference to this agreement and I should think we would be estopped from taking any position inconsistent with our filed exceptions.* However, we do intend to present orally to the Court matters consistent with our exceptions. The question of whether you wish to reserve a few minutes to rebut what we have to say relative to such matters is one only you people can decide." [Italic added.]

On oral argument before the Supreme Court, New Mexico abided by her commitments. She said:

"New Mexico, after it had been brought into this case involuntarily, did request equitable apportionment as to its uses on the Gila River and the tributaries in New Mexico. The master, in his report, did make his decision with reference

to the uses on the Gila River between New Mexico, Arizona, and the United States, on the theory of equitable apportionment, with which ruling we are very much pleased.

"However, it is true that we felt, in the draft report, that there had been considerable limitation of the actual uses in the Gila, on the New Mexico side of the line, and we were unhappy with that result and filed our comments to the master's report with him on that matter.

"Subsequently, representatives of Arizona and New Mexico entered into negotiations to attempt to compromise as to the actual uses on the Gila and its tributaries within the State of New Mexico. After considerable negotiations, that compromise was effected, and a stipulation was filed with the special master.

"The special master adopted in full the findings of fact, conclusions of law, and even provisions of the decree dealing with these uses in accordance with the stipulation between the parties.

"As a result, although New Mexico did improve its situation, we were not completely happy, as is true in most cases in negotiation and compromise, and we did improve our situation, *and we are here to request this Court at this time to adopt in full the findings of fact and conclusions of law, and the provisions of the decree insofar as it applies to New Mexico* and its uses." ("Oral Argument," *Arizona* v. *California et al.*, vol. 4, pp. 535–538). [Italic added.]

The Supreme Court accepted and adopted in toto the master's final report insofar as it pertained to the Gila River dispute:

"Arizona-New Mexico Gila Controversy

"Arizona and New Mexico presented the master with conflicting claims to water in the Gila River, the tributary that rises in New Mexico and flows through Arizona. Having determined that tributaries are not within the regulatory provisions of the project act the master held that this interstate dispute should be decided under the principles of equitable apportionment. After hearing evidence on this issue, the master accepted a compromise settlement agreed upon by these States and incorporated that settlement in his findings and conclusions, and in part IV (A), (B), (C), (D) of his recommended decree. No exceptions have been filed to these recommendations by any of the parties and they are accordingly accepted by us. Except for those discussed in part V, we are not required to decide any other disputes between tributary users or between main stream and tributary users."

Subsequently New Mexico joined with Arizona in the submittal to the Court of a proposed decree.

II. THE BASIS FOR ARIZONA'S AGREEMENT TO THE FINAL SETTLEMENT AS EMBODIED IN THE SUPREME COURT OPINION AND DECREE

Negotiations between the two States that led to the settlement as embodied in the Supreme Court opinion and decree were directed primarily to the amounts of existing New Mexico uses and the quantities of water necessary to satisfy those uses. The attached table shows the course of negotiations leading up to the final settlement.

Any analysis will demonstrate that as a result of the compromise settlement New Mexico had counted as a part of her present "irrigated uses (1) many acres that were not truly "irrigated" at all, but merely "subjugated"; and (2) many acres that were neither "irrigated" nor even "subjugated."

It is estimated that for some areas at least 40 percent of the acres counted as New Mexico's "present uses" by the compromise fitted these two categories. An aerial survey study of the pertinent areas made shortly after the compromise is believed to support this estimate.

Therefore, under the final settlement there was already a built-in area for New Mexico to reasonably expand her actual present existing uses (without regard to Arizona's downstream senior appropriations) and to cover the amount of any evaporation losses on the contemplated Hooker Dam.

Arizona concurred in this result only because of—

(1) New Mexico's acceptance of the valley-by-valley nontransferrable rights concept as made a part of the final settlement;

(2) Arizona's assumption that New Mexico would stand by the implicit understanding that the settlement was final and complete.

III. CONCLUSION

New Mexico's demand ignore both her agreements and her request to the Supreme Court to adopt the master's final report. Moreover, New Mexico's demands are impossible to satisfy. Even if Arizona were to accede to such demands, she would be unable to comply. This is because, any opening of *Arizona* v. *California* and the Gila River decree is both legally and politically impossible, and, in addition, would be rejected out-of-hand by an essential party—the United States—who fought right down to the final bell, what Arizona believed was a final settlement with New Mexico of the Gila River dispute.

Very truly yours,

JOHN E. MADDEN,
Special Counsel, Arizona Interstate Stream Commission.

The final settlement by Arizona and New Mexico of the Gila River dispute

The streams, area by area [1]	New Mexico claim to master (acres)	Arizona claim to master (acres)	Master draft report, May 6, 1960		New Mexico-Arizona letter, July 15, 1960		Final settlement			
							New Mexico-Arizona letter, Aug. 9, 1960		New Mexico-Arizona letter, Aug. 16, 1960	
			Acres	Acre-feet	Acres	Acre-feet	Acres	Acre-feet	Acre-feet per year	Acre-feet for 10 years
Gila:										
Upper Gila	286	287	287		287		287			
Cliff-Gila	5,837	3,284	4,390	12,759	5,314	13,927	5,314	13,662	15,895	136,620
Red Rock	1,598	1,023	1,352		1,456		1,456			
San Francisco:										
Luna	1,670	91	152		225		225			
Apache-Aragon	405	179	253	1,685	316	3,187	316	3,187	4,112	31,870
Reserve	1,235	285	331		725		725			
Glenwood	1,707	491	673		1,003		1,003			
San Simon	2,900	2,900	2,900	7,200	2,900	7,200	2,900	7,200	8,220	72,000

[1] The final settlement made the Gila River decree (Globe Equity) covering Arizona's old appropriative rights and also those in the Virden Valley of New Mexico the cornerstone for all river administration. Thus, the Virden Valley is not a part of this schedule.

52-850—65——27

STATE OF NEW MEXICO,
STATE ENGINEER OFFICE,
Santa Fe, October 8, 1965.

Hon. WALTER ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation,
House of Representatives, Washington, D.C.

DEAR MR. ROGERS: There is attached a copy of my September 15, 1965, letter to Congressman Morris Udall. This letter comments on Mr. John E. Madden's August 26, 1965, letter to Congressman Udall on the subject "New Mexico Demands for Gila River Water Beyond That Provided for in the Stipulated Opinion and Decree of *Arizona* v. *California, et al.*," Mr. Madden's letter has been made part of the record of your committee hearing on legislation to authorize the central Arizona project (H.R. 4671 and other bills).

It is respectfully requested that my September 15 letter to Congressman Udall also be made a part of the record of that hearing.

Congressman Udall has graciously permitted me to advise you that he will make no objection to the granting of this request.

Yours truly,

S. E. REYNOLDS, *State Engineer.*

STATE OF NEW MEXICO,
Santa Fe, September 15, 1965.

Hon. MORRIS K. UDALL,
House of Representatives,
Washington, D.C.

DEAR MR. UDALL: I have received a copy of Mr. John E. Madden's August 26, 1965, letter to you which was made a part of the record of the House subcommittee hearing on the central Arizona project. I hope that you will not consider it inappropriate for me to comment briefly on this letter; it seems to me that a complete and frank exchange of views and information can only help to preserve the friendly relations between our States.

We take no issue with what is said under subheading "I. The Litigation" of Mr. Madden's letter. In fact this discussion supports what is said in the written statement that Mr. Claud Mann and I presented at the central Arizona project hearing on August 26. We do not agree with what Mr. Madden says under his subheadings "II. The Basis for Arizona's Agreement to the Final Settlement as Embodied in the Supreme Court Opinion and Decree" and "III. Conclusion."

Under subheading II. Mr. Madden comments to the effect that an aerial survey study of pertinent areas in New Mexico shows that under the "final settlement" in *Arizona* v. *California* there was a built-in area for New Mexico to reasonably expand her actual present existing uses and to cover the amount of any evaporation losses on the contemplated Hooker Dam. This statement and other passages of the subheading encourage the inference that the stipulation was designed to permit new uses in New Mexico. Such an inference would be contrary to the clear, unambiguous language of the stipulation all of which was drafted in terms of present uses. Certainly the New Mexico negotiators were not party to any sub rosa meeting of the minds that the stipulation would give New Mexico water for future uses, such as evaporation from Hooker Reservoir, in addition to the amounts required for existing uses.

There is attached to this letter a tabulation of the irrigated acreage and consumptive use of water from the Gila River above the Virden Valley decreed to New Mexico in *Arizona* v. *California* and estimates of actual present irrigated acreage and water use in that area. All of the rights to usage reflected in the tabulation, with the possible exception of some minor amounts for stock and domestic purposes, were established prior to the stipulation in 1960. It can be seen from this tabulation that consumptive use of water from the Gila River in New Mexico under present conditions exceeds the amount decreed by about 700 acre-feet annually.

Preliminary results of our survey on the San Francisco River indicate that present usage from that stream materially exceeds the amount decreed. It is apparent that the consumptive use decreed to New Mexico from the San Simon Creek system is somewhat in excess of present usage from that system; however, under the decree in its present form New Mexico does not have the option of using this excess for reservoir evaporation at Hooker Dam or in any other manner outside the San Simon Valley.

Thus, as I testified at the hearing on August 26, New Mexico could not permit the construction and operation of Hooker Dam without an amendment of the decree in *Arizona* v. *California* or a reduction in water use by owners of existing rights.

The attached tabulation is based on aerial photography, machine plotted to a large scale and checked in the field as a part of hydrographic surveys prepared or being prepared for submission to our district court as evidence in the adjudication of water rights. I daresay that the surveys upon which this tabulation is based are far more extensive and intensive than the aerial study mentioned by Mr. Madden.

For the reasons set forth in our written statement we do not agree with the first sentence under Mr. Madden's subheading "III. Conclusion." Furthermore, we feel that he has overstated his case in saying that the United States fought the stipulation between Arizona and New Mexico "right down to the final bell." It is our view that the United States made little more than a pro forma objection to the stipulation. The record reflects that the United States did not even touch on this point in final argument before the Supreme Court.

We find no basis whatever for Mr. Madden's statement that any opening of *Arizona* v. *California* and the Gila River decree is both legally and politically impossible and "would be rejected out of hand by the United States." As you know from the "Principles of Proposed Agreement Between Arizona and New Mexico on Central Arizona Project" which I handed you at a break in the recent hearing the rights of the United States and all other users from the Gila River system in Arizona would be fully protected in the amendment of the Supreme Court decree and the provisions of legislation which we suggest. Thus, there is no readily apparent reason for the United States to reject our proposal.

Also, as I stated at the hearing, it is reasonable to believe that our proposal could be implemented by changing the water master's accounting procedures under the Gila decree without reopening that decree.

Sincerely yours,

S. E. REYNOLDS, *State Engineer.*

TABLE 1.—*Usage from Gila River above Virden Valley* [1]

Acreage		Use—Acre-feet		
		Decree		Estimated existing
Decree	Estimated existing	Maximum annual	10-year average	
7057	6539	[3] 15,895	13,662	[2] 14,400

[1] Based on hydrographic survey essentially complete. Usage in Virden Valley in New Mexico estimated at 6,900 acre-feet annually not included.
[2] Includes use for municipal, stock, domestic, etc., within and outside irrigated areas.
[3] Decree in *Arizona* v. *California, et al.*, allows a maximum use in any 1 year up to this amount. The estimated existing annual use (last column) is based on the average use and must be compared to the 10-year average use set by the decree.

Mr. ROGERS. We have several other witnesses. In the interests of time the Chair is going to at this time recognize Mr. LaSelle Coles, representing the Governor of Oregon.

I understand your statement is short, Mr. Coles.

STATEMENT OF LaSELLE E. COLES, MEMBER, STATE WATER RESOURCES BOARD OF OREGON, ON BEHALF OF THE GOVERNOR OF OREGON

Mr. COLES. Thank you, Mr. Chairman.

My name is LaSelle E. Coles of Prineville, Oreg. I appear before you to present testimony on behalf of the Honorable Mark O. Hatfield,

Governor of Oregon, and the State Water Resources Board of Oregon of which I am a member and chairman of the board's legislative committee. We sincerely appreciate the opportunity to present our views on this important legislation.

We do not intend to comment on the physical features recommended for authorization in these bills but do wish to inform the committee that the State of Oregon has consistently supported sound reclamation development.

We concur wholeheartedly with those provisions of title II of the bill that would authorize the Secretary of Interior to investigate various methods of attaining greater efficiency in water use such as water renovation and reduction of losses.

As an irrigation district manager and immediate past president of the National Reclamation Association, I am well aware that there are great opportunities in the Western States to achieve much more efficiency in water use. We commend the Secretary of Interior for his effort to date to achieve reduction in losses from evaporation, phreatophytes, and inefficient transmission. We hope Congress will look favorably on proposals to accelerate these programs.

We suggest that before authorization is approved to import water into the Colorado River Basin from sources outside the Colorado Basin, a full evaluation of the possibility of achieving more efficient use of water presently in the basin is undertaken.

The bills before you are silent insofar as identifying possible sources of water outside the Colorado Basin that might be imported. We would request that if authorization for such studies is approved by this committee and the Congress, these sources should be specifically identified.

We would also suggest that once determination of a specific source has been decided, equally specific provisions should be made to identify the States from which water is to be diverted in order that they may be represented and have the opportunity to participate in the studies and subsequent recommendations, if such studies are approved.

We further suggest that provision for adequate and equitable protection of the interests of the States and areas of origin should be agreed to by all concerned before authorization to plan works to import water into the Colorado system is granted.

If the committee sees fit to authorize planning of works to import water into the Colorado River system we believe provisions contained in title IV should be amended to insure that the development fund proposed is not made available to finance works necessary to import water except by further and specific acts of Congress. We believe the numerous references in title III to augment the flow of the Colorado River and importation of water into the Colorado River system make such amendments necessary.

Oregon has been a leader in the formation of the recently created Western States Water Council. The council, established by the Governors of 11 Western States, was created to provide the mechanism by which the States would attempt to develop an equitable solution to the water problems of the West. Oregon recognizes that the solution to water problems may involve considerations of a broader scope than that of a particular region, therefore the State has endorsed the creation of a National Water Commission as recommended by the Bureau of the Budget.

Governor Hatfield recommended and the Oregon Legislature approved funds for necessary studies by the Water Resources Board to identify the State's water requirements for all uses including domestic, municipal, irrigation, power development, industrial, mining, recreation, wildlife, and fish life uses, and for pollution abatement, for the next 100 years. Oregon's studies will be completed by 1970. Initial appropriation for these investigations approved by the legislature is $332,000. The purposes of Oregon's study are threefold:

1. Determination of waters, Pacific Northwest, that are surplus to future needs, State of Oregon.

2. Determination of benefits and detriments to the State of Oregon resulting from proposals to divert water from the Pacific Northwest to the Pacific Southwest.

3. Provide information to enable the State of Oregon to evaluate and develop methods of meeting long-range water requirements for all beneficial uses for the entire State.

We believe the type of information to be compiled in the Oregon investigation is necessary before proposals are approved to divert water from one area to another.

Mr. RIVERS. Thank you, Mr. Coles.

Mr. Aspinall?

Mr. ASPINALL. I have only one question. Mr. Coles, as usual, has made his point.

Would you feel any better about section VI, Mr. Coles, if it provided for a member from each one of the—Governor representative members for each one of the States west of the Continental Divide?

Mr. COLES. I would feel better about it and I think we in the State of Oregon would, Mr. Aspinall. Uninformed people are suspicious and people who are informed are ordinarily cooperative.

Mr. ASPINALL. You are suspicious as well as some others about present provisions in the bill in this respect. Others of us who are involved in the Colorado River area, we are suspicious of a national commission which would tend to hide almost anything it wanted to of a local nature under a rug and to go on with something else. This is the reason why many of us support the idea of a more or less sectional commission rather than a national commission.

I think that perhaps you understand why the Bureau of the Budget has suggested this be a national commission rather than regional.

Mr. COLES. I think I do; yes, sir.

Mr. ASPINALL. Thank you very much.

Mr. ROGERS. Mr. Hosmer?

Mr. HOSMER. The 1970 date for the completion of the Oregon studies—is it a matter so complicated that it will take that long or is this just an outside date that might be scaled down a bit?

Mr. COLES. We just received this $332,000, Mr. Hosmer, at the beginning of this biennium. We figure that we can do it in about two bienniums which would bring us up to 1970. That is not a guess. We are sure that that will be about the time it will take to complete the studies which involve soil classification, water use today, places where the water can be put on the land, and such things as that which is not something you can do overnight.

Mr. HOSMER. I certainly want to assure you that insofar as I am concerned, recognizing the needs of the Colorado Basin, I would not

support satisfaction of that need at the expense of anybody else who has need for water and I do not think anybody has that intention.

But let me establish something, if I may, as to the attitude of Oregon. Let us assume this study does indicate that there are flows in the Columbia far in excess to the needs of the Pacific Northwest, and Oregon in particular, up through the next 100 years. Under those circumstances Oregon would not have any objection to diversion of that water to the Colorado basin away from the Pacific Ocean?

Mr. COLES. I would like to answer you in this manner. We have a proposal here for a study and I do not believe your question could be answered until the actual proposed diversion came before the State of Oregon, but I would go on a little further and say that after we have made the study and all of the resources of the Pacific Northwest are satisfied, and if there was a sufficient amount of water at all times to generate power within the Columbia River system, and that water was flowing into the Colorado without doing us detriment, I do not believe so far as I am concerned that the State of Oregon would object.

Mr. HOSMER. Fine. Thank you very much.

Mr. ROGERS. Mr. Udall.

Mr. UDALL. Mr. Coles, I want to congratulate you on a forthright and constructive statement, too, on behalf of your Governor and your State. I hope you will tell your Governor that I am one of those who feels that he has taken an attitude of statesmanship in this whole problem. One of the easiest postures for a politician to take, and demagogery is not unknown in this profession to which I currently belong, is save the water, cry alarm, dash out and stir up the local citizens about threats that may or may not exist. And I think your Governor has shown as much good judgment and statesmanship on this issue, as much willingness to be cooperative, as anyone in the entire West.

I think it is particularly heartening to me that Governors in the West—we often think of Governors all over as being local, parochial, and being concerned with narrow interests—the Governors in the West have taken the lead, and particularly with the help of your Governor have created this Western States Water Council, and I view this as a very sound and hopeful development. I want to assure you that, as Mr. Hosmer has, none of us want to take a single drop of water that your area would ever need. It may well be when these studies are completed there will be a better place to go, a better way to do it. I am happy that at least one State in the Northwest is willing to have studies made if adequate safeguards and protections are written in for the benefit of your area.

Mr. Chairman, I would say finally that on July 13, one of our colleagues, the Honorable Al Ullman, who is a good friend of mine and a very fine Member of this body, had asked me something about the reports and statements that were being made and particularly about this legislation, and I wrote him a short letter outlining what I felt were the effects of any such legislation and potential benefits to your area.

I would like to have this letter included in the record at this point, Mr. Chairman.

Mr. ASPINALL. Reserving the right to object—of course, I will not object—but has the gentleman heard from his colleague, Mr. Ullman, relative to an answer?

Mr. UDALL. Well, I would advise the chairman of the full committee that I delivered this in person, spent about an hour in his office and I was encouraged by his forthright and constructive attitude on the problem. We have a lot of fine Members of Congress in the Northwest.

Mr. ROGERS. Is there objection?

Mr. ASPINALL. I withdraw my objection.

Mr. ROGERS. The gentleman from Colorado withdraws his reservation. Is there objection to the request of the gentleman from Arizona? The Chair hears none and the letter will be inserted as requested.

(The letter referred to follows:)

CONGRESS OF THE UNITED STATES,
HOUSE OF REPRESENTATIVES,
Washington, D.C., July 13, 1965.

Hon. AL ULLMAN,
House of Representatives,
Washington, D.C.

DEAR AL: Recently I spoke to you about the advantages for Oregon, and particularly your congressional district, in a sound program of exporting Columbia River water to the Pacific Southwest. No detailed plans have ever been completed and the main aqueduct for such a proposal could take several different routes. One of the most likely routes is shown in a very rough form on the attached map. So that you can get a general idea of the effect on your district, I would think that this program would have all of these advantages to you and the people you represent:

1. There would be an 8- to 10-year construction program with a total cost of up to perhaps $2.5 billion. I would think that as much as $1 billion might be spent in Oregon for the aqueduct, plus a related series of dams, pumping plants, interim storage reservoirs, etc.

2. After the construction were completed, there would be substantial, permanent Federal installation dealing with the maintenance and operation of these works and providing jobs for your area.

3. It would be very easy to design these works and create them with such capacity to drop off supplemental irrigation water for areas in Oregon near the main aqueduct.

4. Such a program would inevitably require large quantities of BPA electricity, the sale of which would bring benefits to the whole region and make BPA an even more sound investment than it already is.

I would think that the people of Oregon and the Northwest would have the right to insist, before any such program were approved, on safeguards and guarantees along the following lines:

1. No water would be exported unless it was clearly determined to be surplus to any reasonable foreseeable need of the region. The total flow of the Colorado River in the seven States through which it passes is about 15 million acre-feet a year. It is my information that the Columbia River wastes into the ocean every year nearly 200 million acre-feet. I may be wrong, but I can't imagine any program of development or growth for your State which would ever use all that water.

2. The exporting program would take the water only after it had generated electricity in all the Columbia River dams and only at a point at which it could no longer be used for any purpose by Washington and Oregon.

3. Provision would have to be made for the "area of origin" guarantees of the kind southern California has given areas in northern California. These agreements provide that if the sources of origin later need water originally taken by a water short area, the importing area from a fund established for that purpose pays the difference in cost of developing proper water supplies for the export area.

I should also emphasize that none of the pending legislative proposals have suggested or approached or contemplated actual export of water. The only proposals which have been made or will be made in the immediate future are those to study whether such exports are feasible and the effect in such case on both the exporting and importing areas. We in the desperately water short Southwest find it a little difficult to understand what possible objection there could be

to studying and thinking about these serious problems. No such study would commit your area in any way to an agreement to actually export the water.

Sincerely,

MORRIS K. UDALL.

Mr. UDALL. I have nothing else. Thank you.

Mr. ROGERS. Mr. Burton?

Mr. BURTON of Utah. No questions.

Mr. ROGERS. Mr. Tunney?

Mr. TUNNEY. No questions, Mr. Chairman.

Mr. ROGERS. Mr. Wyatt?

Mr. WYATT. I would like to welcome Mr. Coles to the committee. I have discussed this matter with him and had the good fortune of having an opportunity to look the statement over, and I appreciate his forthrightness in presenting the views of the State of Oregon before this committee, and I think the statement fairly represents the views of the Governor as I know them, and I appreciate his giving them. I want to assure Mr. Coles that as a member of this committee I shall do everything I can to see that those views are implemented.

Mr. COLES. Thank you, Mr. Wyatt.

Mr. ROGERS. Mr. Foley?

Mr. FOLEY. Mr. Coles, I would also like to welcome you to the committee.

In your statement you make reference to the Western States Water Council and to the steps taken by the State of Oregon to study its water resources.

Would Oregon have the view that before any studies are authorized, regarding possible importations of water into the Colorado River Basin, that basin, and the State of California, should be exhaustively studied to determine whether sufficient water is available within that region?

Mr. COLES. Mr. Foley, I believe that it was understood that such a study would include the States of California, Arizona, not only as to the water that is being unused but also as to the water that can be saved by eliminating or reducing transportation loss by phreatophytes and such other methods. I think that has been my understanding, that that is generally understood in this whole overall question. I think it should be——

Mr. FOLEY. In your experience has the United States ever authorized inner basin transfers of water in the Western United States except where those basins both exist within one State?

Mr. COLES. I believe not. I think this would be the first time. The others have been San Juan-Chama, Colorado, Big Thompson which have all been within the same State, and I believe that is—there is one——

Mr. FOLEY. Frying Pan-Arkansas.

Mr. COLES. Yes. Frying Pan-Arkansas.

Mr. FOLEY. But any study directed to inner regional transfer from outside a State between basins would be a relatively major step, would it not, in the history of reclamation and water resource use in the Western United States?

Mr. COLES. I think it would be one of the largest steps that has been taken up to this date.

Mr. FOLEY. Would you feel that there is any value in the Bureau of the Budget recommendation for a national study of water needs

by a National Water Commission as a substitute for the study proposed in title II?

Mr. COLES. The State of Oregon has agreed with the recommendations of the Bureau of the Budget. I will speak for myself here. I wonder if we are thinking big enough. We have a shortage of water in the Great Lakes. We have a shortage of water all over the country today. And I have been quite interested in the Parson plan which goes into Canada which would benefit 33 States of the United States, two States in Mexico, two or three provinces of Canada.

I realize that that plan would be hard to come by and would take some time and it would amount to treaties with Canada, with Mexico, agreement between the States, and maybe we are not thinking large enough today, and I think that is more or less the thinking of the State of Oregon in recommending that we follow the recommendations of the Bureau of the Budget.

Mr. FOLEY. That is the official position of the State of Oregon?

Mr. COLES. That is the official position. It says so in the statement.

Mr. FOLEY. As well as the administration.

Thank you very much.

Mr. ROGERS. Mr. Hansen.

Mr. HANSEN. Thank you, Mr. Chairman. Mr. Coles, I note you have made mention of Oregon's studies in your statement, and that they will be completed by 1970. Are you aware of other similar studies being made by other States in the Columbia Basin in the Northwest?

Mr. COLES. Representatives of the other States here, both Washington and Idaho, I think they could answer that question better than I can, but it is my understanding that the State of Washington has appropriated in the neighborhood of $200,000 to start such a study.

Mr. HANSEN. Are these efforts cooperative in any way?

Mr. COLES. No, they are not. Each State is studying the assets of their own State.

Mr. HANSEN. Do you feel that this legislation which is before us today is at all premature in some of the stipulations with regard to importation of water into other basins?

Mr. COLES. I do not believe, sir, that it is premature. I think we have to start moving if we are going to get the job done.

Mr. HANSEN. Do you feel that the position that you have given in your statement today is comprehensive and valid specifically in that you have no other marked items that have been ignored, deleted, or——

Mr. COLES. No.

Mr. HANSEN. Do you feel that there is any difficulty that might be derived in a project of the nature that we are discussing wherein certain foot-in-the-door positions are adopted authorizing and funding projects in a particular basin with the possibility or at least the assurance that there may be water that may be imported from other areas? Do you think there is any danger in this sort of thing to the potential growth in your own State from the fact that here is something that will have to be economically justified later on and that they will have to seek water somewhere in order to do this? Do you see any of this involved in this legislation?

Mr. COLES. I believe that if this committee authorized its project at this particular time, I have not read the report on the project and it would have to stand upon its own feet because there is no assurance that you are going to import water from anyplace even if you authorize the project.

Mr. HANSEN. You would oppose the legislation then, if it were not designed to stand on its own two feet without definite assurance of importation.

Mr. COLES. I do not believe I could do anything else because I think if the project is sound as it stands today, then the project should be authorized because I back reclamation. If you authorize it because you said you were going to import water, there is not anything in this bill that says you will import water. It says you will make a study.

Mr. HANSEN. Do you feel that there is a necessity for a study of water potential, either needs or surpluses, by river basin areas rather than just by States?

Mr. COLES. I do not quite understand your question, Mr. Hansen.

Mr. HANSEN. Do you feel that there is a need to go beyond the State water ascertainment as far as the need or the surplus and do it on a regional or basin basis——

Mr. COLES. Yes, I do.

Mr. HANSEN. And do you think that this should even be broadened more to the national scope?

Mr. COLES. Broadened to national scope is rather large. It includes the entire United States. I think we are dealing with the West now. I understand a western basis.

Mr. HANSEN. Do you feel that if there is something done so each State would have its finger on exactly what they have, in terms of needs and potential, this would then alleviate much of the argument that we are confronted with today?

Mr. COLES. I think that is right; yes.

Mr. FOLEY. Would the gentleman yield?

Mr. HANSEN. Yes.

Mr. FOLEY. I am a little confused, Mr. Coles. I understood your testimony in answer to my question to be that the State of Oregon supported the Bureau of the Budget recommendation provision for title II calling for study should be supplemented by a national study of water resources needs by a National Water Commission, and then in answer to Mr. Hansen's question you seemed to change your statement.

Mr. COLES. No. I did not intend to. I did not understand his question there. We did support the Bureau of Budget; yes.

Mr. FOLEY. You support the recommendation of the Bureau of the Budget.

Mr. COLES. That is right.

Mr. FOLEY. That a National Water Commission make any studies on a national basis.

Mr. COLES. Yes. I was referring specifically to this bill before us here when I said that.

Mr. ASPINALL. If my colleague from Idaho would yield, we are getting mixed up as far as the record is concerned. You answered my question that section VI would be more tolerable to you if all the Governors or if the Governors of all the States were represented, those States west of the Continental Divide, did you not?

Mr. COLES. Yes. That is right.

Mr. FOLEY. If the gentleman would yield further, I share the chairman's concern that we do not want to confuse Mr. Coles, but I think this is an important point as far as the——

Mr. ASPINALL. I think it is important but I think if it is that important, you had better tell why the Bureau of the Budget made this recommendation. You know why they made it, so I think we might as well bring it out.

Mr. FOLEY. Mr. Chairman, I will be happy to yield to you for that purpose.

Mr. ASPINALL. I do not intend to bring it out.

Mr. FOLEY. I have not discussed the matter with the Bureau of the Budget.

The only thing I am trying to decide or have the record show is whether you in testifying for the State of Oregon, Mr. Coles, are supporting the proposed amendment recommended by the Bureau of the Budget which would delete certain sections of this bill calling for a regional study of water resource needs and substitute therefor a study of national water resource needs by a National Water Commission.

Mr. COLES. That is right. That is what the statement says.

Mr. UDALL. Would the gentleman yield a minute?

We are talking, I think, about two different things. One is title VI which sets up the Colorado Regional Water Commission, and some of the questions are related to which States should be represented on that commission.

The other thing we are talking about is the provision in title II for investigations, whether to have the Bureau of the Budget's Water Commission make a national water investigation or whether we are going to have the Secretary of the Interior make an investigation of charges in the Colorado Basin.

They are two separate things in the bill.

Mr. ROGERS. Thank you very much, Mr. Coles.

The next witness is Mr. Jay Bingham, director of Utah Water and Power Board, representing the Governor of Utah, and the Chair will recognize the gentleman from Utah, Mr. Burton, to introduce him.

Mr. BURTON of Utah. Thank you, Mr. Chairman; I appreciate your courtesy and it is a great pleasure once again to present J. R. Bingham, director of the Utah Water and Power Board to this, I might say, great committee.

Jay has been director of our Utah Water and Power Board for a good many years now in our State. I can say that I think he is without peer in terms of expertise on water matters and I am personally very happy to have the opportunity to welcome him and have him present his statement from the Governor.

STATEMENT OF JAY BINGHAM, DIRECTOR, UTAH WATER AND POWER BOARD, REPRESENTING THE GOVERNOR OF UTAH

Mr. BINGHAM. Thank you, Congressman.

Mr. Chairman, it appears that it may be in the interest of time and dispatch of business before the committee if the statement of the Governor could be inserted in the record and with your permission, I would be very happy to highlight it for you.

Mr. ROGERS. Without objection, the Governor's statement will be included in the record, and you may proceed to summarize it.

(The statement of Gov. Calvin L. Rampton will be found on p. 425.)

Mr. BINGHAM. Thank you, Mr. Chairman.

I would like to underscore what Congressman Burton has said that the State of Utah looks to this as one of the great and important committees in our Congress and acknowledge the good works that are initiated here.

I would also point to the importance Utah attaches to this legislation in the matter under consideration. The State of Utah has more than 40,000 square miles or nearly one-half the area of the State which is tributary to the Colorado River.

The State also is represented in both the upper and lower basins, and furthermore, the projects which will ultimately develop the resources of the State of Utah are larger, I think, than most projects in the area, more complex, and will be slower to develop, so the problem of conflict, the problem of preserving a water supply is of especial concern to our State.

We are conscious of the 13-year wait by our neighbors from Arizona for their project and we are conscious, too, that the need for water hasn't remained static during that period of time.

In the Governor's statement, he refers to a matter, I'm sure, well understood by this committee that one of our problems is, of course, the unequal distribution of water, but what I think is faced here is the same problem but on a larger scale.

Our Governor—and I think this statement reflects—is optimistic and he feels that something significant and something that will contribute to the greatest good in development is taking place.

The consensus of opinion, the action of the Governor, is to look jointly at the overall problems of the region and by study and interstate coperation to help achieve the desired goals that we all seek.

It has been well stated before the committee and I am sure a lot of expert witnesses will give you details that the water supply of the Colorado is not adequate. We would at this time indicate our agreement with the study that has been prepared by the consultants of the Upper Colorado River Commission. It is my understanding that will be presented to the committee in detail.

Let me stress what I think is one of the important points in the Governor's statement, that what is contemplated in these studies and the deliberations on these projects is not a seasonal or annual shortage but a total shortage, if you please, where you are contemplating a certain future date when the regulated supply of the river will be used up.

I think that your deliberations will give that full regard.

The State of Utah is in agreement with the other States of the upper basin, first, that we would like to see this project for Arizona accomplished. We feel, first, that legislative assurances should be provided in any bill that you finally consider, that the upper basin's compact apportionment of water will not be jeopardized by the proposed interim use.

Second, we feel that by reason of the fact that there will be an interim use of water and there is a date which is generally agreed upon when upper and lower basin uses will compete for the same water or com-

pete for unused upper basin water that by the same action that would bring this conflict about—that is initiation of the real solution of the problem to meet the deficiency of the river system—should likewise be a part of the legislation.

And this legislation, we agree, should be for not less than 2½ million acre-feet of water annually. We would likewise concur in the point that the diversion of funds from the upper basin to meet so-called power deficiencies in the lower basin be corrected by this legislation.

We think this is basic to the purpose and intent of the compact, power uses are subservient to consumptive uses on the river.

With these principal highlights and indicating my concurrrence with the upper basin, we would urge the amending of the bill and it is my understanding these amendments will be discussed in detail with the committee.

Two final comments—and both relate to the Dixie project which has received the approval and ultimately the authorization by Congress for the Dixie project. We would like to indicate to this committee our concurrence in the provisions of section 309 of the bill before you, which provides that the Dixie project would be integrated into the Lower Colorado River Basin project.

This was originally indicated as being desirable. This project was authorized separately because of the need and because of conditions prevailing at the time.

We would further indicate to the committee our concurrence in the amendment recommended by the Secretary of Interior which would provide additional language in section 402 of the bill, and this goes to the point that the original allocation of nonreimbursable features would remain as authorized in the original bill.

Mr. Chairman, with that I will conclude and again express our appreciation for your time and past consideration, and the opportunity of appearing here.

Mr. ROGERS. Thank you, Mr. Bingham.

Mr. Aspinall.

Mr. ASPINALL. I am glad to see our friend, Mr. Bingham, before the committee because he, too, is recognized as one of the citizens in the Colorado River Basin that is learned in the field of water problems.

You gave quite a good bit of attention to the acreage and square-mile areas, and so forth, of Utah that is included in the Colorado River Basin. I don't know that that makes much difference. It is my understanding that the whole State of Utah is in a position to expect benefits from the Colorado River development.

What is your understanding as to the percentage of the average flow of the Colorado contributed by inflow from the Utah streams into the Colorado River?

Mr. BINGHAM. Mr. Chairman, as I recall from memory some earlier figures which have been developed, it is in the order of 17 percent of the flow arriving at Lee Ferry.

Mr. ASPINALL. And what is your percentage of the upper basin entitlement?

Mr. BINGHAM. Under the upper basin compact, Utah realizes 23 percent of the flow-through at Lee Ferry.

Mr. ASPINALL. So actually, notwithstanding what you have to say about the area and all that, Utah has fared very well under the

agreements between the basins and among the upper basin States; is that correct?

Mr. BINGHAM. That is correct, and water is the important thing.

Mr. ASPINALL. I was going to ask you a question about the Dixie and you brought the Dixie project into the discussion yourself. Of course, at the time we were contemplating whether or not we should authorize the Dixie project, there was some question about whether or not it should be delayed and made a part of the Lower Colorado River project, or whether it should be handled individually.

As I understand it, Mr. Bingham, it was decided that because of the immediate need for the project that you were willing to forgo any benefits that might come to you from having Dixie as a part of the lower basin development. You wanted it treated as a single project and, accordingly, it was so authorized; is that correct?

Mr. BINGHAM. That is correct. It was authorized and in the process of making the repayment ability complete, the State of Utah agreed to relocate, at its own expense, certain roads which would be inundated by the principal reservoir.

Mr. ASPINALL. The State of Utah entered that agreement.

Mr. BINGHAM. The State, Mr. Chairman, indicated its position in this matter. They felt that the road was properly a cost of the project, the relocation of it. We were interested in beginning of the project and were willing to assume that financial responsibility.

However, as our former Governor has indicated and entered into the record, he would hope that at some future time as the basin funds were developed, that this project would be dealt with equitably as were others under the basin development.

Mr. ASPINALL. So, what you are asking for now is for Congress to make a reauthorization of the project to a certain extent so you will not have to stand the cost of relocating the road; is that correct?

Mr. BINGHAM. That is correct.

Mr. ASPINALL. All right.

Mr. ROGERS. Mr. Hosmer.

Mr. HOSMER. There used to be a very fine gentleman out there who surrounded himself with all the water lore and knowledge there is, George Clyde. Is he still around?

Mr. BINGHAM. It so happens the Governor is in town presently returning from an overseas trip.

Mr. HOSMER. Does he substantially concur in what you have said today?

Mr. BINGHAM. He does.

Mr. HOSMER. That is a pretty good recommendation.

Mr. BINGHAM. Thank you.

Mr. HOSMER. You said something I would like to ask about, something about some reimbursements, or something like that.

I didn't quite get what you were talking about—about some revenues or something.

Mr. BINGHAM. In connection with the Dixie project?

Mr. HOSMER. No. It seems Glen Canyon was mentioned. I couldn't understand. Would you explain what you were talking about?

Mr. BINGHAM. This goes to the point—this relates to a matter which was discussed this morning by the State of Colorado, that under the

filling criteria which was devised by the Secretary of the Interior, provision was made ultimately in his pronouncement that the upper basin fund would be charged for power deficiencies that would result from the filling of Glen Canyon Dam. The comment in this statement of the Governor's and the comment this morning goes to the point that we think the feature of the filling criteria was not fair to the upper basin and we are seeking at this time to have that corrected.

Mr. HOSMER. It was fair in your judgment, then, for the lower basin to absorb the power deficiencies?

Mr. BINGHAM. Mr. Hosmer, the power contracts were made in recognition that the upper basin would develop. The upper basin States have, because they have not been in position to utilize the water, been delivering at the compact point far in excess of the amount specified in the contract.

I think in that context, yes, these deficiencies are beyond the responsibility of the upper basin.

Mr. HOSMER. You mean to say that there was contemplation back when the Hoover Dam was authorized that there would be a reservoir such as Lake Powell to fill up and during a short period of time?

Mr. BINGHAM. Congressman, I——

Mr. HOSMER. Do you think that was anticipated?

Mr. BINGHAM. I am sure the upper basin development was anticipated, but I don't believe in that detail, but you will find in the power contracts a declining firm energy rate indicating the development in the upper basin as contemplated at that time.

Mr. HOSMER. You mean to say that as far as generation of power is concerned, that the further up you are on the river, you always have a right as against anybody lower on the river to do what you want with the water with respect to power generation.

Mr. BINGHAM. What I am trying to say, Congressman, is that the compact, I think, is explicit that power is subservient to other uses and this development——

Mr. HOSMER. I am talking about power versus power.

Mr. BINGHAM. This filling was accomplished within the compact entitlement of the upper basin. I think this is our principal thing.

Mr. HOSMER. I couldn't hear you.

Mr. BINGHAM. The filling of the reservoir, inasmuch as it is accomplished within the allocation made to the upper basin, I think, yes, it would have priority.

Mr. HOSMER. The compact talked about water for beneficial consumptive use, not talking about water for power.

Mr. BINGHAM. Mr. Congressman, the storage of water in Glen Canyon is very definitely related to beneficial consumptive use. It is the means by which we assure the delivery of water to the lower basin and accomplish uses in the upper basin.

Mr. HOSMER. Then, by the same token, water going through the Hoover generating system is being devoted to the same purpose for beneficial consumptive use; is that right?

Mr. BINGHAM. I would agree.

Mr. HOSMER. But you claim the storage, dead storage, is in essence of beneficial consumptive use.

Mr. BINGHAM. By reason of the fact that it——

Mr. HOSMER. Going back behind—going through the turbines, for dead storage.

Mr. BINGHAM. It is my contention that it does enable the upper basin to meet its commitment and accomplish its uses.

Mr. HOSMER. In that connection, however, we do have a time element. As I understand it, this closing the gates at Lake Powell for the purpose of building up the head at a sooner time in order that power generation could commence at an earlier date so that the revenues could commence sooner than otherwise—isn't that what the real purpose is?

Mr. BINGHAM. I think this is one of the purposes accomplished, yes.

Mr. HOSMER. All right. Now, here we get another step removed on the theory that you have propounded, that as long as power revenues go for payment of subsidizing irrigation, dead storage is in the category of beneficial consumptive use?

Mr. BINGHAM. I think it goes to the same point, Mr. Hosmer, again that the upper basin is delivering in excess of the quantities in the compact. This is a necessary structure and to put it in operation, this water should be stored without any charges made against the upper basin.

Mr. HOSMER. Well, you are presupposing that the upper basin is delivering in excess of what is required by the compact.

The compact does not read that way. It reads that the upper basin is entitled to so many acres of beneficial consumptive use, subject to getting 75 million acre-feet of water out of the river every year.

Nobody can divide up the water, only the use of the water. Isn't that right?

Mr. BINGHAM. That is correct.

Mr. HOSMER. But it is not in the form of gratuities to the lower basin in any way, shape, or form.

As long as you admit that the lower basin is putting its water through the turbines for the generation of electricity and it amounts to beneficial consumptive use, I certainly do not think it is equitable to charge the revenues against it.

The upper Colorado project was authorized, funded, and constructed in contemplation of the lower basin rights and uses as well, wasn't it?

Mr. BINGHAM. I am sure it was, but at the same time, had releases from Hoover Dam been limited to consumptive uses, then quite a different condition would have occurred than did at the time Glen Canyon was filled, so it is not correct to say that all releases are for beneficial consumptive uses at Hoover Dam, nor have they been over the past.

Mr. HOSMER. No; but many of those releases were necessary, some for cleaning up the river, and a few other things.

Aren't we really talking about management problems here of an entire river, which by law is under the Secretary of the Interior, which he must use his authority to do the best he can to maximize everybody's benefit? Isn't that what we are talking about?

Mr. BINGHAM. What we are talking about is not making that at the expense of the upper basin, Congressman.

Mr. HOSMER. Nor the lower basin, but when you don't have enough water, it is at the expense of somebody.

Mr. BINGHAM. This is one problem that you cannot escape.

Mr. HOSMER. And when it gets to where the water either is in excess and causes a problem, or it is insufficient and causes a problem. In both cases, locally.

I can see why you want the revenues restored. I can see why New Mexico wants that 40,000 or 50,000 acre-feet of property or the water because—that is why the West progressed—because everybody was enterprising and progressive, but I think somebody may be getting a little too enterprising.

Mr. BINGHAM. We think the same thing, Congressman.

Mr. ROGERS. Mr. Burton.

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

Mr. Bingham, after reading the Governor's statement, would it be fair to characterize the official position of the State of Utah and the Governor as supporting the central Arizona project if these three stipulations that the Governor has on page 4 are agreed to?

Mr. BINGHAM. That is correct.

Mr. BURTON of Utah. Now, suppose any or all of these three amendments cannot be made or are not made, would he then be opposed to the central Arizona project?

Mr. BINGHAM. He would.

Mr. BURTON of Utah. Now, the three stipulations that Governor Rampton has here, the first is that he speaks of "legislative assurances that future Federal authorizations or other development of projects within the upper basin's compact apportionment of water from the Colorado River will not be jeopardized by the interim use of unused upper basin water in any lower basin project," and we can theoretically write that into this bill; and the third one, I can see how we could direct the Secretary of the Interior to terminate the diversion of funds from, and requiring that full reimbursement be made to, the Upper Colorado River Basin—and Mr. Hosmer was just talking about that—but, I cannot see how we can make legislative commitment to import not less than 2½ million acre-feet of water annually. We just cannot say we are going to import 2½ million acre-feet, and let it go at that.

Do you have any guidance you could give me on that point?

Mr. BINGHAM. This goes to the position previously presented and a resolution passed by the Upper Colorado River Commission. I think we can best describe it as being a conditional authorization which, upon a showing of feasibility or finding of feasibility by the Secretary and the subsequent approval of the Congress or the President, would authorize the project.

Mr. BURTON of Utah. Do you see any difference between a "conditional" authorization and a "concurring" authorization?

Mr. BINGHAM. Well, I am not experienced in these matters, Congressman. There may be some slight difference but I am not competent to say.

Mr. BURTON of Utah. What we are talking about here in the Governor's statement is "conditional" authorization, that "we would want to support the central Arizona project on these three conditions."

Mr. BINGHAM. That is correct.

Mr. BURTON of Utah. That is all, Mr. Chairman.

Thank you, Mr. Bingham.

Mr. ROGERS. Mr. Udall.

Mr. UDALL. I have no questions.

I do want to say to Mr. Bingham that I have appreciated working with him in recent days and to say what a fine, forward-looking repre-

sentative the State of Utah has in him. It was a real pleasure to make his acquaintance and to have him before the subcommittee.

Mr. ROGERS. Mr. Wyatt.

Mr. WYATT. I enjoyed the statement. I do not believe I have any questions.

Mr. ROGERS. Mr. White.

Mr. WHITE of Idaho. I would like to join my colleague from Utah in saying that I thought the gentleman's statement was very well put and well represented the thinking of the Governor of the State.

Mr. ROGERS. Mr. Hansen.

Mr. HANSEN. Mr. Chairman, I would like to join my colleagues and compliment Mr. Bingham on his statement. I do have some questions, however.

First, you actually, as I noted in your statement, have an interest in both the Upper and Lower Colorado River Basin, is that correct?

Mr. BINGHAM. That is correct.

Mr. HANSEN. Thus, since you are interested in both ends of this problem, do you feel that the upper basin portion of Utah that will be affected is protected in this legislation as posed if the considerations are met, as stipulated?

Mr. BINGHAM. Yes; with the provisions that are in there.

Mr. HANSEN. Do you feel there is any danger, then, that the project in the lower basin, after they are there and committed, would preclude your coming to Congress at some future time and reestablish rights for projects you then may need in the upper basin?

Mr. BINGHAM. I think the Congressman——

Mr. HANSEN. I might add the condition that maybe the import problem would by then have been solved.

Mr. BINGHAM. I think this would be an area where we——

Mr. ROGERS. Excuse me, sir.

The Chair would like to ask that the members and the witness talk up. There is a good bit of interference and noise and the reporter is having a little difficulty hearing.

Mr. BINGHAM. I will. Thank you, Mr. Chairman.

This is a problem and I think it goes to the heart of the concern of the State of Utah for reasons I have pointed out earlier. We feel that conditional authorization of import with the recognition of our rights, and our judgment is, I am sure, affected by the spirit of cooperation, by the recent creation of the 11-State group, and we think these things, in toto, would protect our interests.

Mr. HANSEN. Do you feel your second contingency on page 4 is fair and proper with the idea there would be more water realized? Do you think the nonreimbursable idea is in fact actually fair?

Mr. BINGHAM. I take it the Congressman is referring to the Mexican diversion?

Mr. HANSEN. Yes.

Mr. BINGHAM. I do.

Mr. HANSEN. One final question. Do you agree with many of your predecessors on the witness stand that it is necessary on a regional basis or on basin basis to have immediate studies and determinations as far as surplus and lack of water that might exist so that these problems could be resolved without the bickering and the problems we face in legislation such as that before the committee at this time?

Mr. BINGHAM. Mr. Congressman, the State of Utah feels strongly—and I'm sure her sister States do—that any importation should not be made at the expense or injury or foregoing development in any State.

Mr. HANSEN. Thank you, Mr. Chairman.

Mr. ROGERS. Mr. Foley.

Mr. FOLEY. Thank you, Mr. Chairman.

Mr. Bingham, does the State of Utah have a position regarding the proposed Bureau of the Budget amendment to establish a National Water Commission? I didn't quite understand your answer to Mr. Hansen's question.

Mr. BINGHAM. We have never taken a specific position with that. If it would be of interest, I have my own personal views but the Governor has never taken a specific stand on that question.

Mr. FOLEY. You don't have the position from the State of Utah?

Mr. BINGHAM. On that; no, sir.

Mr. FOLEY. Does the State of Utah have a position as to the source of proposed imported waters?

Mr. BINGHAM. Mr. Congressman, we do not feel there is sufficient information available yet to indicate precisely. I would answer in this context that again we think this can be accomplished without adverse effect on any area.

In fact, we see the possibility of bringing development about sooner in certain areas of the region that otherwise may have to wait or may have to pay more for water by a cooperative development scheme.

Mr. FOLEY. My question is, then, Mr. Bingham, how do you conceive that Congress can conditionally authorize the two and a half million acre-feet importation into the Colorado River Basin?

Mr. BINGHAM. I think the language in the amendment and the statement by the Governor said "not less than," and this would not be the total amount——

Mr. FOLEY. I am happy to have that corrected—"not less than." How are we to, as a committee, or a Congress, to conditionally authorize importations of water when we do not know anything about the feasibility of importation or areas of importation?

Mr. BINGHAM. Your conditional authorization would develop such information, Congressman.

Mr. FOLEY. You are suggesting, then, that we give a blank check to the Secretary of the Interior?

Mr. BINGHAM. I do not think it amounts to that. You are asking for a finding of feasibility. The checkbook operation would result when the project was funded through the congressional process.

Mr. FOLEY. In other words, from the standpoint of the Congress, the Appropriations Committee should be the only committee to review this matter.

Mr. BINGHAM. No, I don't think this entails it. This is one means of getting before the Congress the information and the feasibility of this particular undertaking.

Mr. FOLEY. The State of Utah does not regard anything in this bill as being a commitment to import not less than two and a half million acre-feet into the Colorado Basin?

Mr. BINGHAM. Are you referring to the bill as it presently is or——

Mr. FOLEY. Yes.

Mr. BINGHAM. No. We do not regard it so. The amendments will be presented which we think will provide the necessary language for this. Presently, no.

Mr. FOLEY. You do not see anything at all presently to suggest the Congress is promising not less than two and a half million acre-feet.

Mr. BINGHAM. I regard it as a study with no other commitment.

Mr. FOLEY. Thank you.

Mr. HOSMER. Would the gentleman yield?

Mr. FOLEY. Yes.

Mr. HOSMER. Mr. Bingham, you said you had a personal opinion about the Bureau of the Budget recommendation. What is that opinion?

Mr. BINGHAM. Yes, sir. I feel that on a regional basis where we have more of a community of interests that our effort would be more effective than on a national scale.

Mr. FOLEY. Would the gentleman yield?

Would you have any feeling, Mr. Bingham, that a study of available resources should first be made in the two Colorado basins and California before going outside those areas?

Mr. BINGHAM. I am sure that all areas would be expected to utilize their water resources to full effectiveness. I think such information is available in many of these areas at the present time.

Mr. FOLEY. That is not precisely responsive to my question.

Do you feel it would be fair to study further the resources available within the two basins of the Colorado River and California before going outside those areas to study the resources of other areas?

Mr. BINGHAM. Yes.

Mr. WHITE of Idaho. Would the gentleman yield?

Mr. FOLEY. Yes, sir.

Mr. WHITE of Idaho. Mr. Bingham, you made one other remark in your last statement to Mr. Foley that you felt there would be amendments added to this legislation that would, in effect, be promissory to the Colorado total basin, that there would be imports of water into that area. Did I understand you correctly in what you said?

Mr. BINGHAM. Congressman, let me amplify in this manner. This committee and, of course, the Congress will make the amendments. What I meant to say was——

Mr. WHITE of Idaho. I know, but you alluded to certain amendments you feel will be offered, is that correct?

Mr. BINGHAM. That later—the Commission will suggest to the committee language that we feel would go to the principles covered in the statement.

Mr. WHITE of Idaho. That would guarantee that after a study, there would be importation of water and a promise to the Colorado and the States affected that there would be importation.

Mr. BINGHAM. In the conditional authorization; yes.

Mr. FOLEY. For the record, in answer to my question a moment ago when I asked if you did not feel a further study of the resources available to the Colorado River Basin and California should be undertaken first before any studies outside the region, you answered that question "Yes."

Were you answering personally or were you representing the views of the State of Utah?

Mr. BINGHAM. It represents the feeling of the State of Utah.

Mr. ROGERS. Mr. Reinecke.

Mr. REINECKE. No questions.

Mr. ROGERS. Thank you, Mr. Bingham, very much for your presentation.

Mr. BINGHAM. Thank you, Mr. Chairman.

(The statement by Gov. Calvin L. Rampton follows:)

STATEMENT BY GOV. CALVIN L. RAMPTON, OF UTAH

Mr. Chairman, I appreciate the opportunity to present this statement before this distinguished committee today. I speak for the people of Utah in commending you for the great and good works you initiate. Utah, the West, and indeed the Nation benefit from the water development projects that have their genesis here.

At all levels of government we are engaged in a never-ending struggle to meet the demands of a growing population. We in the West and particularly Utah, the second driest State in the Nation, have been compelled to make more frugal use of our limited water and have had to reach out ever greater distances for additional water.

Water shortage has long been a western problem, but now water or the lack of it is of national concern. At this moment the Northeastern section of the United States, once thought to be immune to the vagaries of nature with respect to water supply, is facing many serious problems resulting from a seasonal water shortage.

UTAH'S INTEREST

The State of Utah has special interest in the legislation pending before this committee. More than 40,000 square miles or nearly one-half of the area of the State is in the drainage basin of the Colorado. We have the second largest drainage area of any State contributing to the Colorado. Furthermore, Utah has interests in the lower as well as the upper basin by reason of a 3,600-square-mile area within the lower basin. More importantly, Utah looks to its compact entitlement in the Colorado River to provide water needed for the comprehensive phase of the central Utah project and other projects now being planned. Needless to say we will scrutinize carefully any proposal which may use water from the Colorado and particularly any proposal which would use even temporarily "our" water.

CENTRAL ARIZONA UNIT DELAYED

Action on legislation to authorize the central Arizona unit has been long delayed. On April 18, 1951, the House Committee on Interior and Insular Affairs indefinitely postponed hearings on the central Arizona project. Thirteen years later on November 9, 1964, field hearings were held in Phoenix, Ariz. Between these two dates the long history of controversy over the Colorado River was climaxed by the now famous *Arizona* v. *California* lawsuit over the apportionment of Colorado River water in the lower basin. While the litigation has ground to its conclusion and the Supreme Court has handed down its decree, development has stood still during the process. Needless to say, the need for water has not stood still.

UNEQUAL DISTRIBUTION

"Arizona's water situation," as has been stated to you by Congressman Udall, "is only a part of a larger problem which confronts all of the States of the Colorado Basin." In Utah we recognize that larger problem.

Many studies, including the summary of the Senate Select Committee on National Water Resources, have recognized that the Colorado River system cannot meet the demands placed upon it. A more recent appraisal states it this way: "Of the eight major drainage basins of the West, only two—the Pacific Northwest-Columbia Basin and the central Pacific basin—can be classified as water surplus basins with sufficient water to meet all foreseeable growth and needs. Indeed, the water runoff from these 2 basins exceeds by more than 5 times the amount of combined flow from the other 6 basins of the 11 Western States."

Uneven distribution of water is not a new problem. What we now face is uneven distribution on a much larger scale along with increasing requirements. The solution certainly must involve the transportation of large quantities of water over great distances.

NEW APPROACHES

Both at home and in my travels, I sense a growing public concern over the adequacy of our water supply to fulfill the needs of the future. Other Governors of the West share my feelings to the extent that we recently created, by unanimous action, the Western States Water Council to promote added interstate cooperation and coordination in planning for the future.

Congressional approval of the Water Resources Planning Act (H.R. 1111) is another manifestation of the need to prepare regional plans for the utilization of our water resources now before disaster strikes.

Other events, particularly the discussion during the past week by representatives of the seven Colorado River States here in Washington, are good omens. I regard these and other events as recognition that the concepts and approaches of the past will not adequately solve present day problems.

LITIGATION NOT THE ANSWER

The conference table will produce better solutions to our water problems than the courtroom. We all realize the costly and time-consuming processes of litigation. We are ever more aware that legal decisions are by their nature too rigid to cope with the intricacies of water apportionment and management.

Unresolved controversies are deterrents to progress. The time and money wasted in bitter disputes can much better be directed to constructive purposes.

Formulas for apportioning shortages are unsatisfactory and are not solutions, since they negate our endeavors to promote progress and development.

THE SHRINKING SUPPLY

The framers of the Colorado River compact of 1922 deliberated at a time when the river averaged in excess of 18 million acre-feet annually at the Lee Ferry measuring point. Had the flow of the river continued at 1922 levels the full compact apportionment of both basins would have been available. Unfortunately, the long term trend of the river has declined considerably. Today, the upper basin, after meeting its compact commitment of delivering 75 million acre-feet each 10 years at Lee Ferry, faces the prospect that less than 6½ million acre-feet will be available annually for use in the upper basin. Consequently, we must insist on safeguards in the form of amendments to the pending legislation that will protect our dwindling supply.

The State of Utah believes that the water supply study made by consultants to the Upper Colorado River Commission gives a fair and realistic appraisal of the Colorado River water supply. Other studies may differ with the time when water uses will exceed the supply but they agree on the important point that the natural supply of the river is deficient to meet the needs. I would stress the point that what we are contemplating is a total shortage, not just a seasonal or annual shortage, but that certain date in the future when a regulated river will be used up.

LEGISLATIVE SAFEGUARDS

It is important that this committee know the position of the State of Utah with respect to the pending legislation. We will support the legislation if it is amended to safeguard the interests of the upper basin. These safeguards include the following:

1. Legislative assurances that future Federal authorizations or other development of projects within the upper basin's compact apportionment of water from the Colorado River will not be jeopardized by the interim use of unused upper basin water in any lower basin project, and that the upper basin's commitment will not exceed the delivery of 75 million acre-feet at Lee Ferry in any period of 10 consecutive years.

2. Legislative commitment to import not less than 2½ million acre-feet of water annually, with the understanding that relief from the Mexican Treaty burden should be the first priority to be served by the imported water and that the costs allocable to that purpose should be nonreimbursable.

3. Directives to the Secretary of the Interior terminating the diversion of funds from and requiring that full reimbursement be made to the Upper Colorado River Basin fund for all expenditures heretofore made to meet the so-called deficiencies in Hoover Dam power generation pursuant to the Glen Canyon filling criteria.

Mr. Chairman and gentlemen of the committee, I urge the amending of H.R. 4671 to accomplish the purpose of the above-stated principles in order that the State of Utah may support the legislation for the Lower Colorado River Basin project.

DIXIE PROJECT

I further ask that you retain section 309 of H.R. 4671 as originally provided in the bill to accomplish the integration of the Dixie project into the Lower Colorado River Basin project so as to qualify it for repayment arrangements and participation in the development fund. I desire to support the amendment heretofore proposed by the Secretary of the Interior to add the following language to section 402: "*Provided, however*, 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 unit shall be borne by the United States and shall be nonreimbursable." This amendment makes it clear that the authority of the Secretary to provide basic recreation facilities and to acquire necessary lands continues as provided in the Dixie project authorization act.

I greatly appreciate your kind consideration of this recital of our vital interests in the legislation now pending before this committee.

Mr. ROGERS. The next witness is Mr. George L. Crookham, Jr., chairman of the Idaho Water Resources Board, representing the State of Idaho, and the Chair will recognize the gentleman from Idaho, Mr. White, to introduce Mr. Crookham.

Mr. WHITE of Idaho. Mr. Chairman and members of this committee, I would like to personally welcome Mr. Crookham here to this hearing and before our committee.

As you said, he is the chairman of the Idaho Water Resources Board created by our legislature, and Mr. Crookham is accompanied by others here today, and I would like to ask them to stand.

There is Mr. Arlie Parkins, who is on the board, and Dr. Evan Kackley, who is also on the board.

Mr. Crookham is accompanied by Mr. Carl Tappan, State engineer of the State of Idaho, and with that, if I may, I would like to yield to my colleague from Idaho for any comments he wishes to make.

Mr. ROGERS. The Chair would recognize the other gentleman from Idaho, Mr. Hansen, for any remarks he wishes.

Mr. HANSEN. I'm sure all those here will be interested to know that this is a new board, just getting their feet on the ground. They are a group of highly qualified men who are doing a fine job. I'm certain the statement they have prepared for today will be worthy of our time.

With this, I would like to yield back for Mr. Crookham's presentation.

Mr. ROGERS. Thank you, Mr. White and Mr. Hansen.

Mr. Crookham, you may proceed.

STATEMENT BY GEORGE L. CROOKHAM, JR., CHAIRMAN, IDAHO WATER RESOURCES BOARD, IN BEHALF OF HON. ROBERT E. SMYLIE, GOVERNOR OF THE STATE OF IDAHO

Mr. CROOKHAM. Thank you, gentlemen.

I am George L. Crookham, Jr., of Caldwell, Idaho, presenting testimony in behalf of Hon. Robert E. Smylie, Governor of the State of Idaho, and in behalf of the Idaho Water Resources Board, recently created through constitutional and legislative action by the voters of Idaho and the 38th Idaho Legislature.

One of the major responsibilities of our board is to plan and program for the present and future optimum use of water resources in Idaho.

We commend the intent of the Lower Colorado River Basin Project Act in its attempt to make more complete use of the land and water resources of the project area. Under the same standards for conservation and use of water as set out in title II of the act, Idaho, too, has a great potential in the proper use of her land and water resources.

We caution, however, that a "greener pasture" approach concerning water import by any area is not a substitute for the "alternative sources and various methods" approach of water supply as directed by H.R. 4671 and the other bills.

Speaking directly to the provisions of the bill authorizing the Secretary of the Interior to proceed with the planning of the importation of water into the Colorado River Basin, we wish to point out that H.R. 4671 and similar bills fail to list the source area or areas of importation.

There is no provision in the bill for any affected State or States from which the water is proposed to be exported to enter into such studies. However, the States from which the water is proposed to be exported have as great, or greater an interest, in such proposals and studies as the States which are to receive the water. Common reasoning dictates that if by some chance the Colorado River Basin States were called upon for the exportation of water, their requests would parallel those we present today.

Various references throughout the bill allude to the importation of water into the Colorado River system. Because of the far-reaching effects of such action, we feel that importation of water from one State or river basin into another should be limited exclusively to a specific act of the Congress and that title IV should be amended accordingly.

We are appalled at the recent agreement reached by the seven States of the Colorado River Basin wherein they are united in an endeavor to ask the Congress to authorize the Lower Colorado River Basin project and to provide in the same act for specific authority to construct works for bringing at least 2½ million acre-feet of water into the Colorado River from some less arid area.

Such a request is repugnant to the purpose of the recently created Western States Water Council. The council, which was created by the Western States Governors' Conference, earlier this month adopted this statement of purpose:

> To accomplish effective cooperation among Western States in planning for programs leading to integrated development of their water resources * * * interbasin transfer shall be subordinated to needs with the States of origin.

Idaho's Gov. Robert E. Smylie succinctly stated on August 20, 1965, our view on the recent agreement among the Colorado River Basin States, and I quote:

> This so-called historic agreement is not a cooperative attempt to solve the water problems of the West. It does, however, unveil a plan to pirate water in stark simplicity.

We respectfully urge that title IV of the bill be amended to provide that importation of water from one river basin to another be limited to a specific act of Congress and also that Congress establish these criteria for consideration of importation of water:

(1) The area or areas seeking importation of water shall first conclusively establish that it or they have put all potable water within their own areas to highest feasible use;

(2) The right of all affected States to participate in water importation programing and study;

(3) Unequivocal protection to the States of origin for all of their present and future water needs;

(4) Subordination of any exportation to present and future needs within the States of origin; and

(5) The feasibility of any project for importation of water to include an evaluation of all cost factors including interest. Indirect benefits that accrue to the basin and States of origin shall not enter into determining price or costs on out-of-basin transfers.

Mr. ROGERS. Thank you very much.

Mr. Aspinall.

Mr. ASPINALL. I have no questions, particularly.

I think it is a very fine, short statement setting forth Idaho's position.

Is it your understanding, Mr. Crookham, that the consensus of opinion that was arrived at on August 20 was a formal agreement?

Mr. CROOKHAM. This is the way we read it in the press, sir.

Mr. ASPINALL. There are so many things in the press. We read so many things in the press that are inaccurate. I read in the press today about Governor Smylie's statement. I am sure he didn't mean exactly what the press indicated, and I am sure that I didn't mean what the press implied when they repeated what I said to Sam Goddard on Monday or Tuesday of this week.

They are all good public servants but sometimes they do not know what they are writing about and, at other times, they lean over backward for home consumption.

I think perhaps, Mr. Crookham, that all that these representatives, in the seven States, are asking is something like the lower basin States, particularly the State of Arizona, are asking at the present time relative to water in the upper basin States.

They see the water is not used and they would like to be participants in the use of that water. This is what I think all the State representatives had in mind when thinking about their own problems. They saw some water that was not being used and they wanted, if possible, to use it.

They have no idea of pirating the water. When you use the word "pirating," in its real definition, you arouse something in the minds of the people that is not only unholy and immoral but it is illegal.

Mr. CROOKHAM. Thank you, Mr. Chairman. I appreciate your confidence and I hope you will feel that we entered into the Western States Council with an open mind and our immediate reaction was to feel that we had been stood up when this agreement was——

Mr. ASPINALL. You are not any closer to being stood up than some of us folks in the upper basin. We kind of feel the same way. We are willing to share within reason. That is our desire.

Mr. CROOKHAM. Mr. Chairman, I certainly concur in that. No one of us here as Americans has the right to waste water in perpetuity, whether upper basin or lower basin or Pacific Northwest, or anywhere else.

Mr. ASPINALL. I think that is the best statement that has been made today. I have nothing further.

Mr. ROGERS. Mr. Hosmer.

Mr. HOSMER. I will reserve mine.
Mr. ROGERS. Mr. Burton.
Mr. BURTON of Utah. No questions.
Mr. ROGERS. Mr. Udall.
Mr. UDALL. No questions.
Mr. ROGERS. Mr. White.

Mr. WHITE of Idaho. Mr. Crookham, I certainly want to compliment you on the statement that you have made and we feel you have ably represented the thinking of the State of Idaho and the people that are so concerned about the possibility and the potential that may be included in this package of legislation.

There is only one regret I think we have in Idaho, and I think you will concur in this, that the attitude seems to prevail, at least with me, that there have been so many agreements made and they have put together a group of people with the idea of importation of water without fully addressing the problem to the actual States or basins from which water might be exported.

I am sure that this is a resentment which I feel, and I am sure the people of my area feel, and I wonder if you concur in this.

Mr. CROOKHAM. Yes, I think this matter of explanation and the intent of cooperation—we tried to bring this out in one of our major points—the recommendations for changing the context of the bill will allow participation of these States. I think this would yield a better feeling, a better understanding.

After all, we are neighbors and we covet your friendship, we covet your business, and I am sure you look upon us in the Northwest as supplying certain of your needs and welfare, that you will continue to rely on us for centuries, you might say.

Mr. WHITE of Idaho. Then, wouldn't you say, Mr. Crookham, that you feel that there should be adequate protection for the areas of origin written into this legislation as has been proposed in the course of these hearings as to the diversion, protection for the expanding industries of the areas of origin, so that there will never be any question that would result in a deficiency of water in those areas from which the water is imported.

Mr. CROOKHAM. Congressman, this is right and just merely because Idaho might show a surplus at a given location at the time of the year that surplus would be available—in other words, you may have x number of acre-feet but this doesn't stand to reason that this can be drawn on in any regular pattern, so the cooperative venture and study is very much a part of the essence of any attempt of this type to make the most of the resources we have.

Mr. WHITE of Idaho. I think when we are talking about the State of Idaho, particularly with the Snake River being so close to the headwaters of the Colorado and some of the plans that have been proposed outside of the Government for the transfer of water and looking at the area of a thousand springs on the Snake River, such a diversion would be a real hazard to the future development of our State and would only tend to see the water flowing at the present time, and we should think hard about what the Secretary says. If there is a proposal for diversion, it should take into account our future needs and specific limitations. A diversion somewhere near the mouth of the Columbia would be the more logical approach rather than try and throw a load

of possibly 10 million acre-feet of water on the Snake which couldn't begin to carry anticipated loads for the State of Idaho.

Mr. CROOKHAM. This is true. I certainly commend the Secretary of the Interior and the Commissioner of Reclamation for designating in their oral testimony that their point of intended study, if they look to the Northwest, would be below the Bonneville Dam. I think this is all proper.

Mr. WHITE of Idaho. Mr. Crookham, I think I would have to say that I agree in your last statement you made in answer to the questions of the chairman of the full committee, that no one wants to waste water but at the same time, we do not want to be in a position where, at some future date, the Columbia Basin would feel a deficiency and it would have to go to the provisions of some of our legislation that the recipient States would have to put up the money to make whole again a certain part of the Columbia Basin. We would be looking to the next basin or the next basin. We should protect those needs logically for the present States of origin.

Mr. CROOKHAM. Congressman, this is most true. I think what we are trying to nail down here at this point is that the peculiarity of Idaho's land resources and the water within her rivers are such that they do not yield to simple determinations. It is a very complex problem and must be approached with a detailed study which Idaho is just about to do.

Mr. WHITE of Idaho. This is why I was so interested in the Water Resources Act and the Regional Planning Act. We could have analyses that would provide us with an inventory of underground water, not only available in certain areas of Arizona but also the great load that is thrown on underground waters in Idaho by pump irrigation, so that we actually know what we have before we come up with any definite conclusions as to what amount of water is available from any tributary within the Columbia Basin.

Again, I want to compliment you, Mr. Crookham, and the gentlemen that are with you, and I think you have made a very definite contribution to the hearings, and I hope that you can report back to the State of Idaho that the Congress is taking a very fair look at what is anticipated.

I yield back the balance of my time.

Mr. ROGERS. Mr. Hansen.

Mr. HANSEN. Mr. Chairman, I would like to compliment Mr. Crookham on his statement. It is well done and well demonstrates the study and preparation that went into it.

Mr. Crookham, members of the board, and Mr. Tappan, we appreciate having you here.

I think, Mr. Crookham, that Idaho has an unfortunate peculiarity in that we are a great watershed, especially in north Idaho, where much of the water leaves us and goes to other States without much opportunity for us to use it. Yet, we have a great arid area in the State which can use more water than adjacent streams can supply; is this right?

Mr. CROOKHAM. This is correct. I find it rather amusing that the Wild Rivers bill is asking Idaho to let the waters go to sea and other bills ask Idaho waters go to the southwest.

Mr. HANSEN. I think there might be another observation that would be important concerning States like Idaho which have small popula-

tions and consequently not many representatives. Being aware of this weakness, they cannot help but view with apprehension and even some suspicion pending legislation such as we are considering which involves compacts and agreements among those States of more population, great booming areas and immediate need.

Mr. CROOKHAM. I think that is right. Getting down to plain economics, like it or not, we face a large explosion of population or unprecendented growth.

It may be that Idaho's role in the future will be a breadbasket to the Pacific Coast. We are becoming more of that now. But it does make a lot of economic sense that if the land and water is available to make a competitive production on food and fiber, then the closer that these productions are done to the sources of land and water, the better the economic structure is. This is a determination.

What happens as the Pacific coast picks up population? Will they maintain their position in agriculture? Will they turn to us?

This is what we in Idaho are thinking. I believe you will turn to that State at one time and look for it as the breadbasket to the Pacific coast. We are reluctant to make any commitments now that would change that thinking.

Mr. HANSEN. Especially with potatoes.

Mr. CROOKHAM. Yes, sir.

Mr. HANSEN. Based on your statement to the chairman of the full committee that no one has the right to waste water in perpetuity, do you feel that areas of origin protection for water is important? Is this correct?

Mr. CROOKHAM. It is correct.

Mr. HANSEN. And do you feel that legislation in this bill should be geared so that whatever projects are authorized should be made to stand on their own merits without going into some nebulous area that they may not be solvable in the future, is this correct?

Mr. CROOKHAM. This was my No. 5 statement, and I thought it was rather a hard-hitting and realistic approach because when you start talking about transfer of water, I think you should look at the total cost of that transfer of water and compare it with the reuse of the existing water or nonpotable water in the other areas. I think you would find some very surprising developments.

Mr. HANSEN. Do you have a comprehensive study at this time of Idaho water resources, needs, and surplus?

Mr. CROOKHAM. No. We are just undertaking such a study and perhaps may not make all the development speed we would like to but this is our intent.

Mr. HANSEN. And do you feel that there is need for Idaho to join with its neighboring States in a regional or basin study of the surplus or the needs of water in that particular area?

Mr. CROOKHAM. Along this line, Congressman, it is very significant that our land-grant colleges are exchanging criteria on evaluation of water resources and attempting to give us the tools by which we can come up to common denominators or comparisons of these studies as we proceed into them.

Mr. HANSEN. Mr. Crookham, again I thank you for being here today in behalf of the State of Idaho, you and the distinguished gentlemen accompanying you.

Mr. ROGERS. Mr. Foley.

Mr. FOLEY. Mr. Chairman, and Mr. Crookham, I would like to join the welcome to you and the other members with you. I have a very deep affection for the State of Idaho, for the country of northern Idaho which I know best.

I was very interested in your statement on page 3 that area or areas seeking importation of water shall first conclusively establish that it or they put all potable water within their own areas to the highest feasible use.

I think that is the first time that such a principle has been enunciated by a witness in these hearings, I would like to ask you in view of that whether you feel, or the State of Idaho feels, that any studies proposed in this bill or other bills should be first confined within the areas where an alleged water shortage occurs.

Mr. CROOKHAM. This is a good question, Congressman, and back in my mind comes to being the report I read by the—I think it was a forestry report by the State of California. I don't know whether it was the forestry of California or the USDA, but this particular report brings this into quite good focus. This was approximately 6 or 7 years ago, but they estimated at that time that there were some 5 to 6 million feet of water available in the California watershed by proper watershed control.

This is minor, just a minor thing, but they talked about such things as the placement of trees to protect the snowbanks, about the removal of brush to let the snow deposit, about the reestablishment of the grass floor among the populace of a properly outlined watershed.

So this is just one little aspect of the thing we are talking about. This is one thing that perhaps could be cleared within the Western Council of State Governments, if these people present their cases, showing that they are making those uses, and we would feel much better about their positions, I am sure.

Mr. FOLEY. In other words, as I interpret your response, your concern—and I am sure it is the concern of others in the Northwest—is that first a conclusive case be made for need, that we don't assume need without adequate proof.

Mr. CROOKHAM. I have sat upon the Agriculture Research Committee of the National Reclamation Association, and we have gone in for these hydraulic stations, there water research stations, throughout the West, and for a very definite purpose, to make better use of the facilities we have at hand.

This is just beginning to yield, and there are practices that can be put into effect and will be put into effect, not only in the water-short areas, but elsewhere.

These are the sort of things that I think you gentlemen are talking about now. Let us make the best use of what we have before the "greener pastures" approach.

Mr. FOLEY. Thank you.

Mr. ROGERS. Mr. Reinecke.

Mr. REINECKE. No questions.

Mr. ROGERS. Thank you very much for your presentation.

Our next witness is Mr. H. M. Ahlquist, director of conservation of the State of Washington.

Mr. Foley is recognized to present him.

Mr. FOLEY. I am happy to welcome Mr. Ahlquist to the committee. He is, for the information of the committee, the duly appointed director of conservation for the State of Washington. I believe this is the first time he has appeared in that capacity before a committee of Congress.

He has a very distinguished record of public service in the State of Washington, and I would like to welcome him here today.

Mr. ROGERS. Mr. Ahlquist.

STATEMENT OF H. MAURICE AHLQUIST, DIRECTOR, STATE OF WASHINGTON DEPARTMENT OF CONSERVATION

Mr. AHLQUIST. Thank you, Congressman Foley.

Mr. Chairman, 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. This opportunity to present our views is appreciated.

The legislation before the committee today, H.R. 4671, and a number of companion bills, contemplates the investigation and planning of "works to import water into the Colorado River Basin from sources outside the natural drainage area of the Colorado River System."

In planning such works, the Secretary of the Interior, according to the language of the bill, "shall make provision for adequate and equitable protection of the interests of the States and areas of origin."

It is difficult to speculate as to what form such adequate and equitable protection of the interests of the States and areas of origin might take. There is no precedence for major diversions of water from one river basin system to another, such as from the Columbia River system to the Colorado River system.

The State of Washington has, over a period of many years, consistently supported the promotion of feasible reclamation programs. These developments form a very definite part of our economy. It is pertinent to mention at this time that we have an estimated 1½ to 2 million acres which can still be developed by the application of water.

We are greatly interested in having this water available for our reclamation growth and for all foreseeable uses within our State; our domestic and industrial needs are expanding very rapidly today.

This brings forward the programs which our State is promoting that we may know our water resources and our projected needs. The 1965 legislature appropriated $200,000 for such studies to be conducted by the State of Washington Water Research Center, which receives matching funds from the Federal Water Resources Research Act. A further study is being made by the Puget Sound Task Force.

Very recently, the Western States Water Council, formed by the Governors of the 11 Western States, was created to attempt to develop an equitable solution to the water problems of the Western States. This shows that the problems of water are recognized and that efforts are being made to properly analyze them within the affected areas by the people of those areas.

We do agree with the provisions of title II, authorizing the Secretary of the Interior to investigate methods of obtaining greater efficiency in the use of water and in particular the reduction of losses in

transmission, evaporation, and other wastes. All methods for the greater utilization of the waters of the Colorado River Basin should be researched before authorization for studies of importing water from out of basin is enacted.

Title III, having to do with the comprehensive development of the Colorado River Basin, the construction, operation, and maintenance of projects, is not within the scope of this testimony. We would endorse, as a matter of principle, the full development of a water basin in the same manner as we sincerely hope to complete the full beneficial uses of our Northwest waters.

We cannot approve those sections which provide for the necessity of importing water from sources "outside the natural drainage area of the Colorado system." Our testimony has already indicated our position on this matter.

The provisions of title IV are generally sound and are basic for the overall development of the many and varied uses of water within a river basin. However, the reference to title III, and the wording having to do with the importation of water into the Colorado River Basin, causes us to fear that these funds might be used to finance facilities for the diversion of water from out-of-basin sources.

We should like to draw your attention to certain provisions of the Water Resource Planning Act of 1965 which was passed by this Congress and signed by the President.

The language states that "nothing in the act shall be construed—

(d) As authorizing any entity established or acting under the provisions hereof to study, plan, or recommend the transfer of waters between areas under the jurisdiction of more than one river basin commission or entity performing the function of a river basin commission.

This would indicate that a river basin commission would not have the authority to study, plan, or recommend the transfer of waters between areas. The provisions of title VI in forming the Colorado Pacific Regional Water Commission do not seem to conform to the provisions of the Water Resources Planning Act which is now the law. Certainly a clarification of this section is in order.

On behalf of the Governor of our State and the people of the State to whom our water resources mean so very much, I respectfully request your full consideration of this testimony.

Thank you, Mr. Chairman.

Mr. ROGERS. Thank you, Mr. Ahlquist.

Mr. Aspinall.

Mr. ASPINALL. Mr. Chairman, I think this is a very clear and succinct statement. I have two questions.

Do I understand it to be the position of Washington that they do not want any study made by any commission, whether it is a commission under title VI or a national commission as proposed by the Bureau of the Budget, of the waters of the Columbia River Basin at this time?

Mr. AHLQUIST. Congressman Aspinall, I will answer the question in two parts.

The State, as such, has taken no official position on the work or the formation of the National Water Commission. We would prefer, in the second question, to have an opportunity through the studies which I mentioned in my testimony that the Water Research Center, the Puget Sound Task Force, the Columbia North Pacific, and many

others that are going on, before we would make a commitment that we would or would not approve the diversion of the water out of the basin.

We do not know our needs in the future. We would like to have some knowledge of them before we make a commitment.

Mr. ASPINALL. What if your study shows that there is considerable surplus water below Bonneville Dam that would be usable but could not be used in the foreseeable future, as forecast by your study, would you then be willing, or do you think the State of Washington would be willing, to have that water transferred or transported to some other area where there is a scarcity of water?

Mr. AHLQUIST. I believe to answer that question fairly it takes a basinwide study. The question was asked of one of the previous testifiers as to whether the studies were being coordinated. Due to the fact that——

Mr. ASPINALL. My question was like the question that was asked the little boy that had a whole cake and he got the stomach ache by eating half of it. He was asked if he would be willing to give up the other half. Now, that is what I have in mind.

Mr. AHLQUIST. I will answer the question in the same language that you are putting it.

If my brother was Idaho and Oregon and so forth, I would consider my brothers before I gave the cake away.

Mr. ASPINALL. Well, of course, but if your brothers in that basin—this is my question—in the whole basin, if the water was finally determined to be excess to any conceivable needs under any study that you and your brothers, Idaho and Montana and Oregon, might make, would you then be willing or do you think the State of Washington would be willing to share?

Mr. AHLQUIST. There has been no official statement made by the State of Washington but as an individual, I would say that after all of our projected needs have been studied under the long-term future, all the possible uses, that we should give thorough consideration to such diversion as you are saying.

Mr. ASPINALL. I have no quarrel with that. That is what I was trying to get.

Mr. ROGERS. Mr. Hosmer.

Mr. HOSMER. I will reserve my time.

Mr. ROGERS. Mr. Johnson.

Mr. JOHNSON. Thank you, Mr. Chairman. I have just one question.

I would like to ask Mr. Ahlquist one question and that is do you not agree that there is surplus water going to waste from the Columbia River into the Pacific Ocean?

Mr. AHLQUIST. At this particular moment, when we have not completed the studies of our potential uses in the million or 2 million acres that I mentioned, and the several million acres that were mentioned previously, gentlemen, by the witness from Idaho, Mr. Crookman, we honestly do not know.

We have a very rapid industrial growth; our population is growing. We do not know. Therefore, I could not say that there is, as of this moment. There might be a surplus and I think I have heard figures and statements that so say, but we have to look forward into the future, Congressman, or we will be in the same position in a couple

of decades that the Colorado Basin is in now with the result of their 1922 compact.

Mr. JOHNSON. All the facilities built so far on the Columbia River and its tributaries have been built by the Federal Government or private enterprise, and a number of the facilities on the Columbia River at the present time are geared for the use of water, domestic and industrial, and they are geared very highly to the control of floods, they are geared very highly to power development. At the present time, there are still a good many million acre-feet of water in the Pacific that can be run through the States of the Columbia River Basin and on into the Pacific.

Now, as we were told by the Secretary of the Interior and the Commissioner of the Bureau of Reclamation, they figure there are a great many millions of acre-feet of water going to waste in the Pacific.

Mr. AHLQUIST. As of today, I think that is a statement of fact.

Mr. JOHNSON. That is their testimony.

Mr. AHLQUIST. I think that is a statement of fact, as of today, but as the utilization and the need for that water in our Northwest and in the State of Washington grows with our growing population and we bring into production these many, many million acres of ground through reclamation of agriculture and production, it may be that that flow of water will be so regulated, as it properly should be for the control of the river for the production of the hydroelectric power for the dams that have been built, and for the normal functions of that water transportation, et cetera.

Now, if that water and if our development as we set it into the future, does not utilize that water, then we have to take a new viewpoint but as of today, we are in the process of hurriedly studying our needs as well as our resources. It might be that I can expand that a little more.

If we can control the floods through additional flood porgrams, through the Corps of Army Engineers, we may be able to so control that whole flow of the Columbia Basin that the water that is there available today that rushes off to the sea all at once will be held back and available and then we will have to take another look at the picture at what water we have.

Mr. HOSMER. Will the gentleman yield?

Mr. JOHNSON. Yes.

Mr. HOSMER. You are not contemplating closing down Bonneville Dam, are you?

Mr. AHLQUIST. Well, I certainly hope not.

Mr. HOSMER. There is a considerable amount of water that flows through Bonneville Dam, is there not?

Mr. AHLQUIST. The utilization of the water for the hydroelectric that has been built, Congressman, is a must, and must continue.

Mr. HOSMER. What we are talking about is water after it has been through Bonneville, which I estimate—and I do not have the figures. I have asked for them—runs into many millions of acre-feet annually.

As a matter of fact, it would waterlog the whole Pacific Northwest if it couldn't run through there. We are talking about the spent water of the Columbia River. Why in the world would anybody object to having that water taken and put into some use for people instead of running down to dilute the Pacific Ocean?

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Mr. AHLQUIST. We would like to have, in answer to your question, over a period of years ahead of us, while we are trying to make all these tests, a complete projection of the costs in power to move that water to the many thousands of feet of elevation that will be necessary and what that will do to us before this water can be used, Congressman.

Mr. HOSMER. It is going to be paid for by the people of the Pacific Southwest. That will be part of the costs of these people that are slaking their thirst, these people over in the Colorado River Basin, and they are willing to pay for what they have to.

Now, you don't really mean to tell this committee that you would stand on a proposition that water should be wasted into the sea when it can be put to beneficial use someplace? You don't mean that.

This last witness from Idaho said we shouldn't waste water in perpetuity.

Mr. AHLQUIST. I think I tried to make the statement several times that as soon as we could get the study completed as to our potential needs and the potential supply of water at Bonneville, that we would be very happy to entertain and think with you for the development of any programs throughout a basin diversion, but until such time as those studies have been made and we know where we are, we must try to maintain our position for the preservation of our assets.

Mr. HOSMER. I understand, but you are not saying that reasonable proposition, from your language. Of course, your origins have to be protected. Of course, there couldn't be any acquisition of rights against the water needed anyplace in the Pacific Northwest.

Do you know how much water runs into the sea every year now?

Mr. AHLQUIST. I couldn't quote you the figure.

Mr. HOSMER. I think it is either 80 million or 180 million. I'm talking, at most, according to something that was said the other day, of utilizing 5 to 6 million acre-feet, a drop in the bucket compared to the resources of that vast river. That is all we are talking about, and this business of piracy in Oregon and Washington and Idaho, or being made to walk a plank, is just simply not related to the facts.

I know you have been sitting here all these days and so have the rest of us. Every day, we have more than one committee member or witness bringing up this business and flashing it all over about people pirating water. It is obvious from the testimony that it isn't so.

I appreciate a lot of talk has to be done at home about protecting rights and you ought to protect them, but we are trying not to waste water and keep it out of the Pacific Ocean.

Now, if the Pacific Ocean wanted to come in here, that is the only one I could figure out that could legitimately complain.

That is all. Thank you.

Mr. JOHNSON. The point I was trying to make was: Is there enough on the river system to let down enough water to guarantee what little water they are talking about in the way of diversion from the mouth of the Columbia?

I presume that was carefully engineered and proposed and constructed and when they were doing that, I imagine they took into consideration a lot of these water needs and uses above these power controls.

Certainly, I believe in the protection of the origins and the States of origin. We have that in my district but it is no different than those in place on the Colorado at the present time.

The only thing that the lower basin group are entitled to or are going to receive is a certain amount of water. I think your statement, from what I could see, was that the Columbia River at flood stage, and the rest of the rivers in the Northwest, had ample facilities already in place to let down enough water to take care of any amount of diversion we are talking about.

Mr. AHLQUIST. Congressman, I would not be in good faith if I would sit here and argue with the point that, if, as, and when those things are realities that you just mentioned, that you might find that the State of Washington, and our neighbor States, to be most willing to cooperate.

We are not sitting here in any way just anti or pirating. That is not the point. We would like to have the time in order to make the survey that is necessary before we make any decisions and in that, I think we are justified.

Mr. JOHNSON. Well, we are here considering a piece of legislation that would authorize a project on the Colorado River that they have been waiting for for about 25 years, and the need has been there. A certain amount of water is in the river and all of these conditions are met and you will probably not get another piece of legislation in the next 20 years, and that is the purpose of the hearing here to provide or try to prove the feasibility of this project, and we are talking about a very little amount of water, only about 2½ million acre-feet, and I'd hate to see that a stumbling block that would stop this legislation.

Mr. ROGERS. Mr. Burton.

Mr. BURTON of Utah. No questions.

Mr. ROGERS. Mr. Udall.

Mr. UDALL. Mr. Ahlquist, the Pacific Northwest, particularly on the Pacific slope, has how much rainfall a year on the average?

Mr. AHLQUIST. How much?

Mr. UDALL. Yes.

Mr. AHLQUIST. It varies quite widely along the Pacific coast. I don't think I could give you an average but I would say it would be well above probably 50 or 60 inches.

Mr. UDALL. Is there an area in this Nation that has more rainfall?

Mr. AHLQUIST. The water that you are thinking of is landing on the west side of the Cascade Mountains and flowing to the sea and is now being studied by the Puget Sound task force which is mainly promoted by the U.S. Army Corps of Engineers.

That water does not lend itself to out-of-basin diversion.

Mr. UDALL. I did not ask that.

Mr. AHLQUIST. No, but there is a considerable sum of water there, sir.

Mr. UDALL. Do I understand the position of the State of Washington that we in the lower basin, the Colorado Basin, should first make complete studies on all the resources in our own States before we could even start undertaking a study of possible importation from other areas?

Mr. AHLQUIST. I do not think—if I understand you correctly, I believe that was a suggestion of the Office of the President, Bureau of the Budget.

Mr. UDALL. What I am talking about is that this bill provides for the Secretary to undertake a study of means of augmenting the

Colorado, to look at all the possibilities, not just the Pacific Northwest, but all the possibilities, and to look at them simultaneously so that eventually the Congress or someone could choose among the alternatives.

Now, is it your position that you ought to look at each one of these alternatives separately before looking at others?

Mr. AHLQUIST. I think the final answer would be in a very coordinated study coming out of the Columbia North Pacific in which the Bureau of Reclamation is interested and the studies of the utilization within the States and the areas of origin. I think that will move along very rapidly.

Every effort at the present time is being made to coordinate those studies. In fact, I had the pleasure of talking with the divisional engineer about some of——

Mr. UDALL. I was told that the four water agencies of the Federal Government have proposed a study of water resources and uses within the Columbia Basin area and they had the study scheduled to begin in fiscal year 1966. The four departments have fund requests in the budget in the total amount of funds that would be in excess of $5.5 million to run for 4 years with a report in 1970 and participation with the State bodies affected. Is this what you referred to?

Mr. AHLQUIST. That is the North Pacific and the Puget Sound task force. That would be my understanding of it. I have heard that figure.

Mr. UDALL. The bill that is before us simply provides in title II that the Secretary of the Interior is directed to prepare estimates of long-range water supply available in a basin and to investigate the alternative sources, including imports. Do you object to the Secretary of the Interior making that study?

Mr. AHLQUIST. I think it would be very foolish and foolhardy of me to sit here and oppose the study by the Department of the Interior, Bureau of Reclamation. However, I would very much recommend that those of us in the Northwest with the many studies that we have going now be allowed to finish our studies and come up with our answer, in all fairness and honesty, before an agency of Government, whether it be the Bureau or other, would make the final answer without our participating in that study or making any recommendations as to the findings.

Mr. UDALL. I have no quarrel with the proposition that has been stated and restated that the States which are potential sites for exports or imports of water ought to be full participants in, and full consideration given to all their needs, before any serious action is taken.

You said in your statement that you have isolated your potentials and that you have 1½ to 2 million acres in Washington that can still be developed by application of water. What would you assume would be a fair amount of water to take care of these acres in intensive agricultural development and the crops that use the most water for 2 million acres?

Mr. AHLQUIST. You mean——

Mr. UDALL. If you have every possible acre in Washington in cultivation, wouldn't 8 or 10 million acre-feet take care of that?

Mr. AHLQUIST. That would be a fair statement.

Mr. UDALL. If you found twice that much land that you do not know about and took another 10 million acre-feet, you could still have well

over 140 million acre-feet going out the mouth of the Columbia every year.

Mr. AHLQUIST. That is a matter of addition and subtraction but I will stand on my point. I think it is a problem before we get into the diversion of water at Bonneville or other places that we have an opportunity to make these investigations of our future needs before an authorization, concurrent or any other type of authorization.

Mr. HOSMER. Would the gentleman yield?

Mr. UDALL. Yes.

Mr. HOSMER. I think the figures I have carry it a little further, based on the sum of about 175 million acre-feet annually now wasting into the Pacific. If we took 25 million acres or so, at 3 acre-feet of irrigation per acre that would take 75 million acre-feet, and would still leave a hundred million acre-feet wasting.

Now, let's suppose that in addition to all its agriculture, the population of the Pacific Northwest increased to a hundred million people—a hundred million people—their requirements would be approximately 1 acre-foot for five people or another 20 million. Subtract that, and you still have 80 million acre-feet wasting down the river and in addition to that, we are talking about taking the water below Bonneville. That is the only place the study needs to be applicable. How you can get any more water and keep it up above than this 80 million acre-feet is something that is going to take some kind of miracle.

Mr. AHLQUIST. Mr. Congressman, I think you are taking a total figure and the testimony of the gentleman just before me, Mr. Crookham of Idaho explained that the total figure included the flood programs which are of no value to you or anybody else because they cannot be handled.

During the even-flow periods when you might want the water, it might not be available and there has to be——

Mr. HOSMER. You mean the 80 million is not enough padding in there when we are talking about 5 million or so? You are just conjuring up ghosts.

Mr. UDALL. You could take 10 cities the size of New York and irrigate twice as much land and still have 80 million feet left over, and we are talking about studying and maybe someday asking for only 7 percent of that. I get a little disturbed when I see some people in your area saying, "No, you can't do that," and "No, you can't study that. We do not want you to even think about that."

I asked one of the people who took this view, if after a day in the desperately water short areas of my State, in the privacy of my room at home, if I didn't make any official statement, if I could just think about it. It's as though a family with plenty of water is living here. Their grass is green and all needs supplied, and there is a family next door about to die of thirst, and there is a pipe running a big stream of surplus water into a sewer, and this family says we will pay you for it, could we use just a bucket or two, and the answer is "No."

I just have a couple more points and I will conclude.

You know, as I said yesterday in these hearings, each region has advantages. We have half the Nation's copper; Texas and Oklahoma have oil. In the development of this country, no one region has said we are going to sit on what we have, thinking 200 or 300 years from now, we might conceivably need it ourselves.

I once built a house using Washington timber. You do not advocate sitting on your timber and not exporting it on the grounds that maybe you will be needing it in the future.

Mr. AHLQUIST. We are very happy you buy Washington timber versus Japanese plywood.

Mr. UDALL. But the main difference between water and Arizona copper, or iron, and oil and gas, is that these things once you take them, they are gone. But water is a renewable resource. This is a resource that can be replenished and is replenished every year and it seems to me a constructive attitude is much easier to come by than the same kind of attitude on a resource such as iron, copper, or oil that is not renewable.

I hope we can work this out. We recognize your problems. I hope you can recognize ours. We are at the end of the ditch and this project, in comparison with a lot of others, is a small one, and we now find that the passage of this bill is tied in with the upper basin, tied with California, with water studies in the State of Washington, studies in other States, thousands of miles from us, and I am afraid that before we finish the hearings, we will be told we must wait in Arizona until we study the Amazon and the Congo.

I appreciate your problems and I hope you will consider ours, and I hope we can work them out as we go along.

Mr. AHLQUIST. I think you can be sure we will.

Mr. UDALL. Thank you.

Mr. ROGERS. Are you finished, Mr. Udall?

Mr. UDALL. I think I have said enough.

Mr. ROGERS. Mr. Wyatt.

Mr. WYATT. Mr. Ahlquist, in your study in the State of Washington which you are commencing on your water needs, how long a period of time is being studied, do you know?

Mr. AHLQUIST. The period in the future?

Mr. WYATT. Yes.

Mr. AHLQUIST. I haven't as yet seen the final contract in the Washington Water Research Center. On the basis of such knowledge as I have, I think it will take it forward into about 1985 or 1990, and take it into the Oregon study thereafter so there will be something in the way of coordination.

Mr. WYATT. Do you know whether your study will be—do you have a target date?

Mr. AHLQUIST. We will do everything we can by 1969 or 1970.

Mr. WYATT. Now, among the problems that will be studied—I have a couple of questions—I assume will be the unsteady flow of the Columbia River, 50 million acre-feet of water, and it sounds like a great deal of water, but you and I both realize that a huge amount of this total occurs during the flood or winter months; is that correct?

Mr. AHLQUIST. That is correct.

Mr. WYATT. You will be studying what will be available during the low months, what must be maintained in the river to meet the future needs of your State and my State and perhaps of Idaho.

Mr. AHLQUIST. Right.

Mr. WYATT. Also, besides the needs of the two States you have touched upon, we have the channel from the mouth of the river to Portland, barge traffic on the river which requires a certain water level, and we have a very substantial fishery industry and those are

things that will be considered in the Washington study, as I assume it will in the Oregon study.

Mr. AHLQUIST. This is correct, the multiple use of water and its beneficial uses are the basis of the research we will do.

Mr. WYATT. That is all I have.

Mr. ROGERS. Mr. Tunney.

Mr. TUNNEY. Are you opposed to that section of the bill which provides for the construction of the central Arizona project, the actual construction of the facilities to take 1.2 million acre-feet of water from the Colorado River and move it into Arizona.

Mr. AHLQUIST. I think, in my prepared testimony, I made the statement that as to the projects that would be built, and so forth, that are in this bill that we would not. However, I would make this statement and this statement alone, that, if the project were based upon the premise that the water for it was going to be made available from sources outside the Colorado River Basin, then I would have to take a viewpoint of where is the water coming from, who has been identified, what study has been made as to the availability of that water?

As far as the concrete and cement and steel, that is not my premise.

Mr. TUNNEY. Are you opposed to that section of the bill, and I gather you are opposed to that section of the bill which authorizes the Secretary to conduct a study of water surplus areas for the purpose of importing water into the Colorado River Basin?

Mr. AHLQUIST. The bill provides "shall make provision for adequate and equitable protection." It is difficult to speculate what that protection is.

Mr. TUNNEY. Are you opposed to the study by the Secretary of the Interior?

Mr. AHLQUIST. Until such time as we are in a position in our study to cooperate with them and they with us. We do not wish the study to be made as a loner.

Mr. TUNNEY. It is my understanding it would not be a loner because your study is being conducted at the present time.

Mr. AHLQUIST. Until the time we are going well, we would have to oppose it as such.

Mr. TUNNEY. As I understand your testimony, your study will not be completed for approximately 4 years.

Mr. AHLQUIST. That is correct.

Mr. TUNNEY. I assume you have been in the hearing room for the past few days and have heard the testimony that Arizona is already in very, very serious trouble, its water table is way down and as each year goes by, it will get worse and worse, and there are really millions of people having their economies endangered by the fact there is no guarantee of future water for their needs?

Are you saying that you would be willing to perhaps allow these people to suffer the potential danger of economic ruin and not allow just a simple study to be conducted by the Secretary of the Interior to determine if there are water surplus areas for importing water into the Colorado River Basin?

Mr. AHLQUIST. You have made it difficult for me to say anything other than give the answer you want.

However, I did hear testimony to the effect that water would be available—what is it—in 1990 for the project where there would be the situation you have just described, or did I hear incorrectly?

Mr. TUNNEY. You heard that. But I also heard testimony that it would take up to 30 years to build the various aqueducts to bring the water down, and if that is true, that puts it up to 1995, and we have a 5-year period there where we will have water shortages, even if we start now.

Assuming the Secretary of the Interior study takes 3 years, and this bill is passed this year, we will have a long period of time—8 or 9 years—of water shortages.

Mr. ROGERS. Mr. Foley.

Mr. FOLEY. I think in your answers to some of the earlier questions, you stated that the State of Washington has not taken an official position on the proposed National Water Commission recommended by the Bureau of the Budget; is that correct?

Mr. AHLQUIST. I so stated.

Mr. FOLEY. And you are aware, are you not, that is the official position of the administration with regard to the studies proposed in the bill that a National Water Commission be substituted?

Mr. AHLQUIST. I have, and I believe I read that in a letter from the Bureau of the Budget.

Mr. FOLEY. You have only been in the hearing room today; is that correct?

Mr. AHLQUIST. That is correct.

Mr. FOLEY. You did hear the testimony of the representatives from the State of Idaho?

Mr. AHLQUIST. I did.

Mr. FOLEY. And have you had a chance to look at the copy of the Idaho statement?

Mr. AHLQUIST. I have not seen it in writing.

Mr. FOLEY. In that statement, there is reference made to a principle recommended by the representative of the State of Idaho that areas, paraphrasing a bit, of alleged water shortage should first establish conclusively that they are putting all their potable water to its highest feasible use before going outside their areas for additional water. Would you say that generally reflects the attitude of those in the Northwest?

Mr. AHLQUIST. I would agree with you in that statement.

Mr. FOLEY. We have heard a great deal about the great surpluses in the Pacific Northwest and I think the gentleman from Oregon, Mr. Wyatt, just asked us questions relating to the heavy flows from the Columbia in the winter and during the flood season.

Mr. AHLQUIST. In December, January, and February, yes.

Mr. FOLEY. Isn't it true that in the State of Washington for example, in periodic low water, users receive brownouts and existing industry has to curtail its operation because of lack of electrical power?

Mr. AHLQUIST. That has happened in occasional cases and having to do somewhat as to the "where" within our State.

Mr. FOLEY. We have also heard from witnesses and from comments of the members, the statement that the studies proposed in this legislation were not directed to any particular source. The Secretary so testified and many similar statements have been made by others.

Testimony was shown by California representatives of the total availability of 70 million acre-feet and total need of 50 million acre-feet when all possible uses were met.

Do you personally have any doubts today as to where some of my colleagues are looking for possible importation of water?

Mr. AHLQUIST. If I infer your question correctly, I think the prime sources you are looking at are the waters of the Northwest in the Columbia Basin at one point or another.

Mr. FOLEY. Specifically a river?

Mr. AHLQUIST. The Columbia.

Mr. HOSMER. Would the gentleman yield?

I would like to say it hardly makes sense to ask the gentlemen from the Pacific Northwest about some other alternative possibilities elsewhere. Thus there should not be inference made of that kind because questions about the Northwest were directed to them.

Mr. FOLEY. I think the gentleman made the comments.

The State of Washington is presently, as you testified, conducting water studies; is that correct?

Mr. AHLQUIST. Yes.

Mr. FOLEY. And in cooperation with other States in the West they are participating in joint efforts to fully develop water resources in the West; is that right?

Mr. AHLQUIST. We are taking an integral position in the Western States water resources study with the 11 other States.

Mr. BURTON of Utah. Would the gentleman yield?

Does the gentleman or the witness know if these water studies conducted by the State of Washington have a shutoff date—a year or 2 years target date, or 20 years?

Mr. FOLEY. I think the appropriations made by the legislation are made on a biennial basis because of the meeting of the legislature every 2 years. They do not have a particular shutoff date, to my knowledge. I will yield to the witness on that?

Mr. AHLQUIST. There has been no shutoff date. The presently projected date is 1970, as far as our present State programs are concerned.

Mr. FOLEY. I have nothing further.

Mr. ROGERS. Mr. Hosmer.

Mr. HOSMER. I reserved my time, Mr. Chairman.

You refer to the brownouts. As a matter of fact, sometimes the Bonneville power is reduced, isn't it? Are you familiar with that?

Mr. AHLQUIST. I am not in a position to state facts about the dates and times of these brownouts.

Mr. HOSMER. I would like to inform the gentleman that, as a matter of fact, sometimes Bonneville does have to be reduced but not because of lack of water but because of too much water, and it backs up into the turbines and reduces the head. That might be of benefit to the Pacific Northwest.

There is one other thing. You have been in this business for a long time, haven't you?

Mr. AHLQUIST. I have enjoyed participating in water considerations for many years.

Mr. HOSMER. Do you recall at one time they were talking about a Columbia River Basin compact?

Mr. AHLQUIST. I do.

Mr. HOSMER. Around the 1950 period, or somewhere around there.

Mr. AHLQUIST. I do.

Mr. HOSMER. Do you also recall there were studies made at that time relative to the number of uses which might be anticipated in the future for water in the Pacific Northwest by the Corps of Army Engineers or the Bureau of Reclamation?

Mr. AHLQUIST. On abuses and uses of water?

Mr. HOSMER. Potential future use.

Mr. AHLQUIST. That study has been going on for many, many years and constantly having new thoughts.

Mr. HOSMER. I would like to suggest that might be a good place to start. It shouldn't take long to update anything that should be updated.

Mr. AHLQUIST. I think we will use all information available to the Corps of Engineers, Bureau of Reclamation, U.S. Geodetic Survey and all the other agencies. We will not try to duplicate the work already done.

Mr. HOSMER. I do not want to leave the inference that there hasn't been a good number of studies made and that the situation is not pretty well understood at the present time. That is what the gentleman understands, too, that we are not starting something de novo.

I do have another figure here that I didn't have earlier. The existing powerhouse on the Columbia at Bonneville, 558,000 kilowatts, with full gate requires 95,500,000 acre-feet of water per year. So that still leaves a little water below Bonneville to play around with.

Mr. ROGERS. Is there any objection to having that included in the record?

Thank you very much.

The Chair recognizes Mr. Tunney for unanimous consent request.

Mr. TUNNEY. I request unanimous consent to insert at this point in the record a statement by James H. Krieger, chairman of the Southern California Water Conference, and a statement by the Feather River Project Association. I ask that these two statements be incorporated in the record for purposes of these hearings.

Mr. ROGERS. Without objection, the statements will be received under the rules and inserted in the record, unless there is objection.

(The statement by James H. Krieger, chairman, Southern California Water Conference, and the statement by the Feather River Project Association follow:)

STATEMENT ON BEHALF OF SOUTHERN CALIFORNIA WATER CONFERENCE[1]

Secretary Udall testified a few days ago before a Senate Government Operation Committee that "The press of population is in a headlong collision course with our resources."

He was discussing a worldwide predicament, as well as a national, regional, and local one. The bill creating the "Lower Colorado River Basin Project Act," which is before you today, is a bold and imaginative step to meet the headon collision between population and resources in the West. In truth the bill concerns itself with more than the Pacific Southwest. While its immediate or short-term purpose is to relieve an emergent condition in the Lower Colorado River Basin the bill concerns itself with much more than this. Under its terms a study is authorized, and it is envisioned that such a study will disclose water can be feasibly transferred from areas of surplus, the wet Northwest, to areas of deficiency in the Colorado River Basin, and that both such areas will receive great benefits from the irrigation works, industrial and municipal water, and power production facilities.

[1] Made by James H. Krieger, chairman, Southern California Water Conference.

On two occasions the Southern California Water Conference discussed all aspects of this bill with representatives of all of the seven States in the Colorado River Basin. In both meetings there were present State officials and distinguished representatives to speak for the interest of each State. The attorney general of California played a large part in this open discussion, the aim of which was to bring forth honestly and clearly whatever differences might exist. Out of that discussion emerged three principal findings which underlie the support which the conference now gives to the proposed bill. These are:

1. There are large areas in the West that need water which can be found only in watersheds lying across the mountains and beyond the boundaries of the thirsty States.
2. Only that water which is surplus to the areas of origin is needed or requested by the areas of need.
3. The areas of States of origin want and expect something in return for the exportation of water, and the areas of import are agreed that this bounty shall be paid for in full measure by the projects to be built.

Given these three principles, the precise format of any regional bill passed by this Congress is of secondary importance. The target is water, a fair and sensible redistribution of the resources of this land. There is no desire to take from any area the water which it needs for its present and future growth. The redistribution will require large sums of money, but these moneys, as in all reclamation projects, can and will be returned to the United States by the beneficiaries of the project. The flood control, recreation, fish and wildlife benefits to the areas of origin, as well as incidental conservation works for irrigation, municipal, and industrial use, will bring wealth and prosperity to these sections of the country as the exportation works will bring sustained life to the dry areas of need.

The task of meeting the head-on collision between population and resources of which the Secretary spoke can only be met under Federal auspices. Only the Constitution, the laws of Congress, and the decisions of our courts which have sustained the powers of Congress in this respect can serve as a proper foundation for the gigantic regional works contemplated in this bill. Whether the bill as drafted must be amended to meet the particular needs of some of the States appears to the conference to be of secondary importance. There is no problem of equating benefits and costs, or sharing these among the areas included in the plan that bulks so large as the determination to get the studies underway which will initiate the building of the project.

The proposed bill with all of the amendments and variations which will be suggested calls for the building of one project and the study of a regional importation plan which will form the basis for many other projects. Thus, the door to regional development can be pried open. The conference has no misgivings about the authorization of future projects once decisive inventories of supply and demand of the West's resources has been made. Projects will be authorized as certainly as people require water to live. The proposed works in the upper basin States on the Colorado River can then be planned and constructed without fear that the commitment of these States to the lower basin States cannot be met. And the lower basin States can proceed with a full development of their resources which now are clouded with doubt and uncertainty.

For the first time in many years there has emerged a union of interest between all the States concerning water development. eW in the West are not alone with our problems. Many of the solutions to the problem of drought which we have learned may be useful to our neighbors in the East. And the Eastern States are likewise confronted with interstate problems of a magnitude as great as those we are experiencing in the West. The stage is set for a nationwide congressional answer to our problems. The proposed bill hews out a solution to a western problem. We in the conference would give equal study and support to an eastern solution should it be presented to us. Demands and needs of the new people coming to our land are too urgent to await the individual solutions which must come in each section of the country. However, the Water Resources Planning Act of 1965 has set the pace for this type of approach. The proposed bill fits into the national scheme of water development. We in the West are faced with an immediate response to our problems, and the passage of this bill will allow the necessary studies to go ahead, studies which will enable the authorization and building of works to meet the demands of new faces, very possibly in the nick of time.

STATEMENT BY FEATHER RIVER PROJECT ASSOCIATION

The Feather River Project Association strongly supports the principles of the above bills and S. 1019—the Lower Colorado River Basin Act—because this act is well designed to remedy underlying causes of water problems in a number of Western States in the best regional and national interests.

The act provides construction of the urgently needed central Arizona project. It includes the construction of Bridge and Marble Canyon Dams, which are necessary to help defray costs by maximum generation and sale of electric power.

The act provides for a 3-year study of additional water sources outside the Colorado River Basin and a report on feasibility of water importations from such sources. The act provides protection for States of origin.

The safeguarding of California's right, confirmed by the U.S. Supreme Court, to 4.4 million acre-feet per year from the Colorado River is protected against demands of new projects until at least 2.5 million acre-feet of additional imported water is provided by new importation works.

We suggest that such a study must consider possibilities of developing a much larger supply—5 to 10 million acre-feet or more per year for future use in the entire area.

We believe these developments are of such urgency that 3 years is a maximum time to be allotted to study of the western region. We oppose the study being made a part of a lengthy national study as proposed by the Bureau of the Budget.

The latter study might easily exceed even the 5-year period recommended by the Bureau—thereby causing serious losses to Arizona and other Western States.

We likewise oppose omission from the program of Bridge Canyon Dam as recommended by the Bureau of the Budget. The power generation from this dam is essential to make the program financially sound. Its construction causes no significant detriment to Grand Canyon National Park.

We support the proposed Colorado Pacific Regional Water Commission provided such a commission is given powers to review proposals and make recommendations to the President and the Congress thereon. To insure that the Commission shall be responsive to needs of each State, we recommend that its composition include water uses.

We thank the committee for this opportunity to present the views of the Feather River Project Association to the end that this act may, through properly servicing the entire western region, accomplish maximum alleviation of water problems which are a serious threat to this important section of the national economy.

Mr. ROGERS. The Chair recognizes the gentleman from Colorado, Mr. Aspinall.

Mr. ASPINALL. Mr. Chairman, I make the unanimous consent request that at the meeting tomorrow, we proceed with the witnesses, Goslin and Tipton, that their presentation and questioning be limited to 1 hour, following which we will proceed with the presentation and questioning of W. Don Maughan, and the presentation and questioning be limited to 1 hour, that in each instance, the time be divided equally among those members attending at the end of the presentation of the formal statement, and that after them, the Honorable Edwin C. Johnson and his presentation and questioning be limited to 30 minutes, and that after the noon hour we meet again at 2 o'clock and finish the list of nine witnesses in the afternoon.

Mr. ROGERS. Is there any objection to the request?

The Chair hears none and without objection, the subcommittee will proceed in that manner.

The subcommittee stands adjourned until 9:45 tomorrow morning.

(Whereupon, at 5:30 p.m., the meeting was adjourned, to reconvene at 9:45 a.m., on Friday, August 27, 1965.)

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

FRIDAY, AUGUST 27, 1965

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 9:45 a.m., in room 1324, Longworth House Office Building, Hon. Walter Rogers, of Texas (chairman of the subcommittee), presiding.

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

Scheduled this morning, under a unanimous-consent request of the chairman of the full committee yesterday afternoon, Mr. Aspinall, the first witness will be Mr. Ival V. Goslin, executive director of the Upper Colorado River Commission, accompanied by Mr. Royce Tipton, of Tipton & Kalmbach, Inc., to present the conclusions of water availability study.

Now, under the unanimous-consent request, the presentation and the questioning will be limited to 1 hour and the time available for questioning will be divided equally between those members present at the time the questioning begins.

The Chair recognizes the gentleman from Colorado, Mr. Aspinall.

(The following correspondence is placed in the record at this point pursuant to permission granted later in hearing. See p. 536.)

HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C., May 22, 1965.

HON. SAM GODDARD,
Governor, State of Arizona,
Phoenix, Ariz.

DEAR GOVERNOR GODDARD: We are making plans to hold hearings as soon as possible on the southwest water legislation, particularly the central Arizona project. Before setting the date for hearings on this matter, I feel I should have some understanding of the position taken by the different States as to the availability of water for the use of Arizona for its central Arizona project.

Please advise me at your earliest convenience as to the amount of water Arizona feels is availabie, taking into consideration present uncommitted uses in the upper basin, the filling of upper basin reservoirs, and, further, taking into consideration the ultimate use by the upper basin of its share of water under the provisions of the Colorado River compact.

Sincerely yours,

WAYNE N. ASPINALL, *Chairman.*

STATE OF ARIZONA,
OFFICE OF THE GOVERNOR,
Phoenix, Ariz., June 14, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs,
House of Representatives, Washington, D.C.

MY DEAR CHAIRMAN ASPINALL: I am glad to have your letter of May 22 in which you advise that you are making plans to hold hearings as soon as possible on the southwest water legislation, particularly the central Arizona project.

You state that before setting the date for hearings on this matter you feel that you should have some understanding of the position taken by the different States as to the availability of water for the use of Arizona for its central Arizona project. I have approved the procedure whereby the experts of my State have been at work since receipt of your May 22 letter with fellow experts from the sister States in the Colorado River Basin in an attempt to sift out the essential water supply facts, so as to expedite your appraisal of the States positions. Fortunately for all of us, I believe, a consensus has been reached by the States of California, Arizona, and Nevada, and we have hope that in the very near future such consensus will be extended to all seven of the States. I shall advise you at once of agreements that are reached.

In the meantime, I would like to express the fundamental position of the State of Arizona—it is that there will be a water supply adequate to justify the central Arizona project, taking into account the rights as well as the present and prospective uses of all seven Colorado River Basin States; the rights and present and prospective uses of agencies and wards of the Federal Government; and the servicing of the Mexican Treaty.

Arizona is in accord with the statement by Commissioner Dominy on August 27, 1963, when, in testifying on S. 1658, he stated in response to questioning:

"We believe that, assuming that the Supreme Court decision remains as announced, there is certainly water in the river for the central Arizona project of 1.2 million acre-feet under that ruling.

"Senator KUCHEL. Would that be in derogation of the use by California of a continuing 4.4 million acre-feet?

"Mr. DOMINY. No, sir."

Arizona's position also accords with the statement contained in the Bureau of the Budget's letter of May 10, 1965, to Senator Jackson in reporting on S. 75 and S. 1019 in which it is stated, "The Bureau of the Budget and the Department of the Interior believe that the water in the Colorado River should be adequate until at least the year 1990 to meet entitlements under the Supreme Court decision."

Arizona's position also accords with the statement by Secretary of the Interior Stewart L. Udall, as contained in his letter to you dated May 17, 1965, in response to your request for a report on H.R. 4671–H.R. 4706. In his letter, Secretary Udall stated: "Twenty-five years, considering the hydrology of the Colorado River, is about the time remaining before the assured flows of the Colorado River available to the lower basin will diminish to the point where diversions for the central Arizona unit would have an impact on existing uses within the basic allocation of 7,500,000 acre-feet."

Arizona's position is also entirely consistent with the hydrology upon which authorization, appropriation, and power rate analyses for the Colorado River storage project and all of its participating projects have been based.

And one thing I believe we can all agree on—in all of the studies which have been made of the Coolrado River in recent years, there is unanimity of opinion that the waters of the Colorado River are inadequate to meet the long-range future needs of both the upper and the lower basins. It was your letter of November 27, 1962, which brought this general problem into sharp focus. In that letter, you requested the Department of the Interior to submit a statement of the extent of their studies, "and an outline for a coordinated comprehensive pattern under which, in your Department's understanding and view, the Southwest's water and power needs might be satisfactorily provided for." The Pacific Southwest water plan, as set forth in the Secretary's report of January 1964, was the direct result of your letter. It is the plan which subsequently evolved into the Lower Colorado River Basin project.

In Congressmen Rhodes' and Udall's letter to you of June 9, 1965, there were some significant statements that bear repetition concerning Arizona's particular needs and abilities to use water in patterns different from other States.

(1) Recognizing that there is a critical need for importation into the basin to satisfy the water needs of this area, Arizona views the Lower Colorado River Basin project as the essential first step in the development of the coordinated comprehensive pattern for which you have foreseen the need.

(2) The immediate construction of a central Arizona project is an essential step in the development of that pattern because there is in Arizona, today, a critical situation resulting from rapid growth of population, expansion of industry, and depletion of ground-water supplies. Arizona's position is unique in that Arizona is not, at this time, seeking a project which can provide for either the total water needs of the area or a supply which will be unvarying and uniform. Moreover, no part of the supply which Arizona now seeks will be used to build a new economy. Arizona merely seeks to obtain water to ameliorate her present shortages and to permit her to maintain as large a portion of her existing economy as may be possible until a permanent and adequate source of supply can be obtained.

(3) Following construction of a central Arizona project, the area served would have three sources of supply; namely, tributary surface waters, ground waters, and Colorado River water. To the extent that Colorado River water is delivered. the overdraft on central Arizona's ground-water reserve will be diminished. To the extent that the overdraft is diminished, Arizona will be able to conserve her ground waters for future use. If, at some far distant future date, there should, as some have predicted, occur years in which there would not be sufficient water available to maintain a full aqueduct into central Arizona, Arizona would, in those years, be in a position to temporarily revert to her utilization of her ground-water reserves in those years and/or draw upon water stored in lower basin reservoirs. In the interim, Arizona would have been enabled to reduce waste of Colorado River water to the Gulf of Mexico which must inevitably follow for many decades, absent a central Arizona project.

We must make every effort to conserve our precious water resources. Early construction of a central Arizona project is a major step toward such conservation. We, in Arizona, concur with the Bureau of the Budget and the Department of the Interior as hereinbefore noted that this eventuality will not occur for at least 25 years and probably will not occur for a much longer period of time. However, even though the water available to a central Arizona project should decline at some future date, Arizona would at that time be in no worse position than she is today and would, in fact be better off, because she would by that time be that much closer to the ultimate solution of her water problems, which solution must and will inevitably be developed, and she will in the interim have conserved a portion of her groundwater resources which, absent a central Arizona project, would have been consumed.

We, as westerners, recognize that you are one of the outstanding champions of western development based upon conservation, control and use of the limited water resources of our area. We are mindful of the field hearings which were held in Arizona last winter on H.R. 9752, and we are aware and appreciative of the fact that these hearings were the result of your personal interest and efforts in our behalf. We hope that this year your committee will take the earliest opportunity to consider H.R. 4671 and H.R. 4706, which are so importantly related to the welfare of each of the seven Colorado River Basin States. As I stated above I will keep you advised of our progress with the States of the upper basin.

With kindest personal regards, I am,

Sincerely yours,

SAMUEL P. GODDARD, *Governor.*

STATE OF ARIZONA,
OFFICE OF THE GOVERNOR,
Phoenix, Ariz., August 16, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs, House of Representatives, House Office Building, Washington, D.C.

MY DEAR CONGRESSMAN ASPINALL: In further response to your letter of May 22 and in accordance with my telegram of August 3, I enclose a memorandum entitled "Colorado River Water Supply" which has been agreed upon by the engineers of Arizona, California, and Nevada.

Sincerely yours,

SAMUEL P. GODDARD, *Governor.*

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
U.S. HOUSE OF REPRESENTATIVES,
Washington, D.C., May 22, 1965.

Hon. EDMUND G. (PAT) BROWN,
Governor, State of California,
Sacramento, Calif.

DEAR GOVERNOR BROWN: We are making plans to hold hearings as soon as possible on the Southwest water legislation, particularly the central Arizona project. Before setting the date for hearings on this matter, I feel I should have some understanding of the position taken by the different States as to the availability of water for the use of Arizona for its central Arizona project.

Please advise me at your earliest convenience as to the amount of water California feels is available, taking into consideration present uncommitted uses in the upper basin, the filling of upper basin reservoirs, and further, taking into consideration the ultimate use by the upper basin of its share of water under the provisions of the Colorado River compact.

Sincerely yours,

WAYNE N. ASPINALL.

STATE OF CALIFORNIA,
GOVERNOR'S OFFICE,
Sacramento, June 28, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs,
House of Representatives, Washington, D.C.

MY DEAR CONGRESSMAN: Thank you for your letter of May 22, requesting California's views on the availability of water for the central Arizona project and advising that you intend to hold hearings as soon as possible on the southwest water legislation. The news that hearings are in the offing on this vital legislation is most gratifying.

Projections of the future availability of water supply in the Colorado River have differed considerably over the years according to the data available and the purpose at hand. It appears to me that our differences over water supply will intensify in the future to the detriment of the entire West unless the seven basin States are able to reconcile these differences and, more important, can reach accord on a regional program of development which relieves the basin of complete dependence upon the limited supply of the Colorado River.

There is unanimity of opinion that the water supply of the Colorado River is insufficient to meet the potential future demands of the area presently dependent upon it. Similarly, there is virtual agreement that no State within the basin can afford any delay in its water reclamation program—to deny either statement is to court crippling shortages, shortages which will have a material, adverse effect on the future prosperity of the West. Prosperous neighbors reflect benefits to my State, and, therefore, we in California are anxious to cooperate with the States of the Colorado River Basin to resolve our mutual water problems on a regional basis and further the Federal reclamation program.

Therefore, before communicating with you, I thought it wise for my experts to confer with their counterparts in the other States of the Colorado River Basin and attempt to develop for consideration by you and the committee a unified approach to estimating the future water supply of the Colorado and the need for its augmentation. Good progress is being made in this regard. However, the upper basin States understandably desire that studies now underway by their consultant be completed before they adopt any position. Hence, we are unable to present a final, definitive answer to your May 22 letter at this time. My engineers inform me that concerted effort should get the job done by the middle of July.

I respectfully suggest that dates for the hearings be established now so as to place a time limit on these deliberations. Such action would preclude any possibility of misunderstanding as to the urgency of the matter before you and your committee.

Sincerely,

EDMUND G. BROWN, *Governor.*

HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C., July 9, 1965.

Hon. EDMUND G. BROWN,
Governor, State of California,
Sacramento, Calif.

DEAR GOVERNOR BROWN: Thank you very much for your letter of June 28 in response to mine of May 22 relative to the availability of water for the central Arizona project.

I am pleased to have this report on the work which is being carried forward to develop the information I requested.

Best personal regards,

Sincerely yours,

WAYNE N. ASPINALL, *Chairman.*

STATE OF CALIFORNIA,
Sacramento, August 16, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs, House of Representatives,
Washington, D.C.

DEAR CHAIRMAN ASPINALL: As I advised you on June 28, a concerted effort has been made by water experts of the seven States of the Colorado River Basin to proivde you a coordinated response to your letter of May 22, 1965, regarding the water supply of the Colorado River.

I am pleased that accord has been reached in the lower basin and that I am able to enclose a copy of a joint water supply memorandum signed by engineers of the three lower basin States.

Sincerely,

EDMUND G. BROWN, *Governor.*

HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C., May 22, 1965.

Hon. JOHN A. LOVE,
Governor, State of Colorado,
Denver, Colo.

DEAR GOVERNOR LOVE: We are making plans to hold hearings as soon as possible on the Southwest water legislation, particularly the central Arizona project. Before setting the date for hearings on this matter, I feel I should have some undersanding of the position taken by the different States as to the availability of water for the use of Arizona for its central Arizona project.

Please advise me at your earliest convenience as to the amount of water Colorado feels is available, taking into consideration present uncommitted uses in the upper basin, the filling of upper basin reservoirs, and, further, taking into consideration the ultimate use by the upper basin of its share of water under the provisions of the Colorado River compact.

Sincerely yours,

WAYNE N. ASPINALL, *Chairman.*

STATE OF COLORADO,
Denver, June 1, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Interior and Insular Affairs Committee,
Longworth Office Building, Washington, D.C.

DEAR MR. CHAIRMAN: Under date of May 22, 1965, you directed a communication to me requesting the position of the State of Colorado concerning the availability of water for use of the State of Arizona under the proposed central Arizona project. You requested that we take into consideration the filling of the upper basin reservoirs, the ultimate use by the upper basin of its share of water under the provisions of the Colorado River compact, and related questions.

We greatly appreciate the opportunity to comment upon this important matter. We fully understand the urgent need for developing additional water supplies in the Pacific Southwest. It is our earnest desire to cooperate in every

manner with your committee and with the States of the Southwest toward a solution of the future critical water shortages of that area. As you already comprehend better than I, however, such cooperation must be consistent with our own needs, objectives and legal rights here in Colorado.

Our State agency charged with the primary responsibility for protecting and developing Colorado's water resources is the Colorado Water Conservation Board. For some years past, that agency has been engaged in making an intensive study of the central Arizona project and other aspects of the Pacific Southwest water plan as originally proposed. As a result of the studies made by that board, I submitted my comments on the Pacific Southwest water plan to the Secretary of the Interior under date of November 27, 1963. Those comments still reflect the thinking and attitude of the State of Colorado. However, changes to the original plan have been recently proposed which will require some reanalysis of our original studies. We are now in the process of completing this reanalysis.

Because the central Arizona project is of such major importance to the State of Arizona as well as to Colorado and the other States of the Colorado River Basin, we have engaged the services of an internationally known firm of consulting engineers to prepare for us an independent report which will cover, among other things, the questions which you have raised. Our contract with that firm calls for a completed report not later than August 1, 1965. As a result of your inquiry, however, we will attempt to accelerate that completion date. Although the studies completed by our State water board could be made available to you at this time, I feel that in the interests of maximum accuracy such studies should be correlated with those of our consulting firm before submission to you.

I also feel that it is vitally important that we coordinate our studies and position with the other States of the Upper Colorado River Basin through the offices of the Upper Colorado River Commission, if at all pssible. To that end I am advising Colorado's commissioner, Ed C. Johnson, of your request.

Again may I commend the courtesy you have extended to all the States involved with reference to the pending legislation. Our comments will be in your hands not later than August 1, 1965, and possibly prior to that date.

Sincerely yours,

JOHN A. LOVE, *Governor.*

HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C., June 17, 1965.

Hon. JOHN A. LOVE,
Governor of Colorado,
Denver, Colo.

DEAR GOVERNOR LOVE: Thank you for your letter of June 1 relative to my request for Colorado's position on the availability of water for the central Arizona project.

I am particularly appreciative of the fact that Colorado has taken the lead in this matter and that, as a result, the Upper Colorado River Commission has undertaken intensive studies of the water situation in the Colorado River Basin.

I appreciate your efforts to expedite the studies and want you to know that I, too, have asked the commission to complete its studies as soon as possible.

In order to keep you currently advised in this matter, I am enclosing a copy of my letter of June 11 to the House Members from Arizona.

Sincerely yours,

WAYNE N. ASPINALL, *Chairman.*

STATE OF COLORADO,
Denver, August 20, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs,
Longworth Office Building, Washington, D.C.

DEAR MR. CHAIRMAN: By letter dated May 22, 1965, you requested that I state the position of the State of Colorado with respect to the availability of water for use by the State of Arizona through the proposed central Arizona project.

As I wrote to you on June 1, of this year, Colorado—later joined by other upper basin States—secured the services of Tipton & Kalmbach to prepare a comprehensive report on the subject of your inquiry. The staff of the Colorado Water Conservation Board was consulted throughout the preparation of the report and

concurs with the contents thereof. A copy of this report was recently delivered to you.

This report indicates that, without exception, any increase in the use in the lower river must now be made from water apportioned to the upper basin, but now unused by it. As the water development in the upper basin continues to accelerate, the time grows shorter when its water will no longer be available for use on the lower river. The question as to when that time is likely to arrive is set forth in some detail in the report.

The report makes it plain that if water requirements of the Colorado River Basin States are to be satisfied, projects must be provided for to import major amounts of water into the Colorado River Basin from sources of surplus, simultaneously with the central Arizona project authorization.

The Tipton report was considered in some detail at a special meeting of the Colorado Water Conservation Board on August 11, 1965. A resolution setting forth the position of that board and the State of Colorado with respect to further developments of the Lower Colorado River Basin has heretofore been furnished to you.

I expect to appear before your committee later this month in connection with its hearings on H.R. 4671 and will be pleased to supply answers to any further questions you may have on the subject on your inquiry at that time.

Sincerely,

JOHN A. LOVE, *Governor.*

HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C., May 22, 1965.

Hon. GRANT SAWYER,
Governor, State of Nevada,
Carson City, Nev.

DEAR GOVERNOR SAWYER: We are making plans to hold hearings as soon as possible on the Southwest water legislation, particularly the central Arizona project. Before setting the date for hearings on this matter, I feel I should have some understanding of the position taken by the different States as to the availability of water for the use of Arizona for its central Arizona project.

Please advise me at your earliest convenience as to the amount of water Nevada feels is available, taking into consideration present uncommitted uses in the upper basin, the filling of upper basin reservoirs, and, further, taking into consideration the ultimate use by the upper basin of its share of water under the provisions of the Colorado River compact.

Sincerely yours,

WAYNE N. ASPINALL, *Chairman.*

THE STATE OF NEVADA,
Carson City, June 23, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs,
U.S. House of Representatives, Washington, D.C.

DEAR CHAIRMAN ASPINALL: I am happy to acknowledge your letter of May 22, 1965, concerning your plans to hold early hearings on Southwest water legislation, particularly the central Arizona project. You asked that the different States in the Colorado River Basin give you their understanding of the availability of water for the use of Arizona for its central Arizona project.

I have instructed the water experts in this field in my State to work with representatives from the other States in the Colorado River Basin to evaluate and highlight the essential water supply information. It is my hope that the several States can provide you a position of unanimity in order that you may have the best grounds possible for early consideration of water projects in the Southwest and in the Upper Colorado River Basin. Regardless of the outcome of reaching the unanimity of position by the seven basin States I will supply you in the near future with a statement as to Nevada's position as to availability of water for the central Arizona project.

Uppermost in importance to my State of Nevada is the legislation now before you to authorize the southern Nevada water supply project. Legislation to authorize this project has already passed the Senate and I wish to take this opportunity to plead with you to hold hearings on this project at the earliest possible date. The first stage of this project will use only 132,000 acre-feet of the 300,000

acre-feet allocated to Nevada. Therefore, there is no question as to the availability of water to meet the needs of the first stage of this project. The first stage of this project will be self-supporting financially as the revenues available from the water users will return all the cost of that stage of the project with interest. This project is so vitally needed that if its construction is not completed by 1968 grave hazard will be placed on our wholly inadequate underground resource which is sustaining our economy today.

Sincerely yours,

GRANT SAWYER, *Governor.*

HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C., July 9, 1965.

Hon. GRANT SAWYER,
Governor, State of Nevada, Carson City, Nev.

DEAR GOVERNOR SAWYER: Thank you for your letter of June 23 in reply to mine of May 22 relative to the availability of water for the central Arizona project.

I am glad to have this report on the studies which are being conducted to develop the information that I requested.

With respect to the southern Nevada water supply project, I have discussed this project with Chairman Rogers of the Irrigation and Reclamation Subcommittee and it is my hope that he can announce hearings at an early date.

Best personal regards.

Sincerely yours,

WAYNE N. ASPINALL, *Chairman.*

THE STATE OF NEVADA,
Carson City, August 17, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs,
U.S. House of Representatives, Washington, D.C.

DEAR MR. ASPINALL: On June 23, 1965, I wrote to you in response to your letter of May 22 asking that the different States in the Colorado River Basin give you their understanding of the availability of water for use by Arizona for its central Arizona project.

I am disappointed that at this time the seven basin States cannot provide you with a position of unanimity regarding the water supply available in the Colorado River for use by the lower basin. However, I am pleased to transmit with this letter a memorandum, dated August 13, 1965, entitled "Colorado River Water Supply," prepared by water experts of the three lower basin States.

It remains my hope that further meetings among the upper and lower basin States will result in a unanimity of position on this subject by all seven of the basin States.

Very truly yours,

GRANT SAWYER, *Governor.*

HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C., May 21, 1965.

Hon. JACK M. CAMPBELL,
Governor, State of New Mexico,
Santa Fe, N. Mex.

DEAR GOVERNOR CAMPBELL: We are making plans to hold hearings as soon as possible on the Southwest water legislation, particularly the central Arizona project. Before setting the date for hearings on this matter, I feel I should have some understanding of the position taken by the different States as to the availability of water for the use of Arizona for its central Arizona project.

Please advise me at your earliest convenience as to the amount of water New Mexico feels is available, taking into consideration present uncommitted uses in the upper basin, the filling of upper basin reservoirs, and, further, taking into consideration the ultimate use by the upper basin of its share of water under the provisions of the Colorado River compact.

Sincerely yours,

WAYNE N. ASPINALL, *Chairman.*

STATE OF NEW MEXICO,
Santa Fe, May 28, 1965.

Hon. WAYNE N. ASPINALL,
House of Representatives,
Washington, D.C.

DEAR MR. ASPINALL: Thank you for your letter of May 21 inviting a statement of New Mexico's position on the question of the availability of water for the use of Arizona for its central Arizona project. I appreciate the importance of this question and the staff of the New Mexico Interstate Stream Commission is already giving it careful study. I anticipate that the commission staff will consult with representatives of other States of the Colorado River Basin in the course of these studies. I hope to be able to make a more specific reply to your letter in the near future.

Sincerely,

JACK M. CAMPBELL, *Governor.*

HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C., June 17, 1965.

Hon. JACK M. CAMPBELL,
Governor of New Mexico,
Santa Fe, N. Mex.

DEAR GOVERNOR: Thank you for your acknowledgement of my letter relative to the availability of water for the central Arizona project. As you know, the Upper Colorado River Commission has now undertaken the studies referred to in your letter. I have asked that these studies be expedited insofar as possible.

In order to keep you currently advised in this matter, I am enclosing a copy of my letter of June 11 to the House Members from Arizona.

With best personal regards, I am,

Sincerely,

WAYNE N. ASPINALL, *Chairman.*

STATE OF NEW MEXICO,
OFFICE OF THE GOVERNOR,
Santa Fe, August 17, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, House Interior and Insular Affairs Committee,
Washington, D.C.

DEAR MR. CHAIRMAN: To provide information for reply to your letter of May 21, 1965, the Upper Colorado River Commission retained Tipton & Kalmbach, Inc., to make an analysis of the water supply available to Arizona from the main stream of the lower Colorado River. I am advised that you have been furnished a copy of the report of Tipton & Kalmbach, Inc. on this study.

The report makes evident the following points: (1) The central Arizona project water supply depends upon deliveries from the upper basin in excess of the deliveries required by the Colorado River compact; (2) such excess deliveries will be made for a number of years until upper basin uses are fully developed; and (3) without importation a full water supply will not be available for the project for a period of 50 years beyond the projected completion date of 1975.

New Mexico is making further analysis of the Tipton report and the central Arizona project water supply and may wish later to make further reply to your letter or to present testimony on this matter to your committee.

Sincerely,

JACK M. CAMPBELL, *Governor.*

HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C., May 21, 1965.

Hon. CALVIN L. RAMPTON,
Governor, State of Utah,
Salt Lake City, Utah.

DEAR GOVERNOR RAMPTON: We are making plans to hold hearings as soon as possible on the southwest water legislation, particularly the central Arizona project. Before setting the date for hearings on this matter, I feel I should

have some understanding of the position taken by the different States as to the availability of water for the use of Arizona for its central Arizona project.

Please advise me at your earliest convenience as to the amount of water Utah feels is available, taking into consideration present uncommitted uses in the upper basin, the filling of upper basin reservoirs, and, further, taking into consideration the ultimate use by the upper basin of its share of water under the provisions of the Colorado River compact.

Sincerely yours,

WAYNE N. ASPINALL, *Chairman.*

STATE OF UTAH,
OFFICE OF THE GOVERNOR,
Salt Lake City, May 25, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, House Committee on Interior and Insular Affairs,
Washington, D.C.

DEAR CONGRESSMAN ASPINALL: I wish to acknowledge receipt of your letter of May 21, 1965, inquiring as to Utah's position concerning the availability of water for the central Arizona project.

The State is presently making an intensive study of the water supply of the Colorado River and the utilization of Utah's allocation of water from this source.

I would like to give this important matter some additional consideration and I would also prefer to coordinate our studies and the position the State takes with the Upper Colorado River Commission.

I appreciate your need for this information and I wish to assure you that we will comply with your request at an early date.

Sincerely,

CALVIN L. RAMPTON, *Governor.*

HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C., June 17, 1965.

Hon. CALVIN L. RAMPTON,
Governor, State of Utah,
Salt Lake City, Utah.

DEAG GOVERNOR RAMPTON: Thank you for your acknowledgement of my letter relative to the availability of water for the central Arizona project. As you know, the Upper Colorado River Commission has now undertaken the studies referred to in your letter. I have asked that these studies be expedited insofar as possible.

In order to keep you currently advised in this matter, I am enclosing a copy of my letter of June 11 to the House Members from Arizona.

With best personal regards, I am,

Sincerely,

WAYNE N. ASPINALL, *Chairman.*

STATE OF UTAH,
OFFICE OF THE GOVERNOR,
Salt Lake City, August 16, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, House Committee on Interior and Insular Affairs,
Washington, D.C.

DEAR CONGRESSMAN ASPINALL: This is in further reply to your letter of May 21, 1965, concerning Utah's position as to the availability of Colorado River water for use of Arizona for its central Arizona project.

The State of Utah, along with the other Upper Basin States, has given the water supply in the Colorado River careful and thorough study. As you know, the Upper Basin States through the Upper Colorado River Commission have retained the services of Tipton & Kalmbach, Inc., to study this problem.

The States and the Upper Colorado River Commission have participated in the selection of data used in the water supply study and the potential upper basin requirements.

The report of Tipton & Kalmbach indicates that a water shortage on the Colorado could occur as early as the year 1984 or as late as the year 2009. Other studies tend to confirm this general conclusion concerning the water supply of the

Colorado River and its inability to supply all future needs. One such study prepared by engineers from the lower basin based on probability studies generally agree with the conclusions reached by the Tipton & Kalmbach report based on safe yield method of analysis.

The position of the State of Utah is that provisions should be made for the importation of substantial quantities of water from sources outside the Colorado River Basin as part of the authorization of any projects in the Lower Colorado River Basin.

Sincerely yours,

CALVIN L. RAMPTON, *Governor.*

HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C., May 22, 1965.

Hon. CLIFFORD P. HANSEN,
Governor, State of Wyoming,
Cheyenne, Wyo.

DEAR GOVERNOR HANSEN: We are making plans to hold hearings as soon as possible on the Southwest water legislation, particularly the central Arizona project. Before setting the date for hearings on this matter, I feel I should have some understanding of the position taken by the different States as to the availability of water for the use of Arizona for its central Arizona project.

Please advise me at your earliest convenience as to the amount of water Wyoming feels is available, taking into consideration present uncommitted uses in the upper basin, the filling of upper basin reservoirs, and, further, taking into consideration the ultimate use by the upper basin of its share of water under the provisions of the Colorado River compact.

Sincerely yours,

WAYNE N. ASPINALL, *Chairman.*

CHEYENNE, WYO., *May 28, 1965.*

Hon. WAYNE ASPINALL,
Chairman, Committee on Interior and Insular Affairs,
U.S. House of Representatives,
Washington, D.C.

DEAR CHAIRMAN ASPINALL: I have your letter with respect to the central Arizona project.

Wyoming intends to make full use of all the water allocated to it under the terms of the Colorado River compact.

To speculate upon any temporary amounts presently not used would only give false encouragement to those concerned with the feasibility of the central Arizona project.

To reinforce this view, I am enclosing copies of memorandums prepared on this matter by the Wyoming attorney general and State engineer which reflect their views.

With kind regards.

Sincerely,

CLIFFORD P. HANSEN,
Governor of Wyoming.

OFFICE OF THE ATTORNEY GENERAL,
STATE OF WYOMING,
Cheyenne, May 27, 1965.

Memorandum
To: The Honorable Clifford P. Hansen, Governor, State of Wyoming Building.
By: John F. Raper, attorney general.
Re letter of Wayne N. Aspinall, dated May 22, 1965.

I believe that there is only one answer to the inquiry made by the Honorable Wayne N. Aspinall with regard to the availability of water for the use of Arizona for its central Arizona project.

Under the provisions of article III(a)(2), Upper Colorado River Basin compact, Wyoming was allowed in perpetuity, 14 percent of the total quantity of consumptive use per annum of the water made available to the upper basin under the Colorado River compact.

Under the terms and provisions of article XVI, it is specifically provided that:

"The failure of any State to use the water, or any part thereof, the use of which is apportioned it under the terms of this compact, shall not constitute a relinquishment of the right to such use to the lower basin or to any other State, nor shall it constitute a forfeiture or abandonment of the right to such use."

All of Wyoming's 14 percent is committed to future development, under plans now in the course of formulation and as required. Wyoming cannot afford to commit this water which has been dedicated to its posterity.

Even if Wyoming would have no foreseeable use of this water, it would not have any right to commit it to the central Arizona project, because it has a first responsibility to the States of the Upper Colorado River Basin under the terms of the compact. This compact is a sacred document and must at all times be honored.

STATE OF WYOMING,
Cheyenne, May 27, 1965.

Memorandum to: The Honorable Clifford P. Hansen, Governor.
From: Floyd A. Bishop, State engineer.
Subject: Letter dated May 22, 1965, from Representative Wayne Aspinall, concerning hearings on the central Arizona project.

I think Wyoming's reply to Representative Aspinall's inquiry concerning the amount of water available for use on the central Arizona project, should be to the effect that there is no excess water available in the drainage of the Colorado River in Wyoming which could be considered for use on the central Arizona or any other lower basin project. In view of the need for water to fill the upper basin reservoirs, there could not possibly be any uncommitted water available within the upper Colorado River area for many years.

Wyoming has stated many times in the past, and we should consistently reaffirm our position, that we firmly intend to make full use of all the water to which we are entitled under the terms of the Colorado River compact and the upper Colorado River compact. It would be basically unsound to authorize the construction of any project in the lower basin on the assumption that the upper basin States, either individually or collectively, will not fully utilize their compact allocations. The only sound approach for considering the authorization of the central Arizona project would be on the basis of a realistic analysis of the available water supply, not including waters which are already committed and allocated to the States of the upper basin. If it is necessary to import water into the lower basin in order to provide an adequate water supply for central Arizona, then this should be the basis for consideration of its authorization.

Wyoming is progressively utilizing more and more of the water allocated for use within the State. When the Seedskadee project is completed and under development there will be a sharp increase in our consumptive use. Present indications are that construction of the canal system at Seedskadee will be initiated within 1 year and we hope to complete the construction work and proceed with development of the land as soon thereafter as possible.

Additional plans for development within the Green River basin of Wyoming are being formulated, and the feasibility of transbasin diversions from the Green River to other drainages is being considered. There is little doubt that Wyoming will completely utilize all waters to which she is entitled within this drainage, and consequently it is our position that the central Arizona project, and all other lower basin projects, should be evaluated on the basis of the water supply to which they are legally entitled under the terms of the compacts and court decrees, and not on an assumption that they will be able to make use of Wyoming's water.

HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C., June 17, 1965.

Hon. CLIFFORD P. HANSEN,
Governor of Wyoming,
Cheyenne, Wyo.

DEAR GOVERNOR HANSEN: This will acknowledge your letter of May 28 relative to my request for Wyoming's position with regard to the availability of water for the central Arizona project. Wyoming's response, of course, was in terms of Wyoming's legal rights to Colorado River water. I had hoped for a reply

which would take into account the physical situation in the Colorado River Basin.

As you know, the matter of water supply and the problems related thereto are under intensive study by the Upper Colorado River Commission. I have asked that these studies by the commission be expedited insofar as possible.

In order to keep you currently advised in this matter, I am enclosing a copy of my letter of June 11 to the House Members from Arizona.

With best personal regards, I am,

Sincerely,

WAYNE N. ASPINALL, *Chairman.*

CHEYENNE, WYO., *June 22, 1965.*

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs, U.S. House of Representatives, House Office Building, Washington, D.C.

DEAR CONGRESSMAN ASPINALL: Thank you for your letter in regard to the problem of water supply of the Colorado River, and the availability of water for the central Arizona project.

I am informed that the Upper Colorado River Commission is presently reviewing this, not only as to the obligations and legal rights of the Colorado River compacts, but also, the physical aspects of present and future water uses.

The fact is inescapable that the upper basin States, including Wyoming, are limited to future uses by entitlements under the compact.

Since we do have common interests as upper basin States, I am sure that the results of any studies made will confirm this fact and further emphasize our future needs.

Thank you for continuing to keep me advised.

Sincerely,

CLIFFORD P. HANSEN, *Governor.*

CHEYENNE, WYO., *August 24, 1965.*

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs,
U.S. House of Representatives,
Longworth House Office Building,
Washington, D.C.

DEAR CONGRESSMAN ASPINALL: Referring to your letter of May 22 in regard to the availability of water in the Colorado River Basin for the central Arizona project, I wish to supplement my letters of May 28 and June 22 in regard to this matter.

Members of my staff have just had the opportunity to complete their review of the Tipton & Kalmbach report on the Colorado River water supply situation, which report was prepared by the Upper Colorado River Commission.

The Tipton & Kalmbach report indicates that there would be sufficient water available for the central Arizona project until sometime between 1990 and 1995. After 1995 the central Arizona project would either have to get water which the upper river basin States intend to put to use by that time, or it would be dependent on the importation of new water into the basin.

To us it is apparent that importation of water into the Colorado River Basin is imperative if the central Arizona project is to have an adequate water supply when the upper basin States of the Colorado River system have put to use those waters which are guaranteed to them by the 1922 Colorado River compact.

Sincerely,

CLIFFORD P. HANSEN, *Governor.*

HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C., June 21, 1965.

Hon. STEWART L. UDALL,
Secretary of the Interior,
Department of the Interior,
Washington, D.C.

DEAR MR. SECRETARY: The report of the Bureau of the Budget on S. 75 and S. 1019 contains this statement:

"The Bureau of the Budget and the Department of the Interior believe that the water in the Colorado River should be adequate until at least the year 1990 to meet entitlements under the Supreme Court decision."

By the phrase "entitlements under the Supreme Court decision" I assume you mean the delivery from the Colorado River of 7.5 million acre-feet of main stream water to the three lower basin States and 1.5 million acre-feet to Mexico.

I assume that the Department of the Interior has detailed data to support this statement and it is therefore requested that it be furnished the committee in connection with the pending legislation on the Lower Colorado River Basin project. It should include the period of the operation study, the schedule of filling upper basin reservoirs, and the upper basin depletions, including evaporation. The upper basin depletions should be shown by project and year and should include the municipal water projects and allowances for oil shale development. I would like to have this information at the earliest possible date.

I am making the same request of the Bureau of the Budget.

Sincerely,

WAYNE N. ASPINALL, *Chairman.*

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., August 6, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs,
House of Representatives, Washington, D.C.

DEAR MR. ASPINALL: Following is the information requested in your letter of June 21, 1965, to support the statement in the report of the Bureau of the Budget on S. 75 and S. 1019 that "The Bureau of the Budget and the Department of the Interior believe that the water in the Colorado River should be adequate until at least the year 1990 to meet entitlements under the Supreme Court decision."

Support for this conclusion as presented in our report on the Pacific Southwest water plan, dated January 1964, is found in table 16A on page IV–13 of that report. This table shows, during the critical storage drawdown (1930–62, inclusive) under year 1990 conditions, that the annual water available would be 7,155,000 acre-feet for consumptive use by the States of Arizona, California, and Nevada after meeting the Mexican Treaty delivery of 1,500,000 acre-feet to Mexico. In the preparation of this table it was assumed (1) that the upper basin storage reservoirs would be filled by 1975, (2) that the depletions by the upper basin States in 1990 would average 4,900,000 acre-feet per year, and (3) that the period of record 1906–62 is representative of long-term Colorado River flow conditions.

The Supreme Court in *Arizona* v. *California* concluded that the consumptive use of 7,500,000 acre-feet of Colorado River water, per annum, when available in the river below Lee Ferry for use in Arizona, California, and Nevada is apportioned as follows:

Arizona	2,800,000
California	4,400,000
Nevada	300,000
Total	7,500,000

By 1990 it was estimated that Nevada would be using only 150,000 acre-feet of its 300,000 acre-foot entitlement. Consumptive uses in Arizona in 1990, other than for the central Arizona unit, were estimated to be 1,160,000 acre-feet. Subtracting these two figures from 7,155,000 acre-feet would leave 5,845,000 acre-feet to meet California's entitlement of 4,400,000 acre-feet and to provide 1,200,000 acre-feet for the central Arizona unit. Thus, on the basis of the presentation in the report on the Pacific Southwest water plan it can be seen that the availability of 7,155,000 acre-feet of Colorado water in 1990 would be more than sufficient to meet the three States' entitlement to, or projected uses of, Colorado River water.

Even if upper basin depletions under 1990 conditions were increased to 5.1 million acre-feet annually, as we now estimate, there would still be adequate water to meet the lower basin States' entitlements to, or projected uses of, Colorado River water. The currently projected depletions of Colorado River water by the year 1990 are itemized on the enclosed table. A specific item for oil shale

development is not included but water for this and other municipal and industrial uses is covered in the general item labeled "Other net uncommitted."

On June 30, 1965, Lake Mead total surface storage was 17,420,000 acre-feet and the three recently completed upper basin reservoirs contained a total surface storage of 9,423,000 acre-feet. If we assume that in the next 10 years the virgin flow of the Colorado River at Lee Ferry will be equal to the average of the 60-year period, 1906–65, inclusive, the amount in excess of projected upstream and downstream demands would be about 30 million acre-feet in this 10-year period. On that basis the combined contents of the storage project reservoirs and Lake Mead would be about 57 million acre-feet on June 30, 1975. With that amount of water in storage, it is our judgment that we could start cyclical reservoir operations in year 1975.

Should you desire to discuss the above explanation in greater detail we will be glad to do so.

Sincerely yours,

STEWART F. UDALL,
Secretary of the Interior.

Upper Colorado River water uses with projected depletions at Lee Ferry
(without Colorado River imports)

[1,000 acre-feet]

	Present	1975	1990	2000	2030
Colorado:					
Present [1]	1,782	1,782	1,782	1,782	1,782
Silt		6	6	6	
Fryingpan-Arkansas		70	70	70	70
Bostwick Park		3	3	3	3
Fruitland Mesa		13	28	28	28
Savery-Pot Hook		13	26	26	26
Denver expansion		60	135	170	215
Colorado Springs expansion		6	6	6	6
Homestake		25	58	74	74
Englewood		10	10	10	10
Pueblo		3	3	3	3
M. & I. Green Mountain		12	12	12	12
Hayden steam plant	4	8	12	16	16
Total, Colorado	1,786	2,011	2,151	2,206	2,251
New Mexico:					
Present [2]	90	90	90	95	95
Navajo Reservoir evaporation	20	35	30	30	30
Hammond	5	10	10	10	10
San Juan-Chama		65	110	110	110
Navajo Indian		80	170	200	250
Expansion Hogback	10	20	20	20	20
Utah construction	15	40	40	40	40
M. & I. Navajo Reservoir		30	60	60	0
Total, New Mexico	140	370	530	565	555
Utah:					
Present [3]	579	581	581	581	581
Bonneville		70	150	166	166
Upalco		20	20	20	20
Jensen		10	10	10	10
Emery		17	17	17	17
Total, Utah	579	698	778	794	794
Wyoming:					
Present [4]	267	267	267	267	267
Seedskadee		65	145	165	165
Lyman		10	10	10	10
Westvaco and other M. & I.	5	41	41	41	41
Savery-Pot Hook		7	12	12	12
Total, Wyoming	272	390	475	495	495
Arizona existing	11	11	11	11	11
Evaporation storage units	100	660	660	660	660
Total committed at sites of use	2,888	4,140	4,605	4,731	4,766
Less salvage [5]	−101	−139	−157	−162	−164
Depletion at Lee Ferry by present committed uses	2,787	4,001	4,448	4,569	4,602

See footnotes at end of table, p. 464.

Upper Colorado River water uses with projected depletions at Lee Ferry (without Colorado River imports)—Continued

[1,000 acre-feet]

	Present	1975	1990	2000	2030
Current proposals:					
Four County, Colo		10	33	40	40
Uintah Unit, Utah				25	45
Resources Inc., Utah		50	102	102	102
Cheyenne, Wyo			26	31	31
M. & I. in Arizona		39	39	39	39
M. & I. from Ruedi Reservoir		20	33	40	40
Animas-La Plata, Colo.-N. Mex			71	110	127
Dolores, Colo			69	87	87
Dallas Creek, Colo			29	37	37
Subtotal, proposals		119	402	511	548
Other net uncommitted [6]		100	250	350	650
Total depletion at Lee Ferry	2,787	4,220	5,100	5,430	5,800

[1] Includes Collbran, Paonia, Smith Fork, and Florida projects.
[2] Includes additional water for Farmington starting in year 2000.
[3] Includes vernal unit of central Utah project.
[4] Includes Eden project and Boulder Lake (SCS).
[5] Estimated to be 4 percent of uses by projects.
[6] Specific projects not identified represents net depletion at Lee Ferry.

U.S. HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C., June 21, 1965.

Hon. ELMER B. STAATS,
Deputy Director, Bureau of the Budget,
Washington, D.C.

DEAR MR. STAATS: The report of the Bureau of the Budget on S. 75 and S. 1019 contains this statement:

"The Bureau of the Budget and the Department of the Interior believe that the water in the Colorado River should be adequate until at least the year 1990 to meet entitlements under the Supreme Court decision."

By the phrase "entitlements under the Supreme Court decision" I assume you mean the delivery from the Colorado River of 7.5 million acre-feet of main stream water to the three lower basin States and 1.5 million acre-feet to Mexico.

I assume that the Bureau of the Budget has detailed data to support this statement, and it is therefore requested that it be furnished the committee in connection with the pending legislation on the Lower Colorado River Basin project. It should include the period of the operation study, and schedule of filling upper basin reservoirs, and upper basin depletions including evaporation. The upper basin depletions should be shown by project and year and should include the municipal water projects and allowances for oil shale development. I would like to have this information at the earliest possible date.

I am making the same request of the Secretary of the Interior.

Sincerely yours,

WAYNE N. ASPINALL, *Chairman.*

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D.C., August 13, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs,
House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: This is in reply to your letter of June 21, 1965, requesting supporting information regarding the statement in our report on S. 75 and S. 1019 that "* * * the Bureau of the Budget and the Department of the Interior believe that the water in the Colorado River should be adequate until at least the year 1990 to meet entitlements under the Supreme Court decision."

The Bureau of the Budget, as you know, has no independent information on the hydrology of the Colorado River and necessarily must rely on data developed by the Department of the Interior. The Department has, therefore, prepared the additional information you requested and is furnishing it to you by separate letter. This information has been reviewed by the Bureau of the Budget, and we believe it responds to your request.

The Department's letter provides a table on Upper Colorado River water uses with projected depletions at Lee Ferry, which includes projected depletions from irrigation and other developments in the Upper Colorado River Basin which would require future legislation and appropriations for the Federal reclamation program. No commitment, of course, can be made with respect to the administration's future position on these proposed developments in the upper basin.

Please let us know if we can be of any further assistance in this matter.

Sincerely,

PHILLIP S. HUGHES,
Assistant Director for Legislative Reference.

STATEMENT OF IVAL V. GOSLIN, EXECUTIVE DIRECTOR OF THE UPPER COLORADO RIVER COMMISSION; ACCOMPANIED BY ROYCE TIPTON, OF TIPTON & KALMBACH, INC.

Mr. ASPINALL. Mr. Tipton, I have in my possession a study which is entitled "Water Supplies of the Colorado River" by Tipton & Kalmbach of Denver, Colo. Is this the study that you have prepared at the request of the Upper Colorado River Commission?

Mr. TIPTON. It is, sir.

Mr. ASPINALL. What is your profession, Mr. Tipton?

Mr. TIPTON. I am a consulting engineer. I reside in Denver, Colo. I am president of the firm of Tipton & Kalmbach, consulting engineers.

Mr. ASPINALL. How long have you been an engineer?

Mr. TIPTON. I have been in private practice for some 40 years.

Mr. ASPINALL. And have you engaged in engineering operations, services, and so forth, outside of the United States of America?

Mr. TIPTON. Yes, sir. We have performed engineering services in the Republics of Venezuela, Colombia, Ecuador, Peru, South America. I have done consulting work in Chile, South America. Our biggest volume of work at the present time is in West Pakistan.

Mr. ASPINALL. And what is your university?

Mr. TIPTON. University of Colorado.

Mr. ASPINALL. Mr. Chairman, I would ask unanimous consent that the study which I now have and which each one of us has, to which I have made reference, be made a part of the record at this place.

Mr. HOSMER. Reserving the right to object, Mr. Chairman, I, too, share a great deal of respect along with many of the people in the lower basin for Mr. Tipton's expertise in this matter. I only want to ask Mr. Tipton: Are you familiar with the study that was made by the various engineers in the lower basin States?

Mr. TIPTON. I am familiar, I believe, with the study made by Mr. Don Maughan. I have a copy of a report he made which was labeled "Preliminary, subject to revision." I do not have a final draft.

Mr. HOSMER. With respect to that particular report, I assume that it differs somewhat from the report that you have just been questioned about, your own report.

Mr. TIPTON. I don't think it differs insofar as results are concerned. So far as methodology is concerned, it does.

In my studies I have followed what we call the old orthodox method of what I call manhandling historical records, seeing what they show.

Now, we know that they will not recur as they did in the past. So there is a tendency on the part of a good many engineers, including Mr. Maughan, to use probability methods.

Now, in my statement, formal statement, which I will submit for the record, I also discuss probability and I noted only this morning, in a comparison between mine and Don Maughan's preliminary study, there is very, very little difference. I am a little more optimistic than he is.

Mr. HOSMER. Thank you, Mr. Chairman. I withdraw my objection.

Mr. ROGERS. Is there objection to the unanimous consent request of the gentleman from Colorado?

The Chair hears none and it is so ordered.

(The study referred to follows:)

UPPER COLORADO RIVER COMMISSION

WATER SUPPLIES OF THE COLORADO RIVER

AVAILABLE FOR USE BY THE STATES OF THE UPPER DIVISION AND FOR USE FROM THE MAIN STEM BY THE STATES OF ARIZONA, CALIFORNIA AND NEVADA IN THE LOWER BASIN

PART I—TEXT

TIPTON AND KALMBACH, INC.

DENVER, COLORADO

JULY 1965

In Two Parts

Part I: Text

Part II: Appendices

TIPTON AND KALMBACH, INC.
300 INSURANCE BUILDING
831-14TH STREET
DENVER 2, COLORADO
PHONE CHERRY 4-2944

R. J. TIPTON, PRESIDENT
OLIN KALMBACH, VICE-PRES.
JINCY HUNT, TREASURER
F. L. KIRGIS, SECRETARY

CABLES:
ARTIP - DENVER
TIPCOL - BOGOTA
TIPVEN - CARACAS
TIPERU - LIMA
ARTDOR - QUITO
TIPAK - LAHORE

July 30, 1965

Upper Colorado River Commission
355 South 4th East Street
Salt Lake City, Utah 84111

Gentlemen:

During the latter part of May 1965 the firm of Tipton and Kalmbach, Inc., was retained by the Colorado Water Conservation Board to make a study of the water supplies available from the Colorado River for use in the Lower Colorado River Basin, and to determine whether such supplies would be available at all times to satisfy uses by the states of Arizona, California, and Nevada as defined in the decision of the U. S. Supreme Court in the case of Arizona vs. California, et al, 373 U. S. 546. Subsequently, at a meeting with three of the Commissioners and some of their engineering advisors, together with the U. S. representative on the Commission, and the Executive Director of the Commission, and its Chief Engineer, held in the office of the Colorado Water Conservation Board on June 3, 1965, the scope of the studies was discussed and it was concluded that the studies would be sponsored by the Upper Colorado River Commission rather than by the Colorado Water Conservation Board. The studies have been made and a report prepared which embodies the results of the studies.

Drafts of the report were reviewed from time to time by the Commission's Engineering Advisors and by some of the members of the Commission. The suggestions of all of the interested parties have all been considered, and those believed to be consistent with the purpose of the report and the thinking of the author have been adopted.

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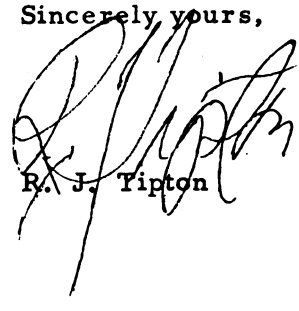
The report consists of two parts: Volume I - Text, and Volume II - Appendices. The text describes the manner in which the studies were made and gives the results of the most pertinent studies and final conclusions based on those results, and the reasons therefor. The Appendices consist of copies of all the detailed river and reservoir operation studies that were considered directly pertinent to the report. The Appendices also contain tables indicating the estimated present depletions on the river by the States of the Upper Division of the Colorado River Basin, and the prognostication by projects of increased depletion in the future, as made by various entities. A master table is included which indicates all known potentials in the Upper Basin and estimates of others which might come into being.

The report is submitted herewith for your consideration.

Sincerely yours,



R. J. Tipton

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Foreword

The reasons for making studies at this time of the available water supplies on the main stem of the Colorado River in the Lower Basin is because of the situation described below.

There are before Congress at the present time a number of bills which would authorize a part of the Southwest Water Plan proposed by the Secretary of Interior. The plan originally contemplated the importation of substantial quantities of surplus water from the streams of the Northwest; this part of the plan has been dropped and is no longer being included in the request for authorization for construction. However, authorization for a study of the contemplated importation is included in the proposed legislation. The principal physical works sought to be authorized are those comprising the Central Arizona Project.

The decision of the United States Supreme Court in the case of Arizona vs. California et al., 373 U.S. 546, considered that the contracts with the Secretary of Interior and the three states of the Lower Basin, Arizona, Nevada and California, and individual entities thereof, constituting an apportionment of 2.8 million acre-feet (maf) of water to Arizona, an apportionment of 0.3 maf to Nevada, and a limitation of 4.4 maf to California effect a valid apportionment of the first 7.5 maf of mainstream water in the Lower Basin. All apportionments by the terms of the contracts are subject to the availability of water. The Master hearing the case recommended that in case of shortage the shortage be divided among the states in proportion to their allocation of water. The Supreme Court in its decree did not follow the recommendation of the Master in respect to the allocation of shortages, but left the matter in the hands of the Secretary of Interior subject to further consideration by the Court or consideration by Congress.

It is understood that the states of Arizona and California have entered into an agreement whereby Arizona will guarantee that her uses will be such as to insure the availability of 4.4 maf of water per year from the main stem to California at all times. The substance of this agreement is spelled out in Bill S 1019 which provides, in essence, a priority to existing consumptive uses by

California of Colorado River water on the main stem up to the amount of 4.4 maf annually, and to existing main stem Colorado River consumptive uses and entitlements in Arizona and Nevada by limiting diversions from the main stem for the Central Arizona Project in any year in which the Secretary of Interior determines there is insufficient main stem Colorado River water available to satisfy the total annual consumptive use of 7.5 maf by the states of Arizona, California and Nevada. This, in itself, would implement one of the suggestions made by the Supreme Court that the matter of allocating shortages among users of the Lower Colorado River Basin be subject to further consideration by Congress. If the Central Arizona Project is authorized and goes into operation, the relevant provisions of Bill S 1019 as now proposed would cause the burden of any shortage in water supplies to be on the Central Arizona Project.

This entire situation poses a problem to the States of the upper division of the Colorado River Basin. Uses in the Upper Basin may not have progressed to the point that all waters apportioned to it by the Colorado River Compact, or to the limit imposed by nature, are being used at the time the Central Arizona Project goes into operation if it is authorized and goes to construction. In other words, there might be some unused water destined for use in the Upper Basin passing Lee Ferry which, if used in the Lower Basin, would pose a problem when those waters subsequently were needed by projects in the Upper Basin. Actually, at the present time some of the uses in the Lower Colorado River Basin on the main stem are being made only because of unused flows in the Upper Basin passing Lee Ferry.

The present studies therefore appeared desirable to enable the Commission to take stock and see what problems might arise because of the situation, and in order that policies and procedures may be developed.

At the meeting of June 3, 1965 of certain members of the Commission and its Engineering Advisors, these studies were authorized and their scope discussed. As the studies progressed, two other meetings were held with the Engineering Advisory Committee to the Commission, at which time the Commissioners from

some of the states were also present. Frequent conferences were held with Mr. Ival Goslin, Executive Director of the Commission; some were had with Mr. Felix Sparks, Director of the Colorado Water Conservation Board, and his technical staff. Mr. Cecil Jacobson, Chief Engineer of the Commission, spent some time in the office of Tipton and Kalmbach, Inc., assisting the studies.

The studies were made under the direction of R. J. Tipton. He is solely responsible for the conclusions derived from the studies contained in the report. During the time the studies were being made and drafts of the report were being prepared, the drafts of the report were reviewed by the groups at the meetings mentioned above. Editorial changes suggested by representatives of the Commission for clarification purposes were accepted; other suggestions more substantive in character were not accepted if they were not concurred in by the author of the report.

The author wishes to express his appreciation for the constructive advice afforded by various representatives of the Commission and its Engineering Advisors during the course of the studies and preparation of this report.

Summary

Based upon the recorded historic flow of the Colorado River, it appears that nature has decreed that the river will not supply enough water to support the apportionment made by the Colorado River Compact to the Upper Basin; an amount of 7.5 maf for consumptive use from the main river to the states of Arizona, California and Nevada; and the allocation to Mexico by the Mexican Water Treaty of 1944. The U.S. Supreme Court in Arizona vs. California, et al., 373 U.S. 546, agreed with the Special Master that the Secretary's (of Interior) contracts with Arizona for 2.8 maf and with Nevada for 0.30 maf of water, together with the limitation of California to 4.4 maf effect a valid apportionment of the first 7.5 maf of main stem water in the Lower Basin. All those contracts provide for the stipulated deliveries of water subject to the availability thereof. The Court recognized that shortages might occur. Where the words "apportionment" or "apportion" appear hereinafter relating to the beneficial consumptive-use values of the states of Arizona, California and Nevada, the word or words mean what the Supreme Court decision said as cited above. The use of the words does not imply an absolute amount of water but rather a limitation of use subject at all times to the availability of water.

With the active storage capacity available to the Upper Basin, including reservoirs of the Upper Colorado River Storage Project now operating or under construction, beneficial consumptive use (depletion at Lee Ferry) in the Upper Colorado River Basin, including reservoir evaporation, is limited to 6.3 million af (maf) per annum, because of the required delivery in successive 10-year periods of 75 maf in accordance with the terms of the Compact. The net depletion, excluding reservoir evaporation, would be 5.6 maf.

If deliveries at Lee Ferry were greater than 7.5 maf per year (75 maf in successive 10-year periods) to insure more power generation and financial support for the Upper Basin development, the net depletion at Lee Ferry by Upper Basin development would be less than the amounts indicated above. These depletions are

less than the 7.5 maf apportioned to the Upper Basin which, in turn, are less than the ultimate total requirements of the Upper Basin.

The relation between Upper Basin depletion and the reservoir storage capacity required to insure its availability is shown in Figures 1 and 2, the first of which is based on deliveries at Lee Ferry of 7.5 maf per year, and the second on an arbitrarily assumed delivery at Lee Ferry of 8.25 maf per year.

The principal studies described herein are based on study periods 1914 through 1964 and 1921 through 1964. The period 1930 to date has been used by the Department of Interior and by the Colorado River Board of California to determine the amount of water available for use from the lower river by Arizona, Californot and Nevada. No appreciable difference exists in the basic data used for the various studies, such as the principal one of virgin flow at Lee Ferry for various years. Some difference does exist, however, in respect to the net losses of water between Hoover Dam and Mexico, which is discussed subsequntly.

All studies disclose without exception that any increase in the use on the lower river must now be made from water apportioned to the Upper Basin, but now unused by it. Actually, at present the aggregate demand on Lake Mead is close to 9 maf per year. It is apparent that even present uses on the lower river are dependent upon significant amounts of water released from Lake Powell in excess of those required by the Colorado River Compact.

As the Upper Basin develops there will arrive a time when its water will no longer be available for further uses on the lower river. The question is when will that time arrive. To forecast this, studies have been made using various assumed rates of depletion in the Upper Basin and various assumed rates of releases from Lake Powell. All of the studies indicate that substantial shortages, amounting to more than 1.0 maf per year before the end of the present century, will exist in the supplies required to meet total uses of 7.5 maf by Arizona, California and Nevada and to meet a delivery of 1.5 maf of water per year to Mexico. The period

would be extended somewhat if Lake Mead were depleted to absolute dead storage, during long periods of drawdown.

A period of low water supply in the Colorado River Basin, such as existed from 1930 to 1964, will occur again at some time, or one which might be more severe could occur. Under such conditions, minimum releases from Lake Powell would be necessary. Simple arithmetic indicates that there will not be enough water on the lower river to sustain a delivery of 7.5 maf for the states of Arizona, California and Nevada, and to take care of the Mexican burden, as shown by the following analysis:

Lower River Requirements:			
1.	Beneficial consumptive use by Arizona, California and Nevada	7.500 maf	
2.	Mexican Treaty Deliveries	1.500	
3.	Reservoir Evaporation	0.730	
4.	Losses below Hoover Dam	0.810	
	Total Requirements		10.540 maf
Water Supply for the Lower River:			
1.	Delivery at Lee Ferry	8.250 maf	
2.	Net Inflow Lee Ferry to Lake Mead	0.675	
3.	Net Inflow from Bill Williams River	0.055	
4.	Release from Lake Mead (drawdown to rated power head)	0.365	
	Total Water Supply		9.345
	Deficiency		1.195 maf

Although an arbitrary initial delivery of 8.25 maf has been assumed in some of the studies, the amount delivered by the Upper Basin eventually will approximate 7.5 maf per year. When the delivery from the Upper Basin is 7.5 maf instead of 8.25 maf, then the deficiency will be 1.945 maf per year. If the provisions of Section (b) of Article IV of the Colorado River Compact are invoked, Lake Mead could be drawn down to absolute dead storage which would provide about 0.60 maf additional water per year which includes the decrease in evaporation from Lake Mead. In this case the above deficiencies would be reduced by about 0.60 maf.

The obvious conclusion is that a firm water supply is not available in the Colorado River to satisfy a basic beneficial consumptive-use requirement of 7.5 maf from the main stem by

Arizona, California and Nevada, plus delivery of 1.5 maf of water to Mexico. If these requirements as well as Upper Basin requirements are to be satisfied, projects must be authorized and constructed to import major amounts of water into the Colorado River Basin from sources of surplus. Such importation is important to both the Upper and Lower Basins.

Studies Made

Study Period

A fundamental item in any study of the Colorado River, taking into consideration the Colorado River Compact, the Mexican Water Treaty, and the Supreme Court decision in the case of Arizona versus California, is the recorded flow of the Colorado River at Lee Ferry and the virgin flow estimated therefrom. Measurements of the Colorado River at Lee Ferry were not begun until the spring of 1921. They have been continuous since that time. However, during the negotiations of the Colorado River Compact of 1922, and later during the studies of the hydrology of the Boulder (Hoover) Canyon Project in the late 1920's, estimates of the flow at Lee Ferry were made, based upon measurements of the river at Yuma and Topock and supplemented by estimates made on the basis of recorded flow of major tributaries above Lee Ferry when such records became available. These estimates extended back to the year 1896.

For the purpose of this report, river and reservoir operation studies were made both for the period 1914 through 1964 and for 1921 through 1964. The beginning year of 1914 was used because at the time the Upper Colorado River Compact was under consideration the Engineering Advisory Committee of the Upper Colorado River Compact Commission, in making an exhaustive study of the estimates of the flow of the river, concluded that estimates of flow prior to 1914 should not be used. The period 1921 through 1964 has been used because the actual records of measured flow at Lee Ferry first became available in 1921. For some studies the period 1930 through 1964 was used. Two studies were made based on the period 1906 through 1964.

For the period beginning in 1896 the estimated virgin flow at Lee Ferry was less than the long-time average until 1903. The period following 1903 includes a generally increasing estimated flow at Lee Ferry up to 1930. From 1930 through 1964 the flow of the river has gradually declined, the 35-year period from 1930 through 1964 being the lowest period of record.

No matter what periods between 1896 through 1964 are used for particular studies, the period of low water supply beginning in 1930 and ending in 1964 cannot be avoided. It would be optimistic to assume a firm water supply any greater than that which existed during the period 1930 through 1964 plus whatever water might have been available from holdover storage at its beginning. This period represents 35 years of reservoir drawdown, which is an exceedingly long time.

The accuracy with which future water supplies and demands can be predicted depends in large measure on how closely the future flow of the river will correspond to that assumed for the purpose of the studies. It must be recognized that the magnitude and sequence of flows which will occur during the next 44-year period will not duplicate, and may not even approxiate, the magnitude and sequence of flows which occurred during the past 44 years. There is evidence to indicate that river flows along with other phenomena associated with and dependent upon climatic and meteorological conditions go through periods of high occurrences followed by periods of low occurrences. However, the occurrences do not follow any regular or cyclic pattern and there is no known method for establishing or predicting the extent or magnitude of the limits of the succession of high and low occurrences. Examination of tree-ring records in the southwestern part of the United States dated back as far as the year 1250 illustrate the ups and downs in precipitation caused by nature, without giving any evidence whatsoever of regular or predictable cycles.

Increased Depletions in the Upper Colorado River Basin

A variable having an effect on the outcome of the studies is the estimated rate at which consumptive use in the Upper Colorado River Basin will increase. Figure 3 illustrates the estimates made by the State of Arizona, recent estimates made by the U.S. Department of Interior (U.S.I.D.), those by the Colorado River Board of California, (C.R.B.), and those by the States of the Upper Colorado River Division. It may be noted that there is a wide range in the estimates of Upper Basin consumptive uses which might take place in the future. Arizona's low estimate and the

higher estimated of the States of the Upper Colorado River Division bracket the others shown.

Arizona's appraisal of the possibility of increased uses in the Upper Basin may be contrasted with the statement made by the U.S. Department of Interior in 1959 in a publication entitled "The Colorado River Storage Project and Participating Projects" which is quoted below:

> *"The Upper Colorado River Basin may have been late in exploration, slow in settlement, and limited in development, but the Upper Basin boldly faces a new future which will see its many resources utilized on an ever-widening scale.*
>
> *The future of the Upper Colorado River Basin lies in its resources. The most important resource is water—water which is corralled and put to work rather than allowed to plunge wildly toward the sea, wasting its energy in the rapids of the colorful canyons.*
>
> *The Upper Colorado River Basin has the water—it has land to be irrigated—it has canyons with dam sites where much water can be stored and where hydroelectric power can be produced —it has petroleum, coal, and natural gas—it has oil shales and rare hydro-carbons—it has mineral resources of uranium and other atomic ores, of many strategic metals, of phosphate and other needed nonmetallic ores.*
>
> *But, these many resources are largely dormant—sleeping giants yet to be awakened. The future will see the use of Upper Basin resources on an ever-widening scale under a development program which will bring together the resources of water, power, land and minerals . . .*
>
> *The future begins to unfold for the Upper Colorado River Basin."*

The Arizona estimates have not been used in any of the present studies because they are considerd to be unrealistically low; they do not account for all projects under construction or now authorized for construction.

The prime factor which will affect the lower river water supplies to meet 7.5 maf of consumptive uses from the main stem in the states of Arizona, California and Nevada, will be the amount of the deliveries at Lee Ferry from the Upper Basin.

Colorado River Operation Studies

In addition to the studies made to determine the limits of depletions by the Upper Basin based on the provisions of the Colorado River Compact and available water supply, several river and reservoir operation studies were made involving the entire main stem of the Colorado River. The details of these studies are shown in the tables appearing in the Appendices to this report.

From the present to 1975, the year in which the first diversions for the Central Arizona Project are assumed, all studies were operated on a common basis. The starting content of the main river facilities is that which is estimated by the Bureau of Reclamation to occur on September 30, 1965. With study sequences commencing with either 1914 or 1921, no difficulty was experienced in filling all the reservoirs and all were spilling in 1975. For all practical purposes, the total filling of both upper and lower systems was simultaneous. A similar condition was obviously impossible under study sequences beginning with the water year 1930.

In 1975 a draft on the Upper Basin storage was sustained corresponding to alternative constant annual releases of 8.25 maf and 8.75 maf. Releases at Lee Ferry corresponding to the U.S. Interior Department estimates and to those of the Colorado River Board of California were also used for some of the studies.

Since generation of power and maintenance of rated head is important in both basin systems, the levels of rated head were used as cut-off points in several of the studies. However, a question could be raised as to whether the storage in Lake Mead could be held at rated power head and the consumptive-use requirements at that time be shorted. This would make domestic and agricul-

tural uses subservient to power. Article IV, Section (b) of the Colorado River Compact provides:

> "*Subject to the provisions of this compact, water of the Colorado River System may be impounded and used for the generation of electrical power, but such impounding and use shall be subservient to the use and consumption of such water for agricultural and domestic purposes and shall not interfere with or prevent use for such dominant purposes.*"

The foregoing provision if strictly enforced would prohibit the holding of water in storage for the generation of power if it were needed for consumptive-use purposes.

Recognizing this contingency other studies called on storage down to a content of 8.0 maf in Lake Mead (equivalent to the level of the Nevada intake) whereas still other studies withdrew all water stored in active capacity.

Alternative schedules of depletions were used in the various studies. Included were the depletions estimated by the States of the upper division, those of the Colorado River Board of California, and the recent estimates of the Bureau of Reclamation.

Future Uses in the Lower Basin

It is not within the purview of this report to apportion shortages among the states of Arizona, California and Nevada. However, for the purpose of the studies certain assumptions were made of present and future uses by those states. It was assumed that the presently constructed projects in Arizona diverting from the Colorado River, including projects to irrigate Indian lands, will ultimately beneficially consume 1.23 maf. Inflow-outflow records indicate that at the present time the consumption by Arizona projects using Colorado River water is close to one million af per year. However, additional drainage will be required to prevent the water table from rising to the point where lands would become waterlogged on the Gila Mesa, Yuma Valley, and the North Gila and South Gila projects. Applications of water on the

mesa are causing the water table to rise beneath the Yuma Valley. It is estimated that substantial amounts of water per year should be withdrawn from the ground water in this area to prevent any further rise in the water table. Additional amounts must be withdrawn from the water table under the South Gila and North Gila projects to prevent further rise in the water table in those areas. It is assumed for the purpose of the present report that, as additional drainage works are installed, additional diversions will be made from the river so that the net beneficial consumptive use will remain at about one million af per year until 1975, and with full development, aside from the Central Arizona Project, will attain 1.23 maf in the year 2000.

It is estimated that the beneficial consumptive use of water by projects using Colorado River water in Arizona, aside from the Central Arizona Project, in 1990 will be about 1.16 maf. Should the Central Arizona Project be authorized at an early date, it is assumed that it would go into operation by 1975. The last report on the Central Arizona Project indicated that its operation would result in a beneficial consumptive use of 1.2 maf per year. This, added to the 1.23 maf for the other projects on the river, results in a total of 2.43 maf, leaving for Arizona a balance of 370,000 af per year to equal the basic 2.8 maf beneficial consumptive use from the main stem apportioned to Arizona. The present studies assume that this remaining 370,000 af of water would either be used on the Central Arizona Project or some place else in Arizona by the year 2000.

It was assumed that uses in Nevada would increase gradually from present uses of 25,000 af per year to 300,000 af per year in the year 2000.

If and when uses in Arizona and Nevada increase to the extent that shortages might occur, it is assumed that California's present beneficial consumptive use would be curtailed to 4.4 maf per year. The time when this curtailment would occur is not known. For the purpose of this study it was assumed that the uses by California would be curtailed to 4.4 maf per year prior to the time storage in Lake Mead would be insufficient to support all downstream main-stem demands without dropping below rated power head.

Depletion Factor

A depletion factor was used to modify the assumed basic depletions by the States of the upper division of the Colorado River Basin. The philosophy of the depletion factor is based on the fact that during periods of low water supply in the Upper Basin all projects in operation will not receive a full water supply. Most of them will not have reservoirs, and some that have reservoirs will not have water in some years to fill those reservoirs. No rational means have been derived for varying the estimated uses by the States of the upper division because of varying water supply. The means used by the U.S. Bureau of Reclamation in its past studies, which it is assumed it is still using, are based on the assumption that the uses would vary from the normal use in a particular year by one-half of the percent that the virgin flow at Lee Ferry in that particular year varies from a long-time average of virgin flow. For the present studies the depletion factor using the U.S.B.R. formula was based on the mean virgin flow for the years 1921 through 1964, except for studies starting in 1906.

River Losses Below Hoover Dam

The Department of Interior in previous studies assumed gross losses below Hoover Dam to be 1.27 maf per year (U.S.I.D. Report on the Southwest Water Plan dated January 1964). The U.S. Bureau of Reclamation has estimated future reductions in waste, salvage of water by channel improvement, salvage of water from phreatophytes and increased drainage return from the Yuma area in the amount of 680,000 af made up of the following items:

Reduction in waste of water by operation of Senator Wash Reservoir	170,000 af
Salvage of water by channel improvements	190,000 af
Salvage of water from phreatophytes	100,000 af
Increased drainage return from the Yuma area	220,000 af
Total	680,000 af

The U.S. Bureau of Reclamation then assumed the net loss of water below Hoover Dam, after the foregoing savings and salvages are effectuated, will be 590,000 af, (1,270,000 af minus

680,000 af). There is no good reason to question the above-mentioned amounts of water estimated to be saved by salvage, drainage, and operation of Senator Wash Reservoir. However, it is believed that the 220,000 af of additional drainage return from the Yuma area cannot be considered as an item in reducing the losses below Hoover Dam, which will reduce the draft on Lake Mead. The 220,000 af does not represent "new water" made available to the Basin, such as the water salvaged because of channel improvements and nonbeneficial consumption by phreatophytes. The 220,000 af is an increment of the original water supply that has been stored in Lake Mead and subsequently diverted by canals out of Lake Mead releases to supply Arizona projects. This amount of water will represent a credit to Arizona and will not in the end reduce the draft on Lake Mead. Therefore the value that is being used in the present studies for net losses below Hoover Dam is 590,000 af plus 220,000 af, or 810,000 af.

The actual amount of water which might be recovered by additional drainage of the Yuma Valley and Yuma Mesa areas is not known at the present time. It is believed, however, that the potential can be as great as 220,000 af. The actual amount recovered may depend somewhat on the outcome of the review of the U.S.I.D. definitive plan for the additional drainage works by the U.S. Commissioner of the International Boundary and Water Commission between the United States and Mexico. Because this item of return flow is not considered in this report as one which brings to the river "new water" thereby decreasing the demand on Lake Mead, whatever the ultimate amount might be will not affect the conclusions reached in this report.

In respect to the Bill Williams River, the U.S. Bureau of Reclamation assumes it will be depleted down to 55,000 af. This amount of inflow below Hoover Dam has been assumed for the purpose of this report.

The above may be compared with the studies made by the Colorado River Board of California which estimates the net losses after accounting for Bill Williams River under present conditions to be 1.2 maf. It estimates a future salvage of 200,-

000 af, leaving a net loss of 1.0 maf. This spread in difference in estimates of future losses below Hoover Dam is given for information. No one can precisely estimate what such losses will be in the future. They depend on the amount of wastes that can be reduced, and the amount of salvage that can be effectuated by the program that is being carried out by the Department of Interior. For this report, as stated above, 810,000 af has been adopted to represent losses below Hoover Dam after the salvage program has been completed.

Storage in the Basin Reservoir

For the present studies the initial usable content of the Upper Basin reservoirs was assumed to be 3.099 maf and of Lake Mead 16.453 maf, which is the anticipated usable content as of September 30, 1965, including bank storage. Maximum usable capacity of Upper Basin reservoirs was assumed to be 29.0 maf, and 29.25 maf for Lake Mead including bank storage. In addition, 1.2 maf was reserved in Lake Mead for flood control.

The net gain between Lee Ferry and Hoover Dam was phased to correspond to recent estimates by the U.S. Bureau of Reclamation.

For Study No. 3 the Upper Basin depletions, deliveries at Lee Ferry, net gain between Lee Ferry and Hoover and losses from Hoover to Mexico corresponded to those of the Colorado River Board of California.

Studies No. 5 and 23 thru 34 differed from the other studies in that the total maximum Upper Basin reservoir content was assumed to be 32.0 maf and the depletion factor was unity. This assumed all existing reservoirs in the Upper Basin and the reservoirs of the Upper Colorado River Storage Project would operate more or less as a unit to make available water to the Upper Basin consumptive-use projects, and to enable the States of the upper division to make the required deliveries at Lee Ferry.

Results of the Studies

Upper Basin

To determine the amount of maximum depletion (beneficial consumptive use) under the terms of the Colorado River Compact that can be made by the States of the upper division of the Colorado River Basin, river and reservoir operation studies were made for the period 1903 through 1964 and for the period 1921 through 1964 to determine the relationship between required storage capacity and depletion. In the studies various amounts of depletion were assumed ranging from 3.0 maf per year to 6.79 maf per year. The results of the studies for the two study periods were identical.

Two sets of studies were made, one assuming an annual delivery at Lee Ferry of 8.25 maf and the other assuming an annual delivery at Lee Ferry of 7.50 maf. The following table indicates the results of these studies. The results are depicted graphically on the two curves shown in Figures 1 and 2. The detailed operation studies are given in Appendix C.

Even with an annual delivery at Lee Ferry of only 7.50 maf, to attain the total beneficial consumptive use (7.5 maf) allocated to the Upper Basin by the Colorado River Compact would require over 72.0 maf of active storage. This storage potential does not exist. It should be noted also that if it did exist, about 1.4 maf of depletion would be because of evaporation from the storage reservoirs, leaving a net of 6.0 maf for beneficial consumptive use by projects within the basin.

STORAGE CAPACITY AND UPPER BASIN DEPLETIONS

Regulated Firm Flow	Required Storage	Estimated Evaporation	Available Upper Basin Depletions for Annual Deliveries at Lee Ferry of 8250 Total	8250 Net	7500 Total	7500 Net
11,250	6,766	250	3,000	2,750	3,750	3,500
12,250	10,766	350	4,000	3,650	4,750	4,400
13,250	20,388	550	5,000	4,450	5,750	5,200
13,951(a)	35,370	820	5,701	4,881	6,451	5,631
14,250	45,536	980	6,000	5,020	6,750	5,770
15,040(b)	72,551	1,380	6,790	5,410	7,540	6,160

(a) Mean Virgin Flow 1921-1964
(b) Mean Virgin Flow 1903-1964
All values in 1,000 acre-feet

In 18 of the 34 studies, details of which are continued in Appendix B, assumed future depletions (beneficial consumptive uses) were those estimated by the four States of the upper division. These studies all show an impossible situation; before the end of the study period in each case, beneficial consumptive uses would begin to be encroached upon and in some cases all such uses would be essentially extinguished to satisfy the Colorado River Compact provision that depletions at Lee Ferry shall not exceed 75 maf in successive 10-year periods. The studies were made and their results presented, by design, to show the danger of overdevelopment with present water supplies, and to demonstrate dramatically the results of those studies which are shown on figures 1 and 2, Upper Basin Depletion vs. Required Reservoir Capacity.

If credit for deliveries above 7.5 maf per year at Lee Ferry were taken, in no case would more than one year be gained before encroachment on beneficial consumptive uses would commence.

Lower Basin

It has been pointed out that the most important factor affecting the water supplies of the main stem of the Colorado River in the Lower Basin is the amount of water passing Lee Ferry from the Upper Basin. A certain amount, in addition to the Compact obligation of 75 maf in successive 10-year periods, will be required to be delivered out of Lake Powell for a period of time to generate sufficient energy, the sale of which will be relied upon to aid in the financing of additional projects in the States of the upper division of the Colorado River Basin. One series of studies contemplated a delivery of 8.25 maf per annum at Lee Ferry. It is understood that the Secretary of Interior and some engineers of the U.S. Bureau of Reclamation consider the release of such an amount of water through the power plants at Glen Canyon Dam to be sufficient to provide funds for substantial additional development in the Upper Basin. Another series of studies was made assuming a release of 8.75 maf per annum from Lake Powell. It

is assumed such a release would be more than adequate to provide funds through the sale of electric energy to aid in the financing of additional projects in the Upper Colorado River Basin.

In one group of studies the depletion schedule of future Upper Basin development as assumed by the U.S. Department of Intrior (U.S.I.D.) was used; in another set the depletion schedule as estimated by the States of the upper division of the Colorado River Basin was used. In each set of studies three conditions of drawdown of Lake Mead were assumed; the first was a drawdown which would result in 16.453 maf remaining in storage as representing the rated power head. The second assumed a drawdown which would leave in storage 8.0 maf which is the minimum content at which the present intake for the City of Las Vegas, Nevada, could be suppled. The third condition of drawdown assumed Lake Mead would be depleted to absolute dead storage.

Two study periods were assumed for the above series of studies; first, the study period 1914 through 1964, and second, the study period 1921 through 1964. For the study period 1914 through 1964, 32.0 maf of storage capacity was assumed in the Upper Basin and a depletion factor of unity was assumed.

Tables No. 1 and 2 attached hereto indicate the results of the two sets of studies described above.

Conclusions

Upper Basin

If it is assumed that the operating capacity of the Upper Colorado River Storage Project is 29.0 maf, and if the delivery at Lee Ferry amounted to 7.5 maf per year, the depletions (beneficial consumptive use) in the States of the upper division of the Colorado River Basin would be limited to 6.3 maf per annum. The net depletion, excluding evaporation from the reservoirs of the Upper Colorado River Storage Project, would be 5.6 maf. If deliveries at Lee Ferry were 8.25 maf per year, the limit of depletions in the States of the upper division would be 5.6 maf including reservoir evaporation, and a net of 4.7 maf excluding reservoir evaporation.

With a storage capacity of 32.0 maf, as assumed by some, the limitation on the net depletion (beneficial consumptive use) in the States of the upper division, excluding evaporation from the reservoirs of the Upper Colorado River Storage Project, with a delivery at Lee Ferry of 7.5 maf per year would be about 5.6 maf per year, and would be 4.8 maf per year if the delivery at Lee Ferry were 8.25 maf per year.

Without importation of water, and such modifications in the required delivery of water at Lee Ferry as would be necessary for the Upper Basin to benefit from the importation of water, it is assumed that the total net beneficial consumptive use in the States of the upper division cannot be more than 5.6 maf per year, and might not be more than 4.8 maf per year.

The addition of more reservoir capacity than will be provided by the existing and authorized units of the Upper Colorado River Storage Project would not materially increase these depletions. The obvious means for enabling the States of the upper division to make a beneficial consumptive use of 7.5 maf per year allocated to them by the Colorado River Compact (less 50,000 af allocated to Arizona by the Upper Colorado River Compact), or even greater amounts, is the importation of water from areas of surplus.

Lower Basin

What the actual future depletion will be in the States of the upper division of the Colorado River Basin is not known. The present studies were based on two future depletion schedules, one as estimated by the U.S. Department of Interior (U.S.I.D.), and the other as estimated by the States of the upper division of the Colorado River Basin. The studies indicate plainly that the latter schedule of depletions cannot be attained with the available water supply. It is believed, therefore, that the true schedule of future depletions will lie somewhere between these two estimates. Releases from Lake Powell for the purpose of generating energy probably will be somewhere between 8.25 maf per year and 8.75 maf per year. These are in excess of that required by the Compact.

It is concluded from the results of the studies summarized in Tables No. 1 and 2 that shortages of water in the main stem of the Colorado River to supply 2.8 maf for beneficial consumptive use in Arizona, and up to 4.4 maf for beneficial consumptive use in California, and 0.3 maf of beneficial consumptive use in Nevada plus 1.5 maf to Mexico will amount to well over one million af by the year 2000. The shortage could materially exceed 1.5 maf by that year. It is concluded that shortages could commence by the year 1991 and in no case would they start later than 1995 under the conditions shown in Tables No. 1 and 2.

The same general conclusions as to the shortage by the year 2000 are indicated from the results of the studies covering the period 1906 through 1965 (estimated). See Studies Numbers 21 and 22 in Appendix B.

The only exception to the above would be if Lake Mead were completely drained to absolute dead storage. Under this condition substantial shortages for the Lower Basin beneficial uses would occur sometime after the year 2000, after which they would be as severe as those indicated in Tables No. 1 and 2, and Studies 21 and 22 of Appendix B.

The beneficial consumptive use of main stem Colorado River water as made at the present time by California is something over 5.0 maf. In the studies it was assumed that California would continue this level of use until it became fairly imminent that the contents of Lake Mead, because of releases for consumptive-use purposes, would approach rated power head. It was assumed that at this point the uses by California would be cut back to 4.4 maf. Some have taken the position that this cutback should be made at the time the Central Arizona Project would go into operation, which is estimated to be about the year 1975 if the project is authorized at an early date and is expeditiously constructed. It is not considered that this position is a sound one.

Under each of the studies from which these conclusions have been derived, deliveries at Lee Ferry of amounts greater than the 75 maf in successive 10-year periods as required by the Compact, have been made. The excess amount of water is more than sufficent under the assumptions made for the studies to supply the amount which California now is using in excess of 4.4 maf. Even if California were cut back to 4.4 maf in 1975, the studies indicate the shortage in the Lower Basin would be substantially greater than one million acre-feet in the year 2000, if the rated power head at Lake Mead is to be maintained.

While the Colorado River Compact by its terms makes the generation of power subservient to the consumptive use of Colorado River water for agricultural and domestic purposes, there arises the question as to whether it would be possible and practicable to deplete storage in Lake Mead to the point that no power could be generated. Power contracts with the Secretary of Interior exist, and many industries and municipalities now are dependent upon the power generated at Hoover Dam. This poses a question that probably cannot be answered at this time.

However, it would appear that it might be unwise at this

time to authorize a new project for use of substantial amounts of water from the main stem of the Colorado River in the Lower Basin when a study of stream-flow records discloses that the requirements for such a project might cause the depletion of Lake Mead below the level where it could generate power. Even then, there would be no assurance that water would be available to the project if storage in Lake Mead were entirely depleted to absolute dead storage. At that time the only water available would be the amount released at Lee Ferry plus accretions to the river between Lee Ferry and Hoover Dam. This would fall far short of enough water to sustain present uses and the new development. Otherwise the assumption would have to be made that after Lake Mead had been depleted to absolute dead storage it would rapidly fill by a succession of years of good runoff. It is considered that such an assumption is not warranted.

Finally, it would be fair to conclude that the authorization of projects in the Lower Colorado River Basin which would utilize substantial additional quantities of water would be unwise at this time unless at the same time a project, or projects, for the importation of substantial amounts of water from sources of surplus are authorized.

Table 1

SHORTAGES TO CALIFORNIA, ARIZONA AND NEVADA BASED ON STUDY PERIOD 1914-1964, DEPLETION FACTOR = 1.0 AND MAXIMUM UPPER BASIN RESERVOIR CONTENT = 32.0 maf

	U.S.D.I. Depletion Schedule						States of the Upper Division Depletion Schedule					
Minimum Lake Mead	Lee Ferry Delivery = 8.25 maf			Lee Ferry Delivery = 8.75 maf			Lee Ferry Delivery = 8.25 maf			Lee Ferry Delivery = 8.75 maf		
Content, maf:	16.453	8.0	0	16.453	8.0	0	16.453	8.0	0	16.453	8.0	0
Study Year												
1966												
1967												
1968												
1969												
1970												
1971												
1972												
1973												
1974												
1975												
1976												
1977												
1978												
1979												
1980												
1981												
1982												
1983												
1984												
1985												
1986												
1987												
1988												
1989	1057						1051					
1990	1412						1412					
1991	1429			413			1429			391		
1992	1446			946			2196			2196		
1993	1464			964			2214			2214		
1994	1481			981			1481	666		2231		
1995	1498	523		998			1498	1272		998		
1996	1515	1289		1015			1515	1289		1015		
1997	1532	1307		1032			1532	1307		2282	1960	
1998	1549	1324		1049			2299	2074		2299	2074	
1999	1566	1341		1066			2316	2091	81	2316	2091	
2000	1583	1358		1083	22		2333	2108	1729	2333	2108	
2001	603	378		1084	859		2334	2109	1731	2334	2109	1550
2002	1585	1360	9	1085	860		1585	1360	1047	2335	2110	1732
2003	1586	1361	1035	1086	861		2336	2111	1733	2336	2111	1733
2004	0	0	0	1087	862		2337	2112	1734	2337	2112	1734
2005	0	0	0	1088	863		2338	2113	1735	2338	2113	1735
2006	795	137	0	1089	864		2339	2114	1597	2339	2114	1315
2007	1590	1365	566	1090	865		2340	2115	1231	2340	2115	1231
2008	1591	1366	1040	2341	2116		2341	2116	1368	2341	2116	1368
2009	1592	1367	1041	2342	2117	1198	2342	2117	1738	2342	2117	1738
2010	1503	1368	1042	1093	868	583	2343	2118	1739	2343	2118	1739
2011	1594	1369	1043	1094	869	584	2344	2119	1740	2344	2119	1740
2012	1595	1370	1044	1095	870	585	2345	2120	1426	2345	2120	1426
2013	1596	1371	1045	2346	2121	1721	2346	2121	1174	2346	2121	1174
2014	1597	1372	1046	2347	2122	1722	2347	2122	1743	2347	2122	1743
2015	1598	1373	1047	2348	2123	1723	2348	2123	1355	2348	2123	1355
2016	2349	2124	1724	2349	2124	1724	2349	2124	1310	2349	2124	1310

Shortages in 1,000 acre-feet.

Table 2
SHORTAGES TO CALIFORNIA, ARIZONA AND NEVADA
BASED ON 1921-1964 PERIOD

	U.S.D.I. Depletion Schedule						States of the Upper Division Depletion Schedule					
Minimum Lake Mead	Lee Ferry Delivery = 8.25 maf			Lee Ferry Delivery = 8.75 maf			Lee Ferry Delivery = 8.25 maf			Lee Ferry Delivery = 8.75 maf		
Content, maf:	16.453	8.0	0	16.453	8.0	0	16.453	8.0	0	16.453	8.0	0
Study Year												
1966												
1967												
1968												
1969												
1970												
1971												
1972												
1973												
1974												
1975												
1976												
1977												
1978												
1979												
1980												
1981												
1982												
1983	452						58					
1984	1159						1159					
1985	1205						1205					
1986	1247			12			1247			12		
1987	0			788			1288			788		
1988	0			829			1329			829		
1989	0			871			1371			871		
1990	806			912			1412			912		
1991	1429			929			1429	1057		929		
1992	1446			946			1446	1221		946		
1993	143			964			1464	1238		964		
1994	0			981			1481	1255		981		
1995	564			998			1498	1272		2248	143	
1996	1515			1015			1515	1289		2265	2039	
1997	0			0			1532	1307		2282	2057	
1998	0			437			1549	1324	919	2299	2074	
1999	813	58		1066	571		1566	1341	1018	2316	2091	
2000	1583	1358		1083	858		2333	2108	1715	2333	2108	1595
2001	1584	1359		1084	859		2334	2109	1722	2334	2109	1414
2002	1585	1360		1085	860		2335	2110	1732	2335	2110	1732
2003	1586	1361		1086	861		2336	2111	1733	2336	2111	1733
2004	1587	1362		1087	862		2337	2112	1720	2337	2112	1720
2005	1588	1363		1088	863		2338	2113	1714	2338	2113	1582
2006	1589	1364	632	1089	864		2339	2114	1235	2339	2114	1235
2007	1590	1365	1043	1090	865		2340	2115	1736	2340	2115	1736
2008	1591	1366	1031	2341	2116	389	2341	2116	1433	2341	2116	1433
2009	1592	1367	1035	2342	2117	1707	2342	2117	1357	2342	2117	1357

Shortages in 1,000 acre-feet.

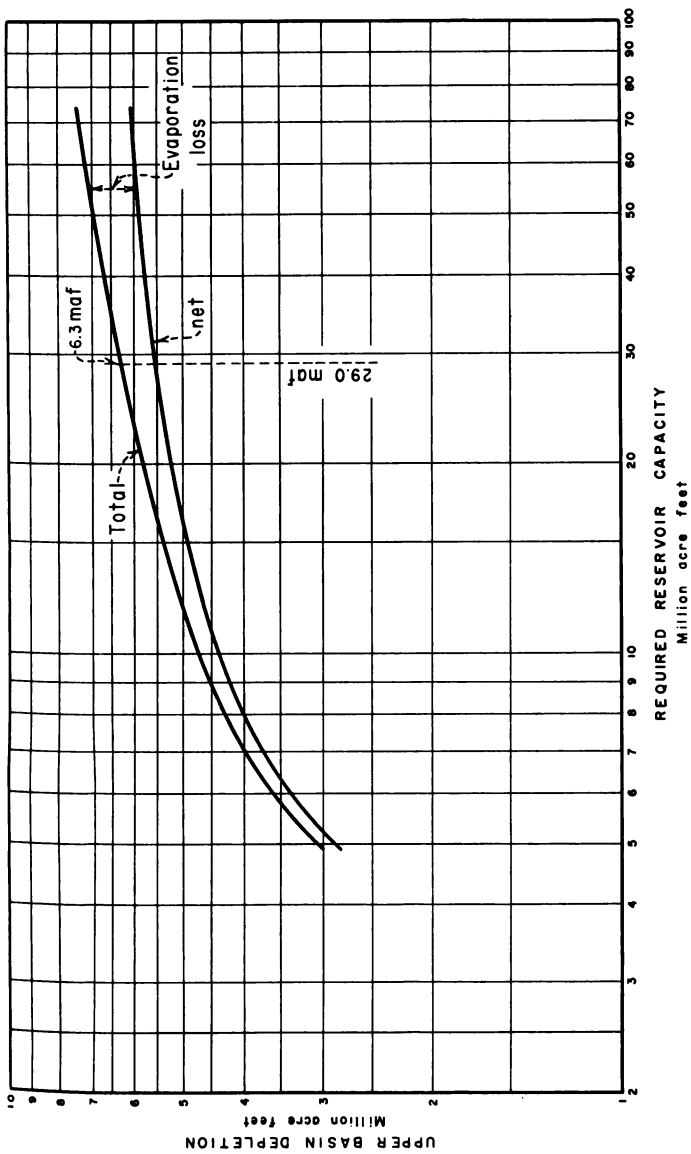


FIGURE 1

COLORADO RIVER 1921-1964
UPPER BASIN DEPLETION
VS. REQUIRED RESERVOIR CAPACITY
7.500 maf DELIVERY AT LEE FERRY

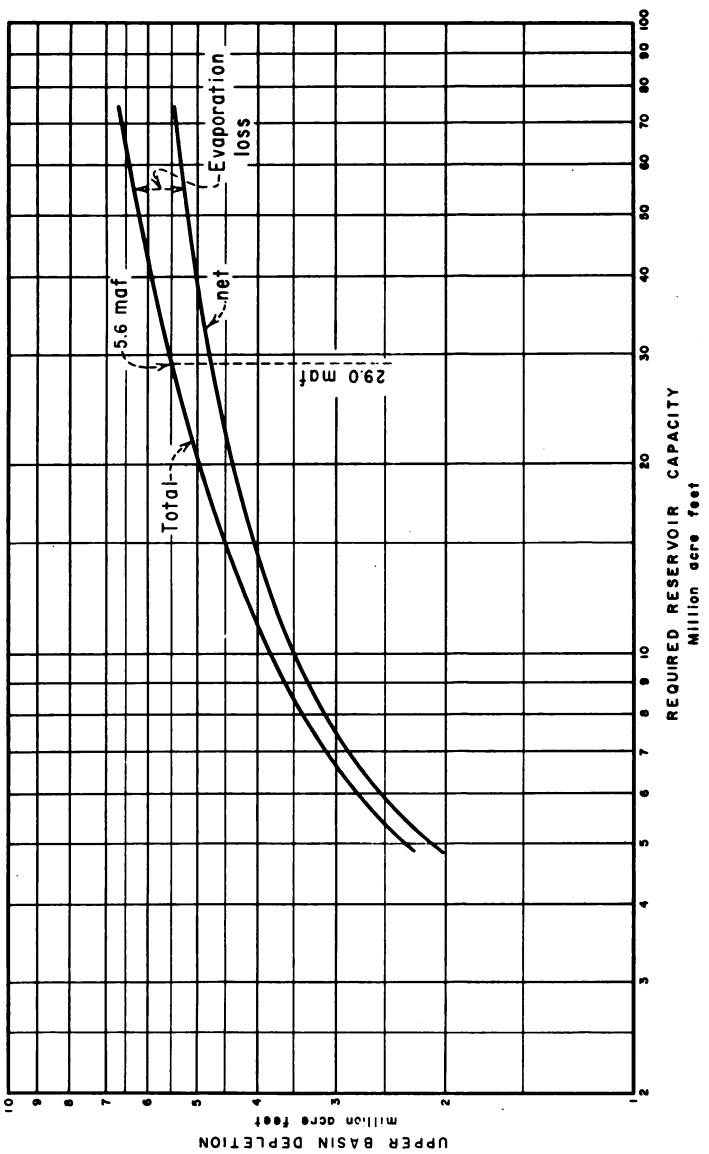
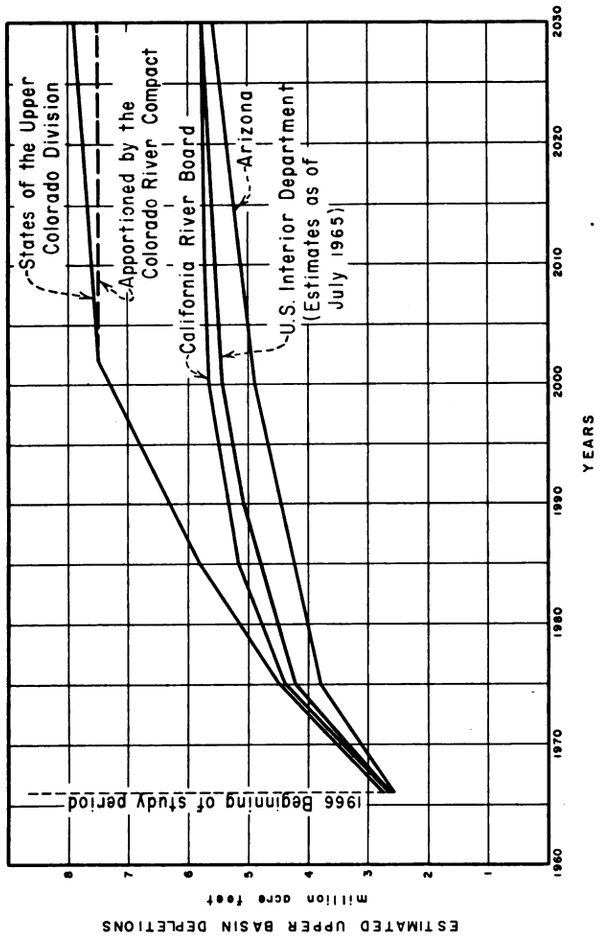


FIGURE 2

COLORADO RIVER 1921-1964
UPPER BASIN DEPLETION
VS. REQUIRED RESERVOIR CAPACITY
8.250 maf DELIVERY AT LEE FERRY

FIGURE 3

ESTIMATES OF
UPPER BASIN DEPLETIONS



Mr. ASPINALL. I would ask unanimous consent that part 2 of that, appendixes, be made a part of the files.

Mr. ROGERS. Is there objection? The Chair hears none. The appendixes will be made a part of the file.

(The appendixes referred to will be found in the files of the committee.)

Mr. ROGERS. Mr. Goslin.

Mr. GOSLIN. Mr. Chairman, members of the committee, my name is Ival Goslin. I am executive director of the Upper Colorado River Commission.

On behalf of the commission, its members, and members of the legal and engineering committees who participated in conferences with representatives of the lower basin last week, I agree with Congressman Udall's statement pertaining to the four principles with respect to the rights, obligations, and requirements of each basin as against the other. And as Mr. Udall stated, we, too, are gratified by the broad consensus of views on many fundamental facts.

I also wish to commend the three Arizona Congressmen for their efforts, their leadership and fairness, in aiding in attainment of this consensus. It constitutes a milestone in public relations on the Colorado River.

The facts are, with respect to the water supply, that there is not enough water in the river with its existing storage facilities for the upper basin to deliver 75 million acre-feet at Lee Ferry in every 10-year period, as required by the compact, and, at the same time, consume 7.5 million acre-feet annually. Or, to put it another way, there is not sufficient water available for all of the projects presently contemplated for the upper basin. This shortage in the upper basin is caused by Mother Nature's water-deficient river coupled with the compact requirement to deliver 75 million acre-feet in 10 years to the lower basin. Major shortages in water supply for a Lower Colorado River Basin project could occur sometime about 1990–2000—25 to 35 years from today, or 15 to 25 years after a Lower Colorado River Basin project would begin to operate.

Mr. Tipton will elaborate further on this point in a few moments.

Mr. ROGERS. Mr. Goslin, if you will permit me to interrupt you at the present moment, I notice you are skipping through the statement. Do you desire this statement to be placed in the record?

Mr. GOSLIN. Yes, sir. Mr. Chairman, I intended to ask that that be done in a few moments.

Mr. ROGERS. Without objection your statement will be included in the record, and you may proceed to summarize it. (See p. 503.)

Mr. GOSLIN. The water supply of the Colorado River is deficient for potential requirements of both the upper and the lower basin, as well as with respect to compact allotments. Were this not the fact, we could endorse the Lower Colorado River project bills without reservations. Without certain protective measures in the proposed legislation, the upper basin, due to its compact commitment to guarantee a delivery of 75 million acre-feet in every 10-year period to the lower basin, would stand the adverse effects of nature's failure to supply the amount of water that was contemplated at the time the 1922 compact was negotiated. That fact, I think, has been brought out by other witnesses.

Even with its extensive holdover storage facilities, upper basin development appears destined to a permanent shortage of about 20 percent of its allotted use—unless the flow of the Colorado River is augmented.

There is ample water in the Colorado River system to supply the upper basin present uses amounting to less than half of its compact apportionment. Likewise, there would be no problem in supplying its projected uses amounting to about 60 percent of its allotment in 1975, or about the time the central Arizona unit will make its initial diversion of water.

We also recognize in the upper basin that for a period of years there will be water in excess of 75 million acre-feet every 10 years delivered at Lee Ferry, because we are fully aware of the fact that we need to turn what water we can through the turbines at Glen Canyon powerplants in order to pay for our upper basin projects.

However, so far as the water supply of the lower basin is concerned, the most important factor is the amount of water that is released from upper basin reservoirs for delivery at Lee Ferry. We feel that Arizona must realize that the unused upper basin water that will be temporarily available for the central Arizona unit must be subject to immediate recall as development progresses in the upper basin. This fact can place the central Arizona project in a precarious position. I am sure also that everyone will recognize the precarious position of the upper basin when it seeks to recall its water from a going downstream economy for the establishment of new upstream developments.

We feel that the only real answer to the complex, involved problems on the river is a concurrent authorization of a water importation project as a feature of the Lower Colorado River Basin project. Only through such a procedure can a firm water supply be guaranteed for the lower basin project, and the upper basin be assured that it can effectively recall and use its allotted water when it is needed.

Now, we in the upper basin sincerely desire to be counted among the supporters of the Lower Colorado River Basin project to be authorized under H.R. 4671. The Upper Colorado River Commission, at a meeting on August 16, 1965, by formal resolution stated that it approves and supports the proposed Federal participation in further development of the Colorado River Basin; provided, that certain principles are incorporated into any authorizing legislation.

Briefly, in review, these principles are as follows:

First, that the Secretary of the Interior shall be directed and required to plan and operate all Federal projects within the Lower Colorado River Basin, to the end that diversions from the mainstream of the Colorado River below Lee Ferry shall be limited, when necessary, so as not to prejudice or preclude the future Federal authorization, or other development, of projects required for the annual consumptive use of water from the Colorado River system in the Upper Division States of 7.5 million acre-feet of water, or such part thereof as may be available, after delivering 75 million acre-feet at Lee Ferry in a period of 10 consecutive years.

Second, that concurrently with any congressional authorization there also be authorized a project to import water into the Colorado River Basin. We wish this water to have a priority; first, that it shall go to the Mexican Treaty obligation in the amount of 1,500,000 acre-

feet per year; second, that it be used to make up any deficiency in the lower basin's supply of water so that the lower basin can have a consumptive use of 7½ million acre-feet per year; and third, that the same apply to the upper basin, that any deficiency between the water available in the upper basin which amounts to about 6.3 million acre-feet and 7½ million acre-feet be made up from imported water.

Third, we wish the legislation to state that the primary purpose of the Colorado River storage project is to implement beneficial consumptive use of water in the upper basin and that the Glen Canyon Reservoir will not be drawn below its rated head except as may be necessary to comply with article III(d) of the Colorado River compact, and except as approved by the Upper Colorado River Commission.

Fourth, that the diversion of funds from the Upper Colorado River Basin fund to pay for the so-called power deficiencies at Hoover Dam, pursuant to the Glen Canyon Reservoir filling criteria, should be terminated.

And fifth, we want all expenditures that have been made from the Upper Colorado River Basin fund to meet the deficiencies in generation at Hoover Dam to be reimbursed to the Upper Colorado River Basin fund.

A copy of our resolution is attached, and we would like to have it made a part of this statement.

In order to implement the objectives of our Commission's resolution, as well as to make effective the four principles to which consensus has been reached with the Lower Basin States, certain amendments to H.R. 4671 have been proposed. I wish to emphasize in fairness that although consensus has been reached concerning the four fundamental principles, agreement has not yet been reached concerning the language of the proposed amendments.

We realize that this committee and the Congress will write the law, but we are hopeful that consensus by representatives of both basins can be attained concerning specific language of the legislation before a bill is reported by the committee.

We wish to emphasize that by our amendments we do not wish to change, alter, or modify the Colorado River compact or any other documents that constitute the law of the river. We are seeking a conditional authorization of a project to augment the supply of water of the Colorado River Basin. We are specifying certain fundamental changes in H.R. 4671 necessary to protect the future water resource development of the upper basin.

In order to accomplish these objectives, we are requesting the Congress to incorporate in the legislation certain instructions to the Secretary of the Interior with respect to planning and operating procedures under the "law of the river."

Mr. Chairman, due to the time limitations, I wish to include in the record the next part of my statement composed of about 14 or 15 pages of amendments and brief explanations thereof. I would like to have this included as part of the statement. We also have a draft bill, copies of which can be distributed to the committee.

Mr. ROGERS. Which page, Mr. Goslin, does this start on?

Mr. GOSLIN. Beginning on page 9. It is a part of the statement. I would like to have it printed in the record.

Mr. ROGERS. It is a part of the statement and, without objection, the resolution will also be included as a part of the statement.

Now, the amendments that you refer to, are they incorporated into your statement?

Mr. GOSLIN. They are incorporated in the statement. They are also incorporated in a draft bill that is on the desk and that we have prepared as a working draft for the benefit of the committee, should the committee desire to use it.

Mr. ROGERS. Yes. Well, that draft bill will be included as a part of the file, without objection, with proper reference made to it in the record.

Mr. GOSLIN. Thank you, Mr. Chairman.

(The draft referred to will be found in the files of the subcommittee.)

Mr. GOSLIN. I would also like to say one other thing about these amendments. These amendments have not been approved as to language by the Upper Colorado River Commission. They were prepared as a working draft by Mr. Larry Sparks, director of the Colorado Water Conservation Board, and myself with the help of members of our engineering and legal committees. They are submitted in that spirit to this committee.

Mr. HOSMER. What you just said necessarily applies to the draft bill as well.

Mr. GOSLIN. What I have just said applies to the draft bill, yes, sir. We do have under the terms of the resolution, as you will notice, the authority to continue negotiations with the representatives of the lower basin. We are hopeful that we can reach a consensus or agreement with regard to the amendments, and I sincerely hope that that can be done.

Mr. Tipton, do you wish to take over at this point?

Mr. ROGERS. Thank you, Mr. Goslin, for your presentation and your cooperation in briefing your statement.

(The prepared statement of Mr. Goslin follows:)

STATEMENT OF IVAL V. GOSLIN, EXECUTIVE DIRECTOR, UPPER COLORADO RIVER COMMISSION

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 is a compact-created, interstate, administrative agency of the upper division States of the Colorado River Basin. These States are Colorado, New Mexico, Utah, and Wyoming.

On behalf of the commission, its members, and engineering and legal advisors who participated in conferences with representatives of the lower division States last week, I agree with Congressman Udall's statement pertaining to the four principles with respect to the rights, obligations, and requirements of each basin as against the other. As Mr. Udall stated, "We are gratified by the broad consensus of views on many fundamental facts." This consensus of technicians of seven States could constitute the foundation for resolving by this committee of other complex problems, upon which there should also be agreement in order to have authorizing legislation that will be reasonably satisfactory to the upper and the lower basin. I also wish to commend the three Arizona Congressmen for their efforts, leadership, and fairness in aiding in the attainment of this consensus. It constitutes a milestone in public relations on the Colorado River.

The 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 the operation of such a project is possible only by temporarily utilizing, in part, presently unused water apportioned in 1922 to the Upper Colorado River Basin by the Colorado River compact. At the time this compact was ne-

gotiated, a consumptive use of 7.5 million acre-feet of water was apportioned to the upper basin. Studies made since, however, have indicated that on the basis of more reliable and longer term period of streamflow records, the compact apportionment of 7.5 million acre-feet of consumptive use to the upper basin cannot be attained. In 1953, the firm of Leeds, Hill & Jewett made a study of availability of water for the State of Colorado. This report shows that, in contrast to the 7.5 million acre-feet thought by the Colorado River compact negotiators to be available, there are only 6.2 million acre-feet of water that can be consumptively used in the upper basin.

Under the auspices of our commission, the internationally known firm of Tipton & Kalmbach, Inc., of Denver, Colo., recently prepared a report entitled, "Water Supplies of the Colorado River Available for Use by the States of the Upper Division and for Use From the Main Stem by the States of Arizona, California, and Nevada in the Lower Basin."

Mr. R. J. Tipton is here with me and will discuss the details of his report for this committee. In order to place Mr. Tipton's report before your committee, I wish at this time to request that its text be printed in the proceedings of this hearing. It consists of a letter of transmittal, 24 pages, and 5 black-and-white illustrations. Appendixes to the report will be submitted for inclusion in the files of the committee.

As a further reason for our concern about the future availability of water in the upper basin, I do wish to state that Mr. Tipton's report shows that, based upon past flows of the Colorado River, with all presently existing or authorized storage reservoirs, and with deliveries at Lee Ferry of 75 million acre-feet each 10-year period, there are only 6.3 million acre-feet of water per annum available for consumptive use in the upper basin. This, again, is in contrast to the 7.5 million acre-feet apportioned by the Colorado River compact. When upper basin reservoir evaporation is deducted, the net consumptive use available to the upper basin amounts only to 5.6 million acre-feet. Furthermore, in the event that deliveries to the lower basin exceed 7.5 million acre-feet per year, the amount of water available to the upper basin is correspondingly reduced.

The facts are that there is not enough water in the river with its existing storage facilities for the upper basin to deliver 75 million acre-feet at Lee Ferry in every 10-year period, as required by the compact, and, at the same time, consume 7.5 million acre-feet annually. Or, to put it another way, there is not sufficient water available for all of the projects presently contemplated for the upper basin. This shortage in the upper basin is caused by Mother Nature's water-deficient river coupled with the compact requirement to deliver 75 million acre-feet in 10 years to the lower basin. Major shortages in water supply for a lower Colorado River Basin project could occur sometime about 1990–2000—25 to 35 years from today, or 15 to 25 years after the project would begin to operate. Practically all water studies that have been made by other entities interested in the Colorado River confirm this finding.

The specter of supplying one-half of any deficiency in deliveries of water to Mexico haunts the upper division States. On a water deficient river this burden is of considerable consequence because it reduces the potential supply for future use. Relief from this burden could be had by requiring the Secretary of Interior in his accounting for lower basin uses of water to include the uses of water from lower basin tributaries as required by the Colorado River compact—or by importing water into the basin to be earmarked to relieve both the upper and lower basin from the Mexican Treaty obligation. Both basins have agreed to seek an importation of water for this purpose.

H.R. 4671 includes an agreement between Arizona and California to apportion water shortages in the lower basin by requiring the central Arizona unit to bear all shortages if water available in the mainstream falls below 7.5 million acre-feet, while, at the same time, giving a priority to a delivery of 4.4 million acre-feet of water annually to California. The meaning of this agreement to the upper basin is that the operation of the central Arizona unit will have to be dependent upon the use of upper basin water. The question then is: How does the upper basin get the water back when it is needed for its future resource development, some of which is even now imminent?

We are aware of the lower basin's water needs. The needs of Arizona are probably more immediate and serious than those of any other State in the basin. California is currently using about 700,000 acre-feet more than confirmed to her by the Supreme Court from the first 7.5 million acre-feet of lower basin main-stem water. She is being forced to make importations into southern California, not

only for the purpose of replacing the 700,000 acre-feet that she must give up to others on the Colorado River, but also for the purpose of supplying her rapidly increasing domestic, municipal, and industrial requirements. Nevada is running short of water in the Las Vegas area. It is estimated that by the year 2000 Nevada will have used all of the 300,000 acre-feet confirmed by the Supreme Court.

In summary, our apprehension stems from the fact that there is not enough water in the river from that available within compact apportionments for all potential uses in either the lower or the upper basin, and any large, new project such as the central Arizona unit can exist only on presently unused compact-apportioned water belonging to the upper basin. There is simply not enough lower basin water available for the central Arizona unit after taking into consideration the Mexican Treaty obligation, Nevada's water uses, the guarantee of 4.4 million acre-feet to California, lower basin reservoir evaporation and other losses in the lower basin.

The water supply of the Colorado River is deficient for potential requirements of both the upper and the lower basin, as well as with respect to compact allotments. Were this not the fact, we could endorse the lower Colorado River project bills without reservations. Without certain protective measures in the proposed legislation, the upper basin, due to its compact commitment to guarantee a delivery of 75 million acre-feet in every 10-year period to the lower basin, would stand the adverse effects of Nature's failure to supply the amount of water contemplated at the time the 1922 compact was negotiated. Even with its extensive holdover storage facilities, upper basin development appears destined to a permanent shortage of about 20 percent of its allotted use.

There is ample water in the Colorado River system to supply the upper basin present uses amounting to less than half of its compact apportionment. Likewise there would be no problem in supplying its projected uses amounting to about 60 percent of its allotment, anticipated in 1975, the time contemplated for the central Arizona unit to make its initial diversion of water. It is also recognized that, in addition to the delivery of 75 million acre-feet in 10 years at Lee Ferry, additional upper basin water will pass through the Glen Canyon power turbines for a number of years in order to produce the power revenues for repaying the cost of upper basin projects.

So far as the water supply of the lower basin is concerned, the most important factor is the amount released from upper basin reservoirs for delivery at Lee Ferry. Arizona, however, must realize that the unused upper basin water that will be temporarily available for the central Arizona unit must be subject to immediate recall as development progresses in the upper basin. This fact places the central Arizona project in a precarious position. I am sure, also, that everyone understands the precarious position of the upper basin when it seeks to recall its water from a going downstream economy for the establishment of new upstream developments. The only real answer to the complex and involved problems on the river is a concurrent authorization of a water importation project as a feature of the Lower Colorado River Basin project. Only through such procedure can a firm water supply be guaranteed for the lower basin project and the upper basin be assured that it can effectively recall and use its allotted water when needed.

We sincerely desire to be counted among the supporters of the Lower Colorado River Basin project to be authorized under H.R. 4671. The Upper Colorado River Commission, at a formal meeting on August 16, 1965, by resolution stated that it approves and supports the proposed Federal participation in further development of the Colorado River Basin; provided, that certain principles are incorporated into any authorizing legislation. In summary, these principles are as follows:

First, that the Secretary of the Interior shall be directed and required to plan and operate all Federal projects within the Lower Colorado Basin, whether heretofore or hereafter constructed, to the end that diversions from the main stream of the Colorado River below Lee Ferry shall be limited when necessary so as to not prejudice, impair, or preclude the future Federal authorization, or other development, of projects required for the annual consumptive use of water from the Colorado River system in the upper division States of 7,500,000 acre-feet of water, or such part thereof as may be physically available, after a delivery of 75 million acre-feet at Lee Ferry in a period of 10 consecutive years.

Second, that concurrently with any congressional authorization of the Lower Colorado River Basin project, or any of its component parts, there also be authorized a project, or projects, to import water into the Colorado River Basin

in such quantities as will relieve the States of the Colorado River Basin from any obligation to deliver water to the Republic of Mexico and will supply the lower basin States and the upper basin States with that portion of 7.5 million acre-feet of consumptive use per year that cannot be supplied from the Colorado River.

Third, that the legislation state that the primary purpose of the Colorado River storage project is to implement benficial consumptive use of water in the upper basin, and that Glen Canyon Reservoir will not be drawn below its rated head except as may be necessary to comply with article III(d) of the Colorado River compact, and except as may be approved by the Upper Colorado River Commission.

Fourth, that the diversion of funds from the Upper Colorado River Basin Fund to pay for the so-called Hoover Dam power deficiencies pursuant to the Glen Canyon Reservoir filling criteria be terminated.

Fifth, that all expenditures that have been made from the Upper Colorado River Basin Fund to meet deficiencies in generation at Hoover Dam be reimbursed to the Upper Colorado River Basin Fund with such reimbursement to include the cost of deficiency energy purchased, the cost of energy impairment and the cost of capacity impairment.

A copy of the Commission's resolution in full is attached to this statement as an integral part of it.

In order to implement the objective of our Commission's resolution, as well as to make effective the four principles to which consensus has been reached with the lower basin States, as outlined by Congressman Udall, certain amendments to H.R. 4671 have been proposed. In fairness, it must be stated that, although consensus has been reached concerning the four fundamental principles, agreement has not yet been reached concerning the language of our proposed amendments to implement them. We realize that this committee and the Congress will write the law, but we are hopeful that consensus by representatives of both basins can be attained concerning specific language of the legislation before a bill is reported by the committee.

We wish to emphasize that through our proposed amendments we do not intend any change, modification or alteration of the Colorado River compact or any of the other documents constituting the "law of the river." We are seeking a conditional authorization of a project to augment the supply of water of the Colorado River basin. We are specifying certain fundamental changes in H.R. 4671 necessary to protect the future water resource development of the upper basin. In order to accomplish these objectives, we are requesting the Congress to incorporate in the legislation certain instructions to the Secretary of the Interior with respect to planning and operating procedures under the "law of the river," and to outline each basin's interest in the imported water necessary for achieving compact-apportioned uses and treaty obligations to Mexico.

Amendments that we are proposing are as follows:

(1) On page 2, line 19, strike the world "lower" preceding the words "Colorado River Basin."

The purpose of this amendment is to indicate that it is the whole Colorado River Basin, not just the lower basin, that is involved in the legislation. Section 102 of the bill makes fleeting reference to the fact that one of its purposes is to provide additional and adequate water supplies for use in the Upper Colorado River Basin as well as in the Lower Colorado River Basin, after which there is little mentioned for the upper basin. This change will correct that situation.

(2) Strike all the words beginning with "mainstream" on page 2, line 22, and ending with the words "operating levels" on page 3, line 2, and add in lieu thereof the following:

"Projects heretofore, herein, or hereafter authorized anywhere in the Colorado River Basin, including the filling and refilling of reservoirs to optimum operating levels."

The purpose of this suggested change is to insure the benefits of this legislation to the entire basin.

(3) On page 3, line 3, add following "investigations" the words "and conditional authorization".

The purpose of this change is to make the title reflect the conditional authorization of water importation which is later proposed.

(4) On page 3, line 8, following the words "Colorado River" add the word "respectively".

The purpose of this change is to specify that the estimates are for each basin.

(5) Strike the second word "alternative" on page 3, line 11.

The word "alternative" is not necessary. The sources are specified.

(6) Strike all the second sentence of section 201(a)(2) beginning on page 3, line 16, and ending on page 4, line 3.

This material is covered in a suggested new section 201(a)(6) which should be inserted following section 201(a)(5) on page 4, line 14, and reads:

"(6) Plan works to import water into the Colorado River Basin from sources outside the natural drainage area of the Colorado River system. In such planning the Secretary shall make provision for adequate and equitable protection of the interest 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 adequate to satisfy their ultimate requirements may be available for use therein at prices to users not adversely affected by the exportation of water to the Colorado River system."

This language directs the Secretary to plan the necessary importation works in addition to the other directions for specific investigations directed in this section.

(7) Strike all the second sentence of section 201(b) beginning on page 4, line 25, and ending on page 5, line 6, and add in lieu thereof the following:

"(c) The Secretary shall within three years from the effective date of this Act submit feasibility reports on the importations planned in accordance with paragraph (6) of subsection (a), capable of delivering annually not less than three million five hundred 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. If the Secretary shall find that such importations have engineering and economic feasibility and that the benefits exceed the estimated cost of construction, and if the Secretary's findings are approved by the President, then the importation works covered by his findings shall be deemed authorized, and may be undertaken by the Secretary. But if the benefits do not exceed said total estimated cost, then said works may be undertaken by the Secretary only after provision therefor has been made by act of Congress enacted after the Secretary has submitted to the President and the Congress the report and findings involved.

"(d) In making the reports and recommendations authorized by this section, the Secretary shall make the following assumptions:

"(1) That the ultimate required delivery of water by the States of the upper division at Lee Ferry or by exchange delivery at alternate points will not exceed an aggregate of seventy-five million acre-feet for any period of ten consecutive years reckoned in continuing progressive series.

"(2) That the primary purpose of the Colorado storage project is to implement beneficial consumptive use of water in the upper basin and that Glen Canyon Reservoir will not be drawn below its rated head, except as may be necessary to comply with article III(d) of the Colorado River compact and except as may be approved by the Upper Colorado River Commission."

The purpose of this amendment is to provide conditional authorization for importation of water into the Colorado River Basin upon the Secretary's findings of feasibility, if the President so approves.

The Secretary is also directed to follow certain basic assumptions which he must use in his reports and recommendations authorized by this section.

(8) Strike all of section 304(c) on page 9, beginning on line 4 and ending on line 17, and add a new (c) reading:

"(c) To the extent that the flow of the main stream of the Colorado River is augmented by water imported from outside sources through facilities constructed by the United States, and to the extent that the main stream waters are insufficient for the purposes herein stated, the Secretary shall make available, either directly or by exchange, in the order and priority herein specified, that amount of water necessary to satisfy annually—

"(1) One million five hundred thousand acre-feet of water for the purpose of compliance with the Mexican treaty;

"(2) The 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; and

"(3) The consumptive use in the upper division States of seven million five hundred thousand acre-feet of water annually."

The substitute (c) establishes a priority of uses for the water to be imported with the first 1.5 million acre-feet to be used to relieve both basins of the Mexican treaty obligation; the second to guarantee a consumptive use of 7.5 million acre-feet to the three lower division States; the third to bring the consumptive use in the four upper division States to 7.5 million acre-feet.

(9) It is suggested that section 304(d) be amended as follows:

(*a*) Strike on page 9, beginning on line 20 with the word "sufficient" through the word "acre-feet" in line 22, and add in lieu thereof the words "water in excess of the consumptive use requirements as set forth in paragraph (c) of this section".

(*b*) Strike the words "such excess" on page 9, line 22.

(*c*) In line 23 on page 9 after the word "use" add the words "of such excess water".

(*d*) In line 23 on page 9 after the word "in", strike all that follows through the word "upon" in line 25 and add in lieu thereof the words "such manner as the Congress may direct".

(*e*) On page 10 beginning in line 1, strike all through line 6.

It is here suggested that should water be made available in quantity in excess of that needed to insure both the upper and lower basin the water allocated by the Colorado River compact plus the Mexican treaty water, Congress should determine how such excess should be divided.

(10) On page 10, following line 6, a new subsection (e) is suggested which reads:

"(e) Notwithstanding any other provision of law this Act shall be so administered that the diversions from the main stream of the Colorado River below Lee Ferry shall be limited when necessary so as to assure availability of water in quantities sufficient to provide for the aggregate annual consumptive use, measured in terms of manmade depletions of the virgin flow at Lee Ferry, by present and potential users of water from the Colorado River system in the upper division States of seven million five hundred thousand acre-feet of water or such part thereof that may be physically available after a delivery of seventy-five million acre-feet at Lee Ferry in any period of ten consecutive years beginning with the first day of October next succeeding the approval of this Act."

The purpose of this proposed amendment is to insure that in the future the upper division will have available the water that will be temporarily used by the central Arizona project in the quantities and at the time it will be needed for its water development projects. This is a recapture clause, but still requires the upper basin to deliver 75 million acre-feet in any 10-year period to the lower basin.

(11) Strike all of section 308(b), beginning on line 23, page 12, and ending on page 13, line 6, and reletter the subsequent subsections "(c)" to "(b)", page 13, line 7; "(d)" to "(c)", page 13, line 22, and "(e)" to "(d)", page 14, line 13.

The upper basin objects to reserving water without charging it to a State in the lower basin. The lower basin States should decide where this water should be used and it should be charged accordingly.

(12) On page 15, in line 12, strike "title III" and in lieu thereof add "titles II and III".

The purpose of the proposed amendment is to indicate appropriations to carry out both titles II and III are to be accounted for through the development fund created by the act.

(13) On page 16, line 4, strike all of the phrase lettered "(B)" which ends on line 8 and renumber "(C)" "(B)" in line 8.

This language is not needed because in a new title VII the Colorado River development fund is assigned a new function by amending the Boulder Canyon Project Adjustment Act.

(14) On page 16, line 10, strike the phrase reading "as provided in the Glen Canyon filling criteria (27 Fed. Reg. 6851)" and at the end of the sentence on page 16, line 15, add the following:

"In addition to reimbursement to the Upper Colorado River Basin fund for the cost of deficiency energy purchased as provided in the Glen Canyon filling criteria (27 Fed. Reg. 6851), the Secretary is directed to reimburse said fund for all expenditures made from that fund to meet Hoover Dam generation deficiencies, including but not limited to the value of energy impairment and the value of capacity impairment attributed to lowering the elevation of the water surface of Lake Mead below elevation one thousand one hundred and twenty-three feet above mean sea level."

The purpose of this amendment is to insure that the upper basin fund will be reimbursed for all money heretofore expended to pay for all types of deficiencies or impairments of power generation at Hoover Dam by reason of the filling of Glen Canyon Reservoir.

(15) On page 20, line 7, strike the period after "programs" and insert a colon in lieu thereof followed by the proviso:

"*Provided, however*, That all of the separable and joint costs allocated to recreation and fish and wildlife enhancement at the Dixie project and the mainstream reservoir unit shall be borne by the United States and shall be nonreimbursable."

This amendment is desired by the Secretary of the Interior and the State of Utah. It would exempt the Dixie project from the terms of the Federal Water Project Recreation Act and continue the authority of the Secretary under the Dixie Project Act to provide basic recreation facilities and to acquire such lands as are necessary for this purpose.

(16) On page 23, strike beginning on line 9 the following words, "which may in its discretion remand any such action to the United States District Court for the District of Columbia".

It is the position of the upper basin States that they should not have to try matters dealing with the Colorado River, should such arise, in the Federal District Court for the District of Columbia. This is a change from the language of Public Law 485–84th Congress (Colorado Storage Project Act) yet seeks to accomplish the same purpose. The wiser course would seem to be to keep the law of the river on matters of suits the same.

(17) At the end of section 502 on page 23, add a new section 503 and renumber the present section 503 as section 504. The new section 503 reads:

"SEC. 503. In connection with the planning, development, and operation of any and all units and facilities of the Lower Colorado River Basin project, the Secretary is directed to refrain from any actions or activities which will in any way impair, prejudice, or preclude—

"(a) The future Federal authorization or other development of water resource projects in the upper division States so long as water uses in the upper division States do not exceed those waters available to such States taking into consideration—

"(1) The assumption set forth in subparagraph (1), paragraph (d) of section 201 of this Act; and

"(2) The priority set forth in subparagraph (3), paragraph (c) of section 304 of this Act; and

"(b) The ability of the powerplants of the Colorado River storage project to generate those amounts of power and energy that, within the limitations of the Colorado River Storage Project Act, will result in the maximum possible monetary benefits to the Upper Colorado River Basin fund, taking into consideration the assumption set forth in subparagraph (2), paragraph (d) of section 201 of this Act, unless the Upper Colorado River Basin Fund shall be fully reimbursed on an annual basis for any loss of maximum power revenues occasioned by the operation of units or facilities of the Lower Colorado River Basin project: *Provided*, That nothing in this Act shall be construed to prevent the Secretary from operating the hydroelectric powerplants and transmission lines authorized by this Act to be constructed, operated, and maintained by the Secretary, in conjunction with other Federal powerplants, present and potential, so as to produce the maximum amount of power revenues for accrual to the Lower Colorado River Basin Development Fund and to the Upper Colorado River Basin Fund, in addition to those revenues which otherwise would be available to each of said funds, respectively."

This amendment directs the Secretary to act with reference to the lower basin projects so that the upper basin will be in a position to develop its water in the future. Provision is also made for the Secretary to operate the upper basin's Colorado River storage project powerplants to return maximum benefits to the Upper Colorado River Basin Fund. The Secretary must also reimburse the upper basin fund for loss in revenues caused by operation of lower basin facilities, such as the loss of head at Glen Canyon powerplant caused by backwater of Marble Canyon Reservoir. The Secretary can operate the power facilities authorized by this act in conjunction with other Federal plants so that there will be a greater accrual of revenues to each of the basin funds than would be otherwise available.

(18) On page 24, line 15, add after "California" the word "Colorado" and following "Utah" in the same line the words "and Wyoming". In line 16 on page 24, following the word "State" add the words "one member appointed by the Upper Colorado River Commission and one member appointed by concurrence of the Governors of Arizona, California, and Nevada".

The amendments proposed are addressed to making the Colorado Regional Water Commission fully representative of all the agencies and States of the

Colorado River Basin which have vital functions in the development of the entire basin. Since it is to be an advisory commission on the Colorado River, it should be fully representative.

(19) On page 25, the following clarifying amendments are suggested:

(*a*) In line 5 following the word "coordination" add "and operation". In the same line, strike the word "further" and add in lieu thereof "present and future".

(*b*) In line 6 following the word "plans" add "and projects".

(*c*) In line 8 following the word "related" add "power and" and strike the word "lower" in the same line.

(*d*) In line 11, change "III" to read "II".

(*e*) In line 17 after the word "related" add "power and".

These amendments merely clarify the wording so that this part of the bill is as comprehensive as what has preceded it.

(20) At the end of page 26, add a new "title VII" amending the Boulder Canyon Project Adjustment Act section 2(d). This amendment reads:

"TITLE VII—AMENDMENT TO BOULDER CANYON PROJECT ADJUSTMENT ACT

"Section 2(d) of the Boulder Canyon Project Adjustment Act (U.S.C., 1940 edition, title 43, sec. 618a(d)), as amended (62 Stat. 284), is hereby further amended to read as follows:

"'(d) Transfer, subject to the provisions of section 3 hereof, from the Colorado River Dam Fund to a special fund in the Treasury, hereby established and designated the "Colorado River Development Fund," of the sum of $500,000 for the year of operation ending May 31, 1938, and the like sum of $500,000 for each year of operation thereafter, until the purposes specified in this section 2(d) are accomplished. The transfer of the said sum of $500,000 for each year of operation shall be made on or before July 31 next following the close of the year of operation for which it is made: *Provided*, That any such transfer for any year of operation which shall have ended at the time this section 2(d) shall become effective shall be made, without interest, from revenues received in the Colorado River Dam Fund, as expeditiously as administration of this Act will permit, and without readvances from the general funds of the Treasury. Receipts of the Colorado River Development Fund for the years of operation ending in 1938, 1939, and 1940 (or in the event of reduced receipts during any of said years, due to adjustments under section 3 hereof, then the first receipts of said funds up to $1,500,000), are authorized to be appropriated only for the continuation and extension, under the direction of the Secretary, of studies and investigations by the Bureau of Reclamation for the formulation of a comprehensive plan for the utilization of water of the Colorado River system for irrigation, electrical power, and other purposes, in the States of the upper division and the States of the lower division, including studies of quantity and quality of water and all other relevant factors. The next such receipts up to and including the receipts for the year of operation ending in 1955 are authorized to be appropriated only for the investigation and construction of projects for such utilization in and equitably distributed among the four States of the upper division: *Provided, however*, That in view of distributions heretofore made, and in order to expedite the development and utilization of water projects within all of the States of the upper division, the distribution of such funds for use in the fiscal years 1949 to 1955, inclusive, shall be on a basis which is as nearly equal as practicable. Such receipts for the years of operation ending in 1956 to 1965, inclusive, are authorized to be appropriated for the investigation and construction of projects for such utilization in and equitably distributed among the States of the upper division and the States of the lower division. The terms "Colorado River system", "States of the upper division", and "States of the lower division", as so used shall have the respective meanings defined in the Colorado River compact mentioned in the Project Act. Such projects shall be only such as are found by the Secretary to be physically feasible, economically justified, and consistent with such formulation of a comprehensive plan. Nothing in this Act shall be construed so as to prevent the authorization and construction of any such projects prior to the completion of said plan of comprehensive development; nor shall this Act be construed as affecting the right of any State to proceed independently of this Act or its provisions with the investigation or construction of any project or projects.

"'Receipts of the Colorado River Development Fund for the year of operation ending May 31, 1966, and for so many years thereafter as is necessary to accomp-

lish the purposes hereinafter described, are authorized to be appropriated under the direction, control, and discretion of the Secretary for the sole purpose of making allowances to the Hoover Dam powerplant for deficiencies in firm energy generation at that powerplant, as such deficiencies are defined in the document entitled "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. In the event that any annual or accumulative appropriation to the Colorado River Development Fund shall be insufficient to accomplish the defined Hoover Dam powerplant allowances, the Secretary may provide the deficit as a cost of operation and maintenance under Section 1(a) of this Act: *Provided, however,* That the making of any allowances as herein defined shall be solely at the discretion of the Secretary and shall be limited to the method herein prescribed. Transfers under this section 2(d) shall be deemed contractual obligations of the United States, subject to the provisions of section 3 of this Act (43 U.S.C. 618a).

" 'The appropriations to the Colorado River Development Fund shall terminate with the year of operation ending May 31, 1987, or at such earlier date that the Secretary shall declare that no further Hoover Dam allowances shall be made. If any monetary balance remains in the said fund at the time of its termination, such balance shall be credited to the purposes specified in section 1(b) of this Act.' "

This amendment directs the use of the Colorado development fund created by the Boulder Canyon Project Adjustment Act after May 31, 1966, to pay for deficiencies in Hoover energy generation occasioned by the filling of Glen Canyon Dam so far as such amounts will be sufficient. If the fund proves to be insufficient to make the full payment, the balance is to be transferred to the operation costs at Hoover Dam.

(21) On page 27, line 1, change "VII" to read "VIII".

This is merely an amendment required by reason of the adding of a new "Title VII".

Mr. Chairman, on behalf of the Upper Colorado River Commission, thank you for the opportunity to appear here and present our views and recommendations relative to H.R. 4671, which is among the most important Colorado River water resource bills to be before the Congress during the turbulent history of the Pacific Southwest.

RESOLUTION

Whereas the States of the Lower Colorado River Basin need the construction of major additional facilities to provide an adequate water supply for a growing and nationally important area, and

Whereas numerous bills have been introduced in the Congress to authorize a federally financed project to accomplish this end, and

Whereas the Upper Colorado River Commission representing the upper division States of the Colorado River Basin is faced with identical problems, and desires to cooperate with the States of the lower basin and to support necessary Federal legislation, provided that such legislation adequately protects the continuing growth of the States of the upper division; Now, therefore, be it

Resolved by the Upper Colorado River Commission at an adjourned regular session assembled at Salt Lake City, Utah, this 16th day of August 1965, That it approves and supports the proposed Federal participation in the further development of the Colorado River Basin *provided,* and *provided only,* when and if the following principles are incorporated into any authorizing legislation:

1. That the Secretary of the Interior shall be directed and required to plan and operate any and all Federal projects within the Lower Colorado River Basin, whether heretofore or hereafter constructed, to the end that diversions from the mainstream of the Colorado River below Lee Ferry shall be limited when necessary so as not to prejudice, impair, or preclude the future Federal authorization or other development of projects which will be required for the annual consumptive use of water from the Colorado River system in the upper division States of 7,500,000 acre-feet of water, or such part thereof as may be physically available, after delivery of 75 million acre-feet at Lee Ferry in any period of 10 consecutive years.

2. That concurrently with any congressional authorization of the Lower Colorado River Basin project, or any of its component parts, there also be authorized

a project or projects to import water into the Colorado River Basin from sources outside the natural drainage area of the Colorado River system, in such quantities as will—

(*a*) Relieve the States of the Colorado River Basin from any obligation to deliver water to the Republic of Mexico pursuant to the terms of the Mexican Water Treaty of 1944.

(*b*) Supply the lower basin States with that amount of water required for the consumptive use of 7½ million acre-feet per year which is not supplied in accordance with article III(a) of the Colorado River compact.

(*c*) Supply the upper basin States, by exchange or otherwise, with that amount of water required for the consumptive use of 7½ million acre-feet per year which is not supplied in accordance with article III(a) of the Colorado River compact.

3. That the primary purpose of the Colorado storage project is to implement beneficial consumptive use of water in the upper basin and that Glen Canyon Reservoir will not be drawn below its rated head, except as it may be necessary to comply with article III(d) of the Colorado River compact and except as may be approved by the Upper Colorado River Commission.

4. That the diversion of funds from the Upper Colorado River Basin fund to the Colorado River Dam fund as payment for the so-called Hoover Dam deficiencies, pursuant to the Glen Canyon filling criteria, be terminated forthwith.

5. That all expenditures made from the Upper Colorado River Basin fund to meet deficiencies in generation at Hoover Dam, pursuant to the Glen Canyon filling criteria, be reimbursed to the Upper Colorado River Basin fund in full, such reimbursement to include, but not be limited to, the cost of deficiency energy purchased, the cost of energy impairment and the cost of capacity impairment.

Be it further resolved, That in order to carry out and implement the intent of this resolution the staff of the Upper Colorado River Commission is authorized and instructed to—

(*a*) Maintain close and continuous liaison with the Governors of the States of Colorado, New Mexico, Utah, and Wyoming, the members of the congressional delegations of those States, and the members of the Upper Colorado River Commission.

(*b*) Negotiate with representatives of the Lower Colorado River Basin States.

(*c*) Present for the consideration of this commission any draft of legislation which is prepared as a result of the negotiations authorized herein.

CERTIFICATE

I certify that the foregoing is a true and correct copy of a resolution adopted by the Upper Colorado River Commission at an adjourned regular meeting assembled at Salt Lake City, Utah, on the 16th day of August 1965.

IVAL V. GOSLIN,
Executive Director and Secretary.

Mr. ROGERS. Mr. Tipton?

Mr. TIPTON. Mr. Chairman, gentlemen of the committee, I have a prepared statement which I will ask be placed in the record. I shall not read from it.

Mr. ROGERS. Without objection, Mr. Tipton, your statement will be included in the record, and you may proceed to discuss it or summarize it as you wish.

(Mr. Tipton's prepared statement, including the exhibits, follows:)

STATEMENT OF ROYCE J. TIPTON, CONSULTING ENGINEER, OF DENVER, COLO.

My name is Royce J. Tipton; I reside in Denver, Colo. I am a consulting engineer, and am president of the engineering firm of Tipton & Kalmbach, Inc., whose main office is in Denver, Colo. I am appearing for the Upper Colorado River Commission.

Because of the pending legislation which seeks to authorize the construction of the central Arizona project, the firm of Tipton & Kalmbach, Inc., was retained by the Upper Colorado River Commission to make a study of the water supplies of the Colorado River available for use by the States of the upper division of the Colorado River Basin and for use from the main stem of the

Colorado River by the States of Arizona, California, and Nevada in the Lower Colorado River Basin.

Exhibit 1 is a map on which has been depicted the Colorado River Basin, the principal rivers of the basin, and other features such as the various units of the Upper Colorado River storage project, and Lakes Mead, Mohave, and Havasu in the lower basin. Certain other dam and reservoir sites are depicted, such as Bridge Canyon, and Marble Canyon in the lower basin, and Gray Canyon, Echo Park, Split Mountain, Cross Mountain, and Whitewater in the upper basin. Lee Ferry is indicated on the map, it being the division point between the upper basin and the lower basin. Glen Canyon Dam is located essentially at Lee Ferry. The line of the proposed central Arizona project is shown on the map as a broken line. The various features of the project are indicated on the map.

Our studies, dated July 1965, indicate that nature has decreed that there will not be sufficient water in the Colorado River to supply the 7.5 million acre-feet apportioned to the States of the upper basin of the Colorado River Basin and also the 7.5 million acre-feet for use by the three States—Arizona, California, and Nevada—plus the 1.5 million acre-feet allocated to Mexico by the Mexican Water Treaty of 1944.

At the time the Colorado River compact was negotiated in 1922, and at the time the Congress gave approval to the compact in 1928, estimates and records of the flow of the Colorado River at Lee Ferry, which is the division point between the upper and lower basins, indicated there was more than enough water to enable the States of the upper basin to deplete the flow by 7.5 million acre-feet per year and at the same time deliver at Lee Ferry 75 million acre-feet in successive 10-year periods for use in the lower basin as provided by the Colorado River compact. The apparent surplus at that time was more than sufficient to take care of the delivery of 1.5 million acre-feet to Mexico, which subsequently was allocated to her by the Mexican Water Treaty of 1944.

Those who were responsible for negotiating the Colorado River compact, and their engineering and legal advisers, were among the most outstanding experts in the United States. At the time the compact was negotiated everyone identified with Colorado River matters was, in general, very pleased with the compact. Interests in the upper basin considered that there was ample water reserved for future uses in the basin. However, in 1930 there began a period of low flow in the Colorado River Basin as well as in other intermountain basins. Such condition has persisted for 35 years. If there should be a repetition of streamflows such as has existed during the 70-year period 1896 to 1965, not only would the water supplies for the States in the upper division of the Colorado River Basin be well below the amount apportioned to those States by the Colorado River compact, but there would not be sufficient water to support any additional major development in the States of the lower basin.

Exhibit 2 depicts the situation. The scale on the left of the exhibit indicates flow in million acre-feet units by 2 million-acre-feet intervals. The scale across the bottom is a time scale extending by years from 1895 to 1965. The heavy irregular line represents 10-year running averages of the virgin flow of the Colorado River at Lee Ferry from 1896 through 1965. The heavy line at the 7.5 million-acre-feet point on the exhibit represents the 7.5 million acre-feet apportioned to the lower basin by article III(a) of the Colorado River compact, which incidentally is the amount the States of the upper division are obligated to deliver at Lee Ferry by article III(d) of the compact. On top of that heavy line is indicated another increment of 7.5 million acre-feet representing the amount apportioned to the upper basin by article III(a) of the Colorado River compact.

It may be noted from exhibit 2 that the virgin flow for the 10-year period ending in 1906 was about equal to the 15 million acre-feet apportioned between the upper and lower basins by article III(a) of the Colorado River compact. The exhibit indicates that the flow rapidly increased, and reached a high about the time the Colorado River compact was negotiated. The virgin flow at Lee Ferry for the 10-year period ending in 1922 averaged about 18.5 million acre-feet. The water supply for the 10-year period ending in 1923 approached 19 million acre-feet. The stippled area above the 15-million-acre-feet line indicates the apparent surplus which existed at the time the Colorado River compact was negotiated, and which persisted until the 10-year period ending in 1933. From 1933 to the present time the successive 10-year flows have been below 15 million acre-feet, except for the 10-year period ending in 1950 when it was about equal to 15 million acre-feet. It was assumed that any water that might be allocated to Mexico would be derived from the water represented by the stippled area.

The hatched area of exhibit 2 represents the deficiency in the water supplies apportioned to the upper basin by the Colorado River compact. The mean annual virgin flow at Lee Ferry was 14.9 million acre-feet for the 70-year period 1896 through 1965. The upper basin at the present time does not have the development which would utilize the full 7.5 million acre-feet per year. Total water requirements in the States of the upper division will at some time exceed the 7.5 million acre-feet. (The Upper Colorado River compact allocated 50,000 acre-feet to Arizona out of the 7.5 million acre-feet apportioned to the upper basin by the Colorado River compact; thus the States of the upper division actually have 7.45 million acre-feet, net, under the two compacts.) It is believed that at some time in the not too distant future there will be beneficially consumptively used as much water in the upper basin as nature will supply.

Detailed river and reservoir operation studies were made of the entire river system, first to determine how much water can reasonably be relied on for beneficial consumptive use in the States of the upper division of the Colorado River Basin and, second, how much water will be available to satisfy existing and proposed uses in the lower basin, limited at the moment by the 7.5 million acre-feet which the Supreme Court recognized as having been apportioned to the three States of the lower basin—Arizona, California, and Nevada. A series of studies was made to determine the relation between the Upper Colorado River Basin storage capacity and the amount of depletion that could be made in the upper basin while at the same time delivering 75 million acre-feet at Lee Ferry in successive 10-year periods. The results of this series of studies are shown on exhibit 3. The scale on the left of the exhibit indicates by units of 1-million-acre-feet depletions by the States of the upper division. The scale across the bottom of the exhibit indicates the required reservoir capacity in units of million acre-feet to permit a given depletion to be made as read on the scale at the left. The aggregate capacity of the units of the Upper Colorado River storage project which have been completed or which are under construction, is 29 million acre-feet above rated power head. This includes bank storage. With that capacity, the limit of depletion in the States of the upper division is 6.3 million acre-feet including reservoir evaporation. Deducting reservoir evaporation, the amount available for use at the points of use is only about 5.6 million acre-feet. In order to approach the total beneficial consumptive use of 7.45 million acre-feet apportioned to the States of the upper division by the Upper Colorado River compact (7.5 million acre-feet minus 50,000 acre-feet to Arizona), some 72 million acre-feet of storage capacity would be required. Reservoir losses would be about 1.5 million acre-feet. No such reservoir potential exists in the upper basin. While exhibit 3 indicates the results for the study period 1921 through 1964, another period, 1903 through 1964, was used for another study and results identical to those indicated on figure 1 were obtained.

Regardless of what may happen in the lower basin, so long as the States of the upper division are obligated to deliver at Lee Ferry 75 million acre-feet in successive 10-year periods, the amount of water available will fall far short of that apportioned to the upper division by the Colorado River compact and the Upper Colorado River compact. The only way this situation can be relieved is by the importation of water from places of water surplus.

To determine how much water would be available for beneficial consumptive use by the States of the lower division, 36 studies were made extending for various lengths of time, and assuming various rates of increased beneficial consumptive use in the States of the upper division. Because at present any increase in lower basin uses must rely on water apportioned to the States of the upper division but not presently used by them, the timing and magnitude of increased uses by the States of the upper division appear to some to be important. Some believe that if sufficient unused upper division water were available to the central Arizona project throughout its payout period the project would be feasible. Others believe that the probability of having major importation projects which can bring new water supplies to the Colorado River Basin is such that this water would be brought into the basin before the unused water supply from the Upper Division States became exhausted and was no longer available for use in the lower basin.

Various estimates have been made of the magnitude and timing of additional developments in the upper basin. On exhibit 4 are indicated the prognostications made by the State of Arizona, the U.S. Interior Department as of July 1965, the Colorado River Board of California, and the States of the upper division.

The scale on the left of the figure indicates the estimated depletions by the States of the upper division in units of 1 million acre-feet. The scale across the bottom is a time scale extending from the year 1960 to the year 2030. It may be noted that there is a wide spread among the estimates of the various entities, that of Arizona being the lowest, and that made by the States of the upper division being the highest. Those made by the U.S. Interior Department and the Colorado River Board of California lie fairly close together. In the studies the estimates made by the U.S. Interior Department, the Colorado River Board of California, and those made by the States of the upper division were used.

Various deliveries at Lee Ferry were assumed, one amounting to the compact delivery of 75 million acre-feet in successive 10-year periods as provided for by article III(d) of the Colorado River compact. In another series of studies a delivery of 8.25 million acre-feet per year was assumed, in order to generate power the sale of which would aid in financing the construction of projects in the upper basin. Another series of studies assumed a delivery of 8.75 million acre-feet, the excess release being for the same purpose—the accrual of funds to aid in the financing of additional development in the upper basin. In one series of studies it was assumed that Lake Mead would not be drawn below rated power head or a content of 16.453 million acre-feet. Another series of studies assumed Lake Mead would be drawn down to a content of 8 million acre-feet, which is the lowest it could be drawn down and still supply water to the intake for Nevada. Another study assumed the drawing down of Lake Mead to the absolute limit of dead storage. A net inflow from Lee Ferry to Lake Mead of 675,000 acre-feet was assumed. This represents the historic inflow depleted for reservoir evaporation at Marble Canyon Reservoir, depletions by the Dixie project on the Virgin River in Utah, and by some additional depletion of the Little Colorado River. Losses below Hoover Dam were assumed at 810,000 acre-feet after the salvage program proposed by the U.S. Interior Department has been completed. It was assumed that the Bill Williams River would contribute a net of 55,000 acre-feet to the river below Lake Mead after certain developments have been made on the Bill Williams River.

The beneficial consumptive uses by the States of the lower basin were assumed as 4.4 million acre-feet by California, 2.8 million acre-feet by Arizona, and 300,000 acre-feet by the State of Nevada. The minimum water supply required by the central Arizona project is 1.2 million acre-feet. It is assumed that the diversion from the river would be synonymous with beneficial consumptive use as defined by the court, because it is not believed that any of the return flow from the central Arizona project would reach the main stem of the Colorado River.

A list of the studies is given in table B–1. All of the river and reservoir operation studies disclosed that there would be substantial shortages in the water supplies for the lower basin under the above assumptions at the end of this century unless Lake Mead were to be drawn to the top of the dead storage. In two of the studies the emptying of Lake Mead would delay the occurrance of shortages until the year 2006 in one case, and to the year 2008 in another case. Under the other assumptions based on the schedule of the upper division depletions as estimated by the States of the upper division, even if Lake Mead were emptied, substantial shortages would occur by the year 2000.

The results of the most pertinent studies are indicated in tables 2 and 2–A.

It is concluded that, without question, the importation of water from sources of surplus supplies is extremely important to both the lower basin and upper basin.

It is fully realized that making river and reservoir operation studies utilizing historic records implies that there will be an exact reoccurrence of water supplies as disclosed by the historic records; this, of course, is not possible. Some authorities are trending more and more to the use of probability methods in predicting future water supplies; such studies also must be based on what has happened in the past, but various studies can be made whereby the records of various years are shuffled, recognizing in the shuffling that a series of high years is apt to occur together, and a series of low years is apt to occur together. A strict probability analysis of the virgin flow of the Colorado River at Lee Ferry as estimated and as recorded for the 70-year period 1896 through 1965 discloses that the median year is equal to the average year of 14.9 million acre-feet. It can be assumed that from a probability standpoint there is a 50-percent chance the water supply would exceed 14.9 million acre-feet per year, and a 50-percent chance it would be less than 14.9 million acre-feet per year.

To take care of compact uses and the Mexican Treaty burden, the virgin flow at Lee Ferry would have to average slightly more than 17 million acre-feet per year. A strict probability analysis discloses that there is only a 30-percent chance that this flow would be equaled or exceeded. Utilizing only the 6.3 million acre-feet which at the moment nature has destined as a limit to which the upper basin can deplete the flow at Lee Ferry, the amount of water required to supply this and to meet the Mexican Water Treaty burden, and the Supreme Court allocations to the States of the lower division, equals slightly more than 16 million acre-feet per year. There is only a 40-percent chance that this quantity of water would be equaled or exceeded.

Whatever method of analysis of the water supplies of the Colorado River is used, the results are essentially the same, i.e., there is not enough water in the river to satisfy the apportionments under the compact and the allocation to Mexico under the Mexican Water Treaty. Importation of water is the only solution to the situation. It would appear to be extremely unwise to authorize the construction of a project in the lower basin on the supposition that there will be enough unused water in the upper basin to supply the needs of the project until importation of water is made. If the Central Arizona project is authorized, the authorization for the importation of water into the Colorado River Basin should be made at the same time.

Mr. TIPTON. I shall make an oral presentation which, because of the limits on time, will be short.

I will refer to various exhibits which are on the easel. Those same exhibits appear in the back of my prepared statement if members of the committee would desire to refer to the exhibits there rather than on the easel.

The first exhibit on the easel I shall not discuss. It is a map of the Colorado River Basin. You are all familiar with it. There has been presented to you the lower basin. This includes the upper basin with some emphasis on the Colorado River storage project.

The next——

Mr. ROGERS. Now, Mr. Tipton, if you will excuse me just a minute, the appendages to your statement will be included as a part of your statement in the record.

Mr. TIPTON. Yes. Mr. Chairman, it is my impression that the printer can work better from the large-scale drawing, so if they may be submitted as a part of my record, part of my statement, I shall appreciate it.

Mr. ROGERS. Yes. Now, are they the same drawings as attached to your statement?

Mr. TIPTON. Yes, they are the same and there are a few corrections to be made on the map. I will make these changes.

Mr. ROGERS. Without objection, those changes will be made in the record.

Mr. TIPTON. At the time the Colorado River compact was negotiated in 1922, the ones identified with the negotiation of the compact constituted the best water experts in the United States, both legal and engineering. The father—the so-called father of the compact was Delph Carpenter, a very brilliant chap. The engineering adviser to the Federal representative, Herbert Hoover, was A. P. Davis, one of the best engineers the country has ever known.

At that time it was firmly believed there would be in the river, including tributaries, over 20 million acre-feet of water, over 18 million acre-feet of virgin flow at Lee Ferry.

There appears on the easel a graph which shows 10-year running mean of the virgin flow of the river at Lee Ferry. Fortunately no

one disputes the amount of the estimated virgin flow at Lee Ferry. All engineers who have been identified with this problem for a great many years agree with that virgin flow.

The heavy line, ragged line, running across the graph represents those 10-year running means. It may be noted that in the 10-year period ending in 1922, when the compact was negotiated, the 10-year average of the virgin flow at Lee Ferry was about 18.5 million acre-feet. In the next year, 1923, the 10 years ending there, it approached 19 million acre-feet. When tributary flows were added, tributary flows below, it would bring it up to well over 20 million acre-feet.

The compact was negotiated—you are all familiar with the terms of it which I will not repeat. Everyone was happy. The upper basin was happy. Everyone identified with the Colorado, its development, felt assured of a future water supply.

Time went on and, in addition to the amount that was allocated between the two basins, which is shown at the 15 million acre-foot line running across the graph, in addition to that there was the surplus water represented by the stippled area above that 15 million acre-foot line.

There was no conception whatsoever but what the Mexican—any Mexican obligation which might be imposed by a treaty subsequently negotiated could be more than fulfilled out of that area which is shown as the stippled area.

Time went on. Along about 1930 the flow of the river began to take a nosedive and the low flow has persisted now for 35 years. In 1965 it will be up somewhat.

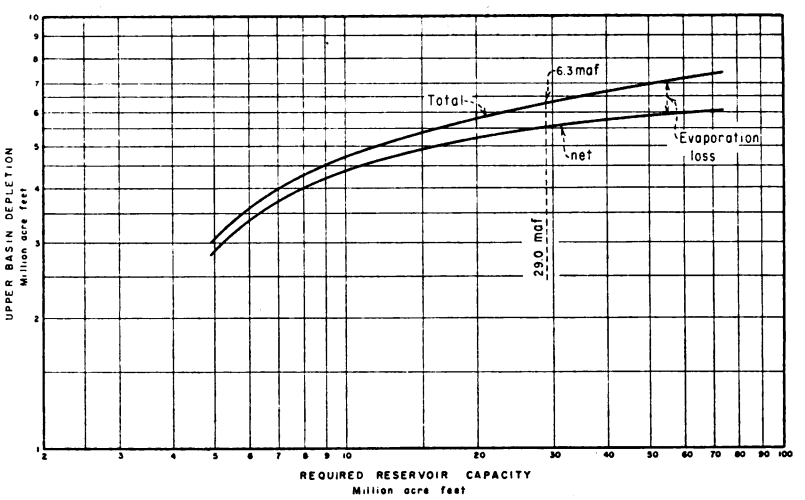
If you will note from the graph, the trend is downward, downward, downward, until the 15 million acre-foot line is crossed in the 10-year period ending in about 1932. The hatched area below the 15 million acre-foot line and above the line representing the 10-year mean annual flows at Lee Ferry represent the deficiency in the water supply to satisfy the allocation of the Upper Colorado River Basin made by the Colorado River compact. And it has never in the 35 years—never has the 10-year average flow ever reached the 15 million mark except very momentarily in the 10 years ending in 1950.

Now, what happens from now on nobody knows, absolutely nobody. The trend at the moment is upward. That trend might correspond to the trend that started in 1940, and after going for a few years might again drop off.

My first task was to determine then how much water is there available in the upper basin as imposed by nature for use by the upper basin? I made an analysis of the yield in the upper basin or the amount of beneficial consumptive use that could be made in the upper basin and at the same time deliver the 75 million acre-feet in successive 10-year periods at Lee Ferry as provided by article III(d) of the compact. It has been known since the compact was negotiated that storage would be required, longtime holdover storage to enable the upper basin to make its depletions. So the graph you see now represents the relation between storage capacity and the amount that the upper basin can deplete the flow of the river.

52-850—65——34

EXHIBIT 3



COLORADO RIVER 1921-1964
UPPER BASIN DEPLETION
VS. REQUIRED RESERVOIR CAPACITY
7.500 maf DELIVERY AT LEE FERRY

The active capacity of the upper Colorado River storage project, including those units now constructed and in operation and those under construction, is 29 million acre-feet, including bank storage. The storage in that amount, the depletion in the upper basin, is limited to 6,300,000 acre-feet per year, including reservoir evaporation. Deducting the reservoir evaporation from the storage project, upper Colorado River storage project, there is left over 5,600,000 acre-feet for use up to the point of use.

In order to fully attain the objective of utilizing 7,500,000 acre-feet and based on a longtime period, 1906 up to date, there would be required 72 million acre-feet of storage in the upper basin, only for holdover regulatory purposes in order to enable the upper basin to deliver—the Upper Division States to deliver 75 million acre-feet in a 10-year period.

There is not that much storage, of course, potential in the upper basin. So we have to face that fact. That is a fact regardless of whatever happens in the lower basin. We are short that much water and the only way to alleviate that situation is by new water brought into the basin in some fashion.

Now, I went to the lower basin. In making these studies, from time to time there were meetings held with the engineering advisory committee of the Upper Colorado River Commission and with others. Not only were studies reviewed by them but the drafts of the report were reviewed by all the engineers and committees.

I said at the outset that I hoped the studies would show an adequate supply for the central Arizona project. Arizona I consider my second State. I have done more engineering work in Arizona than any other State in the West with the exception of my own State, Colorado. My work dates back a good many years. I testified in behalf of this

same project back 20 years or so ago, before the same committee. I testified for Arizona in the Arizona-California suit. The master paid little attention to my testimony. The only solace I get is he didn't pay any attention to anybody else's. [Laughter.] He hung his hat on legislative history and the contracts that are entered into between the Secretary of the Interior and the various interests in the lower basin. And that was simple.

I have had other assignments—ground water. I was engineer adviser to the mediator who settled the Buckeye controversy which involved every single water user in the Gila and Salt River Basin. So my sympathy lies with Arizona. Unfortunately, these studies did not turn out that way.

Now, we made 36 studies of the water supply, various periods, using various assumptions as to depletions in the upper basin, various assumptions as to deliveries at Lee Ferry, and in no single study did we find an adequate water supply for central Arizona. We found the same as the Bureau of Reclamation, that there would be a water supply up to some time toward the end of the century.

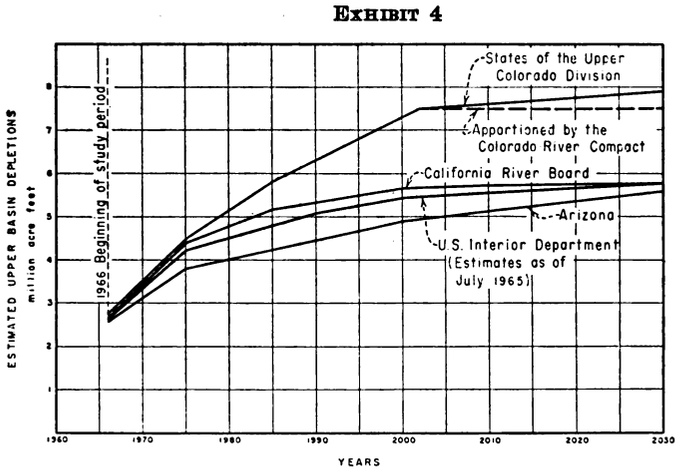
Some of these studies showed the shortage might occur as early as the 1980's; others, the middle 1990's. In the year 2000, all of our studies showed very substantial shortage unless Hoover, Lake Mead, were depleted to dead storage with no power being developed, and that would only delay the problem for a very few years.

There are many factors in this which require judgment.

The next exhibit shows estimates made by various entities as to the progressive depletion of the river flow by the upper basin. The lowest is Arizona which we dare not use. It is unrealistic. It doesn't take into consideration even authorized projects.

The next is the Department of the Interior. The next is the Colorado River Board of California. Uppermost is estimates made by the States, the responsible officials of the States of the upper Colorado River division. I used all of those except, as I say, Arizona.

EXHIBIT 4



ESTIMATES OF
UPPER BASIN DEPLETIONS

Now, the Bureau apparently recognizes that the depletions might be greater than estimated, and I wish to put in the record my urging the committee to read the statement on page 11 of my report which is a statement that the Department of the Interior made in 1959 concerning possible upper basin development. That statement is a good statement. I agree with it and it does not conform by any means with the curve on this graph which shows the prognostications of the Department of the Interior.

Mr. Dominy on August 25, the day before yesterday, states—

I will brief this. I won't take time to read it. He recognizes that:

> If the upper basin depletion is greater than we have estimated in our studies, then the reduction in water supplies could occur as early as 1985, and we have recently studied our payout on the Colorado storage project and we could still payout, on the works now underway, participating projects and all of the big dams, with such a reduction in waterflows.

TABLE B–1.—*Summary of studies*

Study No.	Period	Depletions	Delivery [1]	Lake Mead minimum content [1]
1	1921 to 1964	States	USID	16,453
2	do	USID	do	16,453
3(a)	do	CRB	CRB	16,543
4	do	States	8,250	16,453
5(b)	do	do	8,250	16,453
6	1930 to 1964	do	8,250	16,453
7	do	USID	8,250	16,453
8	1914 to 1964	States	8,250	16,453
9	1921 to 1964	USID	8,250	16,453
10	do	do	8,250	8,000
11	do	do	8,250	0
12	do	do	8,750	16,453
13	do	do	8,750	8,000
14	do	do	8,750	0
15	do	States	8,250	16,453
16	do	do	8,250	8,000
17	do	do	8,250	0
18	do	do	8,750	16,453
19	do	do	8,750	8,000
20	do	do	8,750	0
21	1906 to 1964	do	USID	16,453
22	do	USID	do	16,453
23(b)	1914 to 1965	do	8,250	16,453
24(b)	do	do	8,250	8,000
25(b)	do	do	8,250	0
26(b)	do	do	8,750	16,453
27(b)	do	do	8,750	8,000
28(b)	do	do	8,750	0
29(b)	do	States	8,250	16,453
30(b)	do	do	8,250	8,000
31(b)	do	do	8,250	0
32(b)	do	do	8,750	16,453
33(b)	do	do	8,750	8,000
34(b)	do	do	8,750	0
35	1906 to 1965	do	7,500	16,453
36	do	USID	7,500	16,453

[1] Values in 1,000 acre-feet.
(a) Colorado River Board gains and losses.
(b) Depletion factor equals 1.0, upper basin reservoirs, 32,000,000 acre-feet maximum.

Now, the flows that we assume pass Lee Ferry, 8,250,000 and 8,750,000, are for the purpose of generating energy to accumulate funds to finance the projects in the upper basin. The Department of the Interior release is for the same purpose. Here Mr. Dominy, much to my satisfaction, says that they have arrived at the conclusion that the releases could be materially reduced as early as 1985 and there would still be funds enough to carry on the development of the upper basin.

Now, the key to much of this is what is the delivery to be at Lee Ferry?

Mr. ASPINALL. Mr. Chairman——

Mr. ROGERS. Mr. Aspinall.

Mr. ASPINALL. Time is getting short and, so that each one could have at least 2 minutes, I ask unanimous consent to yield my time to Mr. Tipton so he can finish his presentation in 2 minutes.

Mr. ROGERS. Without objection, so ordered.

Mr. TIPTON. I will finish in 2 minutes.

I have looked at preliminary studies, with the Bureau, the detailed studies, and reducing deliveries at Lee Ferry to 75 million in 10-year periods and correcting for certain other items, some of which are factual, some of which are a difference of opinion from a technical standpoint, I can arrive at shortages of a million and a half acre-feet using the Bureau's figures by just making those adjustments.

TABLE 2.—*Shortages to California, Arizona and Nevada based on 1921–64 period*

Minimum, Lake Mead	U.S. Department of the Interior depletion schedule						States of the upper division depletion schedule					
	Lee Ferry delivery equals 8,250,000 acre-feet			Lee Ferry delivery equals 8,750,000 acre-feet			Lee Ferry delivery equals 8,250,000 acre-feet			Lee Ferry delivery equals 8,750,000 acre-feet		
Content, million acre-feet	16.453	8.0	0	16.453	8.0	0	16.453	8.0	0	16.453	8.0	0
Study year:												
1983	452						58					
1984	1,159						1,159					
1985	1,205						1,205					
1986	1,247			12			1,247			12		
1987	0			788			1,288			788		
1988	0			829			1,329			829		
1989	0			871			1,371			871		
1990	806			912			1,412			912		
1991	1,429			929			1,429	1,057		929		
1992	1,446			946			1,446	1,221		946		
1993	143			964			1,464	1,238		964		
1994	0			981			1,481	1,255		981		
1995	564			998			1,498	1,272		2,248	143	
1996	1,515			1,015			1,515	1,289		2,265	2,039	
1997	0			0			1,532	1,307		2,282	2,057	
1998	0			437			1,549	1,324	919	2,299	2,074	
1999	813	58		1,066	571		1,566	1,341	1,018	2,316	2,091	
2000	1,583	1,358		1,063	858		2,333	2,108	1,715	2,333	2,108	1,595
2001	1,584	1,359		1,084	859		2,334	2,109	1,722	2,334	2,109	1,414
2002	1,585	1,360		1,085	860		2,335	2,110	1,732	2,335	2,110	1,732
2003	1,586	1,361		1,086	861		2,336	2,111	1,733	2,336	2,111	1,733
2004	1,587	1,362		1,087	862		2,337	2,112	1,720	2,337	2,112	1,720
2005	1,588	1,363		1,088	863		2,338	2,113	1,714	2,338	2,113	1,582
2006	1,589	1,364	632	1,089	864		2,339	2,114	1,235	2,339	2,114	1,235
2007	1,590	1,365	1,043	1,090	865		2,340	2,115	1,736	2,340	2,115	1,736
2008	1,591	1,366	1,031	2,341	2,116	389	2,341	2,116	1,433	2,341	2,116	1,433
2009	1,592	1,367	1,035	2,342	2,117	1,707	2,342	2,117	1,357	2,342	2,117	1,357

NOTE.—Shortages in 1,000 acre-feet.

TABLE 2-A.—*Shortages to California, Arizona, and Nevada based on 1906–65 period*

[Values of shortages in 1,000 acre-feet]

Study year	Depletion schedule of States of upper division		Study year	Depletion schedule of States of upper division	
	Assumed by U.S. Department of the Interior	As assumed by States of upper division		Assumed by U.S. Department of the Interior	As assumed by States of upper division
1966–93	0	0	2005	684	
1994	0	1,338	2006	2,339	
1995	2,324	2,448	2007	1,691	
1996	2,465	2,265	2008	0	
1997	2,282	2,282	2009	0	
1998	2,299	[1] 2,299	2010	1,237	
1999	2,310		2011	2,344	
2000	2,333		2012	0	
2001	2,117		2013	0	
2002	0		2014	1,393	
2003	0		2015	[1] 2,349	
2004	0				

[1] In excess of 2,300 through the year 2025.

NOTE.—Minimum content, Lake Mead, 16,453,000 acre-feet. Annual delivery at Lee Ferry 7,500,000 acre-feet.

Now, Mr. Chairman, I would like to have permission after I have reviewed the Bureau's studies to submit to this committee for the record an analysis of those studies, compared with the studies I have made. I can say this without qualification and say it categorically, that nothing has occurred in these hearings that I have heard that would change my opinion one iota with respect to the studies that I have made or conclusions I have drawn therefrom. I have had no answer to arrive at. I am not—the studies are not done to arrive at any kind of an answer except factual.

Mr. ROGERS. How long will it take to prepare that analysis?

Mr. TIPTON. As soon as I get the official reports from the Bureau.

Mr. ROGERS. When do you expect that?

Mr. TIPTON. I don't know. I have right here what was furnished me which is in the form of worksheets. If I could have those, it would take 1 day or less time, a very very short time.

Mr. ROGERS. As far as closing the record, without objection I think as the matter presently stands, the analysis will be received for the record.

Mr. TIPTON. Mr. Chairman, this sheet here shows the analysis which I made from the—from what I have, but I don't want to submit that to the committee because I don't know whether I have the official records of the Bureau.

Mr. ROGERS. I think there will be plenty of time for it.

Mr. TIPTON. Thank you, gentlemen. That is all I have to say.

Mr. ROGERS. Thank you very much, Mr. Tipton.

The Chair recognizes the gentleman from Florida, Mr. Haley, for 2 minutes.

Mr. HALEY. Thank you, Mr. Chairman.

Mr. Goslin and Mr. Tipton, both of you in your statements indicate and make a strong statement to the effect that in order to even live up

to the Colorado Basin compact, you just don't have enough water to do that. Is that correct?

Mr. GOSLIN. Yes, sir. You do not have enough water to meet compact apportionments in both basins.

Mr. HALEY. Well, now, you also say that in order to do that you must have additional water from other sources. Is that correct?

Mr. GOSLIN. That is correct.

Mr. HALEY. Well, now, let me ask both of you, where are you going to get this water?

Mr. GOSLIN. Congressman Haley, we have not pointed our fingers at any particular place. We do believe, however, that studies should be made by the Secretary of the Interior and a conditional authorization granted by the Congress for diversion of water from some source that we hope the Secretary will find has water available.

Mr. HALEY. Do you think after all these years of study out there—I am sympathetic to your situation—but after all of these years and here is a project that we have now before us to either authorize or reject, yet you have no idea of where you can get the water or the cost if the water is available to meet the commitments of the basin.

Mr. GOSLIN. I think we have some ideas, Mr. Haley, as to where the water might be available. Of course, we do not have any ideas with regard to the cost.

Mr. HALEY. The question I think the Congress, before it should act on anything here, I think we should have something before the Congress to find out if you are going to appropriate water from somewhere else, the Congress ought to be in a position to know what the cost of that diversion might be. Wouldn't you think that would be a reasonable thing for the Congress to have before it?

Mr. GOSLIN. I think that is very reasonable, Congressman Haley. In fact, I think it is mandatory.

Mr. ROGERS. The time of the gentleman has expired. The Chair recognizes the gentleman from California, Mr. Hosmer.

Mr. HOSMER. I reserve my time.

Mr. ROGERS. The Chair recognizes the gentleman from California, Mr. Johnson.

Mr. JOHNSON. Thank you, Mr. Chairman. There are just one or two questions I would like to ask.

Mr. Goslin, in your draft here you follow the principles of the original bill that is before us now, H.R. 4671, with certain modifications?

Mr. GOSLIN. Yes, sir. We used H.R. 4671 as a basis from which to work and made our proposed amendments conform to that draft.

Mr. JOHNSON. With the exceptions that you have stated in your testimony there, you would be in support of the project.

Mr. GOSLIN. Oh, yes. We want to be in support of the project. The idea is to get into this bill certain principles that will make the upper basin water that is going to be temporarily used by the central Arizona project available to us in the quantities and at the times in the future when we may need it.

Mr. JOHNSON. Well, do you also agree with the Bureau of Reclamation that the figures they submitted here would pay out this project?

Mr. GOSLIN. We have made no studies with regard to payout, Congressman Johnson.

Mr. JOHNSON. Well, Mr. Tipton, when you testified in 1947 and 1948 on the original central Arizona project, where were they to get the water?

Mr. TIPTON. Sir?

Mr. JOHNSON. Where were they to get the water for that project at that time? You testified in favor of the project?

Mr. TIPTON. Yes. My testimony was limited to the meaning of the term "beneficial consumptive use" by the compact. It was directed mainly at the Gila River water in Arizona. I did not testify either as to economic feasibility or water supply. I do dimly remember that I said I agreed with Mr. Debler's analysis of the water supply.

Now, you must remember, Congressman, since that time nature has done things that we didn't intend that she do. I am at this moment bruised all over from the fact that nature has pulled the rug out from under my feet on several occasions, and this is not the only one.

Mr. ROGERS. The time of the gentleman has expired. The Chair recognizes the gentleman from Kansas, Mr. Skubitz.

Mr. SKUBITZ. Mr. Goslin, do you think any action ought to be taken on this legislation until we determine first where we are going to get the water?

Mr. GOSLIN. Yes, sir, I do. I think that action should be taken on the legislation. I think the action should include some type of commitment or conditional authorization, if you may please, with regard to an importation of water. The bill as written, as I read it, makes no real commitment as to an import of water. It merely makes a commitment on the part of the Congress that a study shall be made.

Mr. SKUBITZ. Do you agree with that statement, Mr. Tipton?

Mr. TIPTON. Yes, sir.

Mr. SKUBITZ. Thank you.

Mr. TIPTON. And I would go further, Congressman. Maybe I am getting a little beyond your question. I think the study should be made by the Department of the Interior and not by any national water committee.

Mr. SKUBITZ. Thank you, Mr. Tipton.

That is all, Mr. Chairman.

Mr. ROGERS. The gentleman yields back the balance of his time.

The gentleman from Arizona, Mr. Udall, is recognized for 2 minutes.

Mr. UDALL. I wish I had more time because I would like to pay an extensive tribute to both of you. Mr. Tipton, I respect you as a sincere, able, outstanding hydrologist, and my friend, Ival Goslin, is about as able, and dedicated, and sympathetic, and frank, and fine, and candid a person as I have ever dealt with, and I want him to know we will deal with him the way he has dealt with us, and we want to continue to work with him.

Mr. GOSLIN. Thank you.

Mr. UDALL. I just have a couple of minutes and I want to hit some points I think can be handled with some very short answers because of what is expressed or implied in what you said.

Does the gentleman from Utah care to make—Mr. Burton, do you care to make a unanimous consent request?

Mr. BURTON of Utah. Yes. I would like to make a unanimous-consent request that, following one question I have to ask Mr. Goslin, I be able to yield to you my time remaining.

Mr. ROGERS. Is there objection?

Mr. UDALL. I yield for that question.

Mr. BURTON of Utah. What do you estimate the virgin flow of the Colorado River is going to be in 1965, Mr. Goslin?

Mr. GOSLIN. It will be about 17 million acre-feet.

Mr. BURTON of Utah. That is the virgin flow. Now, do you think that is high or low on a given average?

Mr. GOSLIN. I think——

Mr. BURTON of Utah. In the past 10 years.

Mr. GOSLIN. I think that is considerably above what the average has been during the past 30 years, as an example, and much greater than the average for the previous 10 years.

Mr. BURTON of Utah. Thank you.

Mr. UDALL. Mr. Tipton, hydrology is not an exact science.

Mr. TIPTON. By no means.

Mr. UDALL. You have to make a number of different assumptions when you make these studies and honest, reasonable, sincere men can make different assumptions and still——

Mr. TIPTON. Right. More than that, engineering is not an exact science.

Mr. UDALL. All right. And it follows, then, that no living man, no living expert can tell us how much water will flow down the Colorado in 1966 or 1989 or 2002 or any other year.

Mr. TIPTON. I agree.

Mr. UDALL. And you refer in this connection on page 10 to the one technique which is being used by some responsible people and that is the technique of probability studies.

Mr. TIPTON. Right.

Mr. UDALL. This is a recognized method that you wouldn't quarrel with.

Mr. TIPTON. Well, I have used it since 1925, not on water supplies but for other purposes, and, no, I wouldn't quarrel with it. It doesn't give you as good an answer as other methods. It gives you an idea.

Mr. UDALL. Gives you a band of probability within which——

Mr. TIPTON. A band of probability.

Mr. UDALL (continuing). Within which the truth——

Mr. TIPTON. A band of competence. Are you going to play the slot machine or play roulette or what are you going to play?

Mr. UDALL. You can take a low part of the band or take a high part and still be honest and sincere about it.

All right. Now, we talked a lot in these hearings about up to some point in 19—in the 1990's, perhaps there being a sufficient amount of water for a full supply for the central Arizona aqueduct. I want to make it clear that you agree with the proposition that we are not talking about midnight, December 31, 1992, a full supply and the next morning nothing. We are talking about full supply up to some point and thereafter a diminishing trend.

Mr. TIPTON. Quite rapidly. Quite rapid diminishing trend. My studies show that, very rapid.

Mr. UDALL. I recognize that it will diminish rapidly but you wouldn't wake up one morning and find nothing, having had a full supply the night before.

Mr. TIPTON. No.

Mr. UDALL. Now, then, have you made any studies or can you agree or disagree with Mr. Dominy's testimony that assuming 8.25 deliveries at Lee Ferry, on the long-term average, and assuming the deliveries that you think there will be in the years immediately after construction of the central Arizona project, that this project is financially feasible even though we know that eventually there won't be a full supply for the project?

Mr. TIPTON. The word "feasible" I think is being used too loosely here. I wouldn't call a project feasible unless it performs the function for which it was intended. If you cut the water supply from 1.2 million acre-feet to 400,000 acre-feet after a 25-year use of the 1.2, I wouldn't call that a feasible project.

Mr. UDALL. I was talking in terms of feasibility of returning the investment that the taxpayers had in the project.

Mr. TIPTON. Well, power returns a great deal of it. Sure. But you return the cost and then what do you have? It is not performing the functions for which it was intended.

Mr. UDALL. The way to have it perform that function in your judgment as in mine is to get busy on this import problem that will——

Mr. TIPTON. With all speed possible.

Mr. ROGERS. The time of the gentleman has expired. The Chair recognizes the gentleman from Oregon, Mr. Wyatt, for 2 minutes.

Mr. WYATT. Do you seriously feel that this Congress should authorize conditionally or otherwise projects to import water regardless of how many billions of dollars may be involved, a real blank check?

Mr. GOSLIN. Yes, sir. I think definitely there should be something in the legislation to commit the Congress to import water into the Colorado River Basin. It is inevitable that such is going to have to be done sometime in the future. We might as well start facing the problem now and get at it.

Mr. WYATT. I am happy to yield my time to anyone who may want to use the balance.

Mr. ROGERS. Mr. Wyatt yields back 1 minute.

The Chair recognizes the gentleman from Washington, Mr. Foley, for 2 minutes.

Mr. FOLEY. Pursuing the question asked by Mr. Wyatt, you propose that we authorize conditionally the importation of water into the Colorado before we know what the cost would be?

Mr. GOSLIN. Yes, sir.

Yes. I think you should have a conditional authorization in the bill subject to a finding of feasibility, or of financial repayment, or certification back to the Congress, or some such feature, but definitely there should be some intention to have an importation.

Mr. FOLEY. Have you conducted any studies on where this importation would be derived from?

Mr. GOSLIN. No, sir.

Mr. FOLEY. Or what the cost would be?

Mr. GOSLIN. No, sir; we have not.

Mr. FOLEY. Have you conducted any studies regarding the availability of water in northern California, for example?

Mr. GOSLIN. No, sir; except to just look at streamflows, and so on, but we have conducted no studies as such.

Mr. FOLEY. Are there any additional waters that can be utilized within the Colorado River Basin itself that are not being used either by salvage or other means?

Mr. GOSLIN. Oh, yes; certainly.

Mr. FOLEY. Have you conducted any studies on those?

Mr. GOSLIN. Not ourselves. We have used the figures of the Bureau of Reclamation for basic data.

Mr. FOLEY. Has the Commission made any recommendations regarding salvage, and so on?

Mr. GOSLIN. No, sir. Not directly.

Mr. FOLEY. Do you agree with Secretary Udall in his statement this week that salvage and conservation should be the first order of business in augmenting water to the Colorado River Basin?

Mr. GOSLIN. I think salvage and conservation should be the first order of business in any river basin, including the Colorado River.

Mr. FOLEY. Has it proceeded as fast as in your judgment it could?

Mr. GOSLIN. No, sir, it has not. I think there are a number of measures that probably should have been taken and still could be taken in the Colorado River Basin to augment the supply of water from those sources.

Mr. FOLEY. Is that true——

Mr. ROGERS. The time of the gentleman has expired. The Chair recognizes the gentleman from Idaho, Mr. Hansen.

Mr. HANSEN. Thank you, Mr. Chairman.

You recognize the need for importation of water, is that correct?

Mr. TIPTON. That is correct.

Mr. HANSEN. Do you feel there is any problem involved in the current legislation so far as you are concerned in the upper Colorado Basin about using the surplus water you have at this time in the lower basin? Do you feel there is any problem in getting this back if we don't tie down this so-called importation to a better degree?

Mr. TIPTON. I think there is a potential problem. You can see everybody has a feeling of good will here. They agree on certain things, certain safeguards, protections. As for the generation going past, people living on the wealth that has been developed by this water that we are going to withdraw, then what are we confronted with? I don't know. I can't speculate that far ahead. I know human nature and I know water users and I know how rabid they can be.

Mr. HANSEN. You also recognize the great need, then, for someone—and I think you might have mentioned a moment ago the Bureau of Reclamation—to make a study of the surpluses and needs of the various river basins so we will know what we are talking about, is this correct?

Mr. TIPTON. That is correct.

Mr. HANSEN. I yield back the balance of my time.

Mr. ROGERS. The Chair recognizes the gentleman from California, Mr. Reinecke.

Mr. REINECKE. Mr. Chairman, I ask unanimous consent to yield my time to our traveling minister from Arizona, Mr. Udall.

Mr. ROGERS. Is there objection? The Chair hears none. Do you yield to Mr. Udall now?

Mr. REINECKE. Yes.

Mr. UDALL. My cup runneth over and I thank my good friend.

Mr. HALEY. You don't need any water, then. [Laughter.]

Mr. UDALL. Mr. Tipton, in making your conclusions in your studies, did you assume that there would be no salvage, no additional salvage conducted in the lower basin?

Mr. TIPTON. I made no such assumption.

Mr. UDALL. You assumed, then, that the losses in the lower basin would be the same as they are now.

Mr. TIPTON. That is correct.

Mr. UDALL. And if large-scale canal linings, better channeling were accomplished in the lower Colorado and certain other things to save water, we would simply adjust your figures as to the amount of water left over for central Arizona by those amounts.

Mr. TIPTON. Congressman, from a technical standpoint there is a misconception about the value of lining of canals. That water is not lost that seeps out of those canals. It is still an asset to the basin, in order to satisfy the Mexican treaty burden or some other way, or when you get into the central Arizona area proper, you have all kinds of pumps there that are taking 3 million acre-feet out of the ground, that can still take that out cheaper than you can put in lining.

Mr. UDALL. I understand that, but if we do salvage through cutting down evaporation, through the better channelization in the Colorado, if we can salvage water in that fashion, would we simply add those amounts to your figures?

Mr. TIPTON. Oh, yes.

Mr. UDALL. Now, then, I wanted to correct one thing which perhaps you gentlemen can then help me with. It has been said several times here that there is absolutely no precedent for taking water out of one—not only from one basin to another but from one State to another. Isn't it true that the San Juan-Chama project of the upper Colorado project takes New Mexico's entitlement of upper basin water out in Colorado and then transfers it into the Chama River which is a tributary of the Rio Grande and eventually into New Mexico's Rio Grande watershed?

Mr. TIPTON. That is correct.

Mr. ROGERS. The time of the gentleman has expired. The Chair recognizes the gentleman from California, Mr. Hosmer, for 2 minutes.

Mr. HOSMER. Mr. Tipton, in these differences between your conclusions and those of Mr. Maughan, are they based on judgment factors as to when and at what rate the upper basin depletion will continue?

Mr. TIPTON. No.

Mr. HOSMER. What are they based on?

Mr. TIPTON. The pure probability studies based on the recorded flow, the estimated virgin flow at Lee Ferry.

Mr. HOSMER. I ask unanimous consent to release the balance of my time to the gentleman from Arizona, Mr. Udall.

Mr. ROGERS. Is there objection? The Chair hears none.

Mr. UDALL. I thank my friend.

Your studies contemplate, Mr. Tipton, that at best the upper basin in order to satisfy its obligations under the compact can save for its own consumptive use a total of 6.3.

Mr. TIPTON. That is correct.

Mr. UDALL. Which leaves the upper basin 1.2 short of its allocations under the compact.

Mr. TIPTON. That is correct.

Mr. UDALL. As the framers of it envisioned.

Mr. TIPTON. That is correct.

Mr. UDALL. This means the upper basin has for that reason a direct stake in any importation program to make the river whole.

Mr. TIPTON. That is correct.

Mr. UDALL. You advocate that we get on with this importation program as soon as we can.

Mr. TIPTON. With all possible speed.

Mr. UDALL. I am sure as an engineer you recognize the advantage and necessity of long-term planning because 10 or 15 or 25 years in this business is like tomorrow in a lot of other businesses.

Mr. TIPTON. Not only the physical problem, but it is a political problem—interstate compacts and all that kind of thing.

Mr. UDALL. I wanted to say that I certainly admire the very constructive way in which you have approached this study and that all of us respect your technical competence and the way you have gone about it.

Mr. TIPTON. Thank you.

Mr. ROGERS. The time of the gentleman has expired. The Chair yields his 2 minutes to the gentleman from Colorado, Mr. Aspinall.

Mr. ASPINALL. Mr. Chairman, I wish to commend the two witnesses before us for the cooperation that they have given the committee this morning. I have just one additional question.

Did you in your study, Mr. Tipton, take into consideration those amounts of water that are purportedly being used by illegal users along the Colorado River?

Mr. TIPTON. Being used by——

Mr. ASPINALL. Illegal users.

Mr. TIPTON. Illegal users?

Mr. ASPINALL. Those users who do not have any water rights but——

Mr. TIPTON. They are included in the losses. They constitute part of the losses. I am not quite sure that I know what you mean by the illegal users.

Mr. ASPINALL. Well, they are users along the Colorado River that don't have any water rights. They are diverting water to lands which they do not own.

Mr. TIPTON. The net inflow between Lee Ferry and Hoover and the loss between Hoover and the boundary determined by inflow-outflow determines and those are automatically taken into consideration.

Mr. ASPINALL. That is all.

Mr. ROGERS. Thank you gentlemen for your presentation.

Mr. GOSLIN. Thank you, Mr. Chairman, for the opportunity to express our views.

Mr. TIPTON. Thank you, sir.

Mr. ROGERS. Our next witness is Mr. W. Don Maughan, California Department of Water Resources, to present conclusions of the lower basin States water availability study. You may proceed.

STATEMENT OF W. DON MAUGHAN, REGIONAL PLANNING STAFF SPECIALIST, DEPARTMENT OF WATER RESOURCES, STATE OF CALIFORNIA; ACCOMPANIED BY W. S. GOOKIN, STATE ENGINEER, ARIZONA INTERSTATE STREAM COMMISSION, STATE OF ARIZONA; I. P. HEAD, ADMINISTRATOR, COLORADO RIVER COMMISSION OF NEVADA, STATE OF NEVADA; W. E. STEINER, ASSISTANT CHIEF OF ENGINEERS, DEPARTMENT OF WATER RESOURCES, STATE OF CALIFORNIA; AND D. E. COLE, CHIEF ENGINEER, COLORADO RIVER BOARD OF CALIFORNIA, STATE OF CALIFORNIA

Mr. MAUGHAN. Thank you. Mr. Chairman and members of the committee, I am W. Don Maughan, regional planning staff specialist, department of water resources, for the State of California. I make this statement not only for myself but also on behalf of Mr. W. S. Gookin, State water engineer, Arizona Interstate Stream Commission, State of Arizona; Mr. I. P. Head, administrator, Colorado River Commission of Nevada, State of Nevada; Mr. W. E. Steiner, assistant chief engineer, department of water resources, State of California; and Mr. D. E. Cole, chief engineer, Colorado River Board of California, State of California. We appear before you now to present our joint memorandum on the Colorado River water supply in response to the question posed by Chairman Aspinall in his letter of May 22 as to the availability of water to the central Arizona project.

Before reading our memorandum, we will summarize the response to the question posed by Chairman Aspinall. He asked each State for its views as to the availability of water for the central Arizona project—

taking into consideration present uncommitted uses in the upper basin, the filling of upper basin reservoirs, and, further, taking into consideration the ultimate use by the upper basin of its share of water under the provisions of the Colorado River compact.

Our joint studies indicate that there is better than an even chance that by 1975, the earliest date that the central Arizona project could be completed, Lakes Mead and Powell together will contain more than 40 million acre-feet of water in a total storage capacity of about 55 million acre-feet. There is an even chance, taking into consideration projections of upper basin depletions in the amount of 5.5 million acre-feet per annum that a full supply of 1.2 million acre-feet per annum would be available for the proposed central Arizona project until about the turn of the century. If there is no import of water by that time, the water supply available to the central Arizona project would then gradually reduce as the upper basin growth continues. In other words, on the basis of our joint memorandum, sufficient water will not be available to provide 1.2 million acre-feet per annum to the central Arizona project together with other main stream commitments in the lower basin after upper basin depletions reach 5.5 million acre-feet.

We have reached this conclusion on the basis of the studies reported in our joint water supply memorandum dated August 13, 1965. Before responding to questions, I ask permission to read that memorandum into the record.

Mr. ROGERS. Without objection, you may proceed.

Mr. MAUGHAN. This is dated August 13. This memorandum regarding the probable future water supply of the Colorado River is prepared at the request of our Governors for the guidance of legislators and administrators in passing judgment on pending legislation to authorize a Lower Colorado River Basin project, which would include urgently needed facilities in the lower basin, principally the central Arizona project, and investigations leading to a regional plan to supplement the water supply of the river at an early date.

SUMMARY AND CONCLUSIONS

The water supply of the future cannot be predicted with absolute confidence, particularly in a stream of such widely fluctuating annual runoff as the Colorado River. We can only estimate future possibilities within reasonable limits, based upon what has happened in the past. Risks are inherent in all such projections.

We are unanimous in the opinion that the supply of the river will be insufficient to meet future demands, estimated to reach about 18 million acre-feet per annum by year 2000, or to meet apportionments of use of water made by the Colorado River compact to the upper and lower basins, and the Mexican Treaty burden. It is simply a question as to how long it will take the demands to surpass the water available. Both basins are ultimately dependent upon substantial importations which should be made available by the last decade of the present century.

We have concluded, however, that there is a 50–50 chance that the supply in the main stream will equal or exceed the amount needed to provide: (1) 4.4 million acre-feet a year for California; (2) water for decreed rights and existing mainstream projects in Arizona and Nevada and the southern Nevada water supply project; (3) water for increasing demands of the upper basin; and (4) a full supply of 1.2 million acre-feet per annum for the proposed central Arizona project until about the turn of the century, gradually reducing thereafter.

Present main stream uses and commitments in the Colorado River Basin, with California uses limited to 4.4 million acre-feet per annum—California's present uses are approximately 5.1 million acre-feet—are:

	Million acre-feet per annum
Upper basin	4.7
Lower basin	5.7
Mexico	1.5
Net losses after salvage (mean of various estimates of the salvages)	.8
Total	12.7

Probability studies indicate a 95-percent chance that the fuutre long-range average annual runoff will exceed 13.3 million acre-feet, and a 50-percent chance that it will equal or exceed 14.9 million acre-feet. With an even chance that there will be 14.9 million acre-feet available for present uses and commitments amounting to 12.7 million acre-feet, and with a water supply augmentation program pending, it is in the national interest to develop a portion of the remaining unused water resources by enactment and implementation of H.R. 4671, 89th Congress.

DISCUSSION

In considering water projects in a single river basin such as the Colorado, absent special circumstances or a program of augmenting its water supply by importation or otherwise, most estimates of future water production have been based upon so-called safe yield studies. These consist of hypothetical reservoir operation studies in which the estimated or recorded streamflows of the past are routed through existing or proposed reservoirs in exactly the same sequence in which they occurred historically, deducting losses in storage and calculating by successive trials the uniform annual release from the downstream reservoir which could have been maintained under various assumptions. Thus the results of safe yield studies are circumscribed by the somewhat rigid assumption that historical runoffs, including those during the critical low runoff period of record, will be repeated in the future in exactly the same sequence.

The Colorado River has been the subject of numerous safe yield studies. The most recent studies of the virgin flow of the main stream at Lee Ferry indicate a dependable yield over the least favorable runoff period (1931–64) of about 13.7 million to 14 million acre-feet a year, varying a little according to judgment factors although obviously not enough to supply future demands. However, the more favorable historic sequence flows at Lee Ferry beginning in 1921 would have furnished by 1930 enough water to fill all storage reservoirs presently in existence or under construction within the Colorado River Basin.

Main stream supply available for use in the lower basin equals the dependable yield at Lee Ferry minus (1) estimated upper basin depletions and future increases thereof, (2) estimated net channel and regulatory losses in the lower basin, and (3) the quantity required for Mexico under the 1944 water treaty. Any variation in these deductions stems from judgment factors. Judgment may be tempered according to whether the prime objective is to protect existing rights or to optimize the utilization of the water supply.

Depending upon a variety of such factors, water available for the proposed central Arizona project has been estimated to range from an inadequate quantity even under initial operation of the project to quantities adequate to supply the project with 1.2 million acre-feet a year throughout the entire repayment period.

Safe yield studies which span the critical drought period minimize the risk of overcommitment of the water supply of the river basin but by the same token may result in underdevelopment and a consequent waste of water to the ocean or unnecessary evaporation from reservoirs during a sustained period. The risk of overdevelopment must be given greater weight if consideration is being given independently to a self-contained water supply system than if consideration is being given concurrently to two or more systems that may be conjunctively regulated and developed to mutual advantage.

There are several reasons why decisions in the regional program should be based on technical information on water supply beyond that provided by the foregoing approach. We have adopted an approach which recognizes that the future will not mirror the past and applies the theory of probabilities to the occurrence of natural phenomena in order to determine what future flows will probably be.

52-850—65——35

The probability approach to projecting future events is a commonly accepted technique in the appraisal of risks. Probability techniques have been used for years in the assessment of flood frequencies, in weather forecasts, in actuarial procedures, and so forth. Many scientists and educators have encouraged the use of the probability technique in planning for water conservation. The Corps of Engineers uses probability methods to evaluate and justify flood control projects. The U.S. Geological Survey also uses probability methods of water supply analysis.

Wide variation may be expected in the future runoff of the Colorado River not only in annual flows but also in 10-year and even 50-year averages, as demonstrated by nearly 70 years of streamflow data, about 110 years of lake level measurements and roughly 700 years of tree-ring data. For example, in the 70-year period of estimated and measured flow at Lee Ferry, the average virgin flow for the first 35 years was about 17 million acre-feet annually, but the average for the last 35 years was only about 13 million acre-feet.

Probability analyses of the annual virgin flow of the Colorado River at Lee Ferry, using streamflow estimates for the 69-year period 1896–1964 show a 90-percent chance that the virgin flow will average between 13.3 million and 16.5 million acre-feet per annum over the next 69 years and between 12.8 million and 17 million acre-feet over the next 35 years. The midpoint in each case is 14.9 million acre-feet. Therefore, the chances are equal that the future average will be above or below that quantity. There are 19 chances in 20 that the future 69-year mean flow will equal or exceed 13.3 million acre-feet. There is 1 chance in 20 that it will exceed 16.5 million. Since there is a total of more than 60 million acre-feet of storage capacity in major reservoirs in the basin the possibility of unusable spills need not be weighed for the present purpose.

A lower basin main stream supply of 7.1 million acre-feet a year is required to satisfy 4.4 million acre-feet of use in California, existing uses in Arizona and Nevada, and the central Arizona and southern Nevada projects. Opinions differ as to such matters as net channel and evaporation losses and the rate of future increase of upper basin depletions. Such differences affect only the estimate of the date when augmentation of the Colorado River must be accomplished. Deducting from the midvalue of 14.9 million acre-feet a year the Mexican Treaty deliveries and the midvalues of current estimates of upper basin depletions and net channel and evaporation losses, indicates that a residue of at least 7.1 million acre-feet a year of the main stream supply would be available to Arizona, California, and Nevada until about the turn of the century, and would reduce gradually thereafter.

	Million acre-feet per year
Virgin flow at Lee Ferry	14.9
Net losses below Lee Ferry plus delivery to Mexico	2.3
Available for upper basin depletions and in main streams for Arizona, California, and Nevada	12.6

When upper basin depletions reach 5.5 million acre-feet, water available from Arizona, California, and Nevada would be reduced to 7.1 million acre-feet.

For comparison, if the 1-in-20 chance of a mean virgin flow as large as 16.5 million acre-feet should materialize, the residual main stream supply available to Arizona, California, and Nevada would be of the general order of 8.7 million, and at the other extreme, if the 1-in-20 chance of a mean virgin flow as low as 13.3 million should prevail, the corresponding residual supply would be as little as 5.5 million, which would make the early augmentation of the Colorado even more imperative. We believe that the midpoint value is sensible.

The average annual water supply available to the three lower basin States would gradually decrease to the 7.1 million acre-feet shown above by about the turn of the century, the rate of decrease depending on salvage operations in the lower basin and future depletions by upper basin projects.

Of course, more than 7.1 million acre-feet will be needed to meet all the projected needs of the lower basin, including the needs of California in excess of 4.4 million acre-feet and the present needs of central Arizona beyond an additional 1.2 million acre-feet.

The interval between the completion of the central Arizona project and completion of import works will constitute the period during which there is the greatest risk of water shortage. The probability studies indicate, however, a favorable chance of having a substantial reserve of water in main stream storage when the central Arizona project goes into operation. They show a 54-percent chance that in 1975 Lakes Mead and Powell together will contain more than 40 million acre-feet (about 75 percent of their total capacity) and a 78-percent chance that both will be at least at rated power head (about 30 million acre-feet.)

Additional development of the utilization of the Colorado River system water supply can and should proceed as part of a regional program to augment the supply, carefully phased with in-basin development, to minimize the risk of overcommitment within the basin itself. Enactment of legislation to authorize a Lower Colorado River Basin project keyed to timely supplementation of the Colorado River will render pointless further argument about the future supply of the river.

We agree that each of us will transmit the foregoing synthesis of views to our respective Governors with the recommendation that it be forwarded to Chairman Wayne N. Aspinall as the position of our respective States regarding the availability of water in the Colorado River.

This statement is signed by the five engineers I previously identified.

Mr. ROGERS. Thank you, Mr. Maughan.

The Chair will give approximately three and a half minutes apiece and I will recognize the gentleman from Colorado, Mr. Aspinall, for three and a half minutes.

Mr. Haley?

Mr. HALEY. I ask unanimous consent to yield my time to the gentleman from Colorado.

Mr. ROGERS. Is there objection? The Chair hears none. The gentleman from Colorado is recognized for 7 minutes.

Mr. ASPINALL. At the beginning of this morning's session, we were so hurried that I forgot to make certain requests of the committee.

I now ask unanimous consent that the letter which I sent to all of

the Governors in the Colorado River Basin under date of May 22, 1965, together with the answers of the Governors—in most instances acknowledgment first and later on a statement of their position and who was to answer for them in this hearing—be made a part of the record at the beginning of today's session.

Mr. ROGERS. Is there objection?

The Chair hears none. So ordered.

(The documents referred to appear on pp. 449–461.)

Mr. ASPINALL. The memorandum referred to by the Governors of the three lower basin States and attached to their final reply to my request should not be included because it is the memorandum just read by Mr. Maughan.

I also ask unanimous consent that the two letters, one of which was addressed to the Secretary of the Interior, June 21, 1965, and one addressed to the Deputy Director Elmer B. Staats of the Bureau of the Budget relative to certain questions concerning this matter, and their answers be placed in the record immediately following the correspondence with the Governors.

Mr. HOSMER. Reserving the right to object, were those letters initiated by the chairman?

Mr. ASPINALL. They were.

Mr. HOSMER. I withdraw my reservation.

Mr. ROGERS. Is there objection? The Chair hears none and the information will be included.

(The documents referred to appear on pp. 462–465.)

Mr. ASPINALL. Mr. Chairman, of course, everybody on the committee and most of the people in the reclamation world understand that this committee has as one of its staff members one of the best analytical reclamation engineers there is to be found anyplace. The reason that the requests were made for the information from the various Governors was so that we would be able to analyze the different studies and reports which were brought before us at the hearing.

Now, as I undestand your report, Mr. Maughan, your report is based upon studies by the various engineers of the State of California, the Bureau of Reclamation, Arizona, and possibly some of the studies made by the upper basin. Is that correct?

Mr. MAUGHAN. Well, we have considered each of those sources for upper basin depletions and channel losses. The probability analysis was our own, the three lower basin States.

Mr. ASPINALL. I understand that. You see, what the Chair was after in the first instance was to get a detailed engineering statement from the various States involved relative to their position on this question of availability of water. Your statement is satisfactory but we do not have any engineering backup material upon which to evaluate your statement and that is the reason that I asked you where you got your material, and as I understand it, this material is available and I would ask unanimous consent, if it is all right with the witness now before us, that we be furnished for the file of our hearings the different data upon which your decisions and your final consensus was arrived at.

Mr. MAUGHAN. Yes, sir; we would be most pleased to submit that for the committee.

Mr. HOSMER. Reserving the right to object, is this voluminous material?

Mr. MAUGHAN. I think we can summarize it so that we can provide what Congressman Aspinall wants in not too many pages.

Mr. HOSMER. I wonder if you want to include discretionary authorization to have it placed in the record if it is suitable.

Mr. ASPINALL. If it will meet with the approval of the chairman of the subcommittee and the gentleman from California, Mr. Hosmer, I would include that.

Mr. HOSMER. Thank you.

Mr. MAUGHAN. We will keep that in mind and try to make it suitable for that purpose.

Mr. ROGERS. Without objection the material will be received subject to the approval by the chairman and the ranking minority member.

(The document referred to follows:)

STATE OF CALIFORNIA—RESOURCES AGENCY,
DEPARTMENT OF WATER RESOURCES,
Sacramento, September 14, 1965.

Hon. WALTER ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation, Committee on Interior and Insular Affairs, House of Representatives, House Office Building, Washington, D.C.

DEAR MR. ROGERS: Attached hereto are backup data to the joint Arizona, California, and Nevada testimony on Colorado River water supply which was presented on August 27, 1965, at the subcommittee hearings on H.R. 4671, "Lower Colorado River Basin Project." These data were requested at the hearings by Chairman Aspinall and Congressman Hosmer.

Sincerely yours,

W. DON MAUGHAN,
Regional Staff Specialist,
Staff and Services Management.

BACKUP DATA TO JOINT TESTIMONY OF W. S. GOOKIN, I. P. HEAD, W. E. STEINER, D. E. COLE, AND W. D. MAUGHAN

1. Derivation of probabilities for filling of Lake Powell and Lake Mead to indicated levels in 10 years

At the end of the 1964 water year (September 30), the total surface storage in Lake Powell was 6,210,000 acre-feet, and the active surface storage in Lake Mead was 11,620,000 acre-feet. The aggregate was 17,830,000 acre-feet. To raise the 17,830,000 to either 30 million or 40 million acre-feet by September 30, 1974, would require an average annual virgin flow at Lee Ferry for the 10 intervening years of 13,400,000 acre-feet and 14,600,000 acre,feet, respectively, based on the following assumptions:

(*a*) Upper basin depletions averaging 3,600,000 acre-feet over the next 10 years, which would include an allowance for filling Flaming Gorge, Curecanti, and Navajo Reservoirs to reasonably high operating levels (i.e., depletions of 2,700,00 acre-feet in 1965 increasing at a uniform rate to 4,100,000 acre-feet in 1974, plus an aggregate of about 2 million acre-feet added to the three named reservoirs).

(*b*) Annual water requirements below Lee Ferry based on last 5 years of record show a range between 8,200,000 acre-feet and 8,800,000 acre-feet without drawing on storage; and an average of 8,400,000 acre-feet, if it is assumed that arrivals into Mexico will be kept to about 150,000 acre-feet a year in addition to the 1,500,000 acre-feet provided for under the 1944 Mexican Water Treaty. As it is believed that any increase of water use on existing projects and undeveloped Indian lands will be offset by conservation measures effectuated in 1964 and by those now underway, it has been assumed that consumptive use requirements below Lee Ferry over the next 10 years would average about 8,400,000 acre-feet a year.

(*c*) Bank storage at Lake Powell has been running as much as 30 percent of the surface storage during initial filling. Lake Mead has been filled, drawn down and refilled several times since its initial filling about 25 years ago and records indicate that now the bank storage factor is probably less than 10 percent of surface storage changes. For the purpose of estimating the percent chance of reaching specified surface storage levels over the next 10 years, an average bank storage factor of 15 percent for the two reservoirs has been assumed. To raise the combined surface storage levels as of September 30, 1964, to an aggregate of 30 million acre-feet would add an estimated 1,800,000 acre-feet to bank storage, and to raise it to 40 million acre-feet would add an estimated 2,600,000 acre-feet to bank storage.

A probability curve was prepared on the basis of progressive 10-year mean virgin flows 1896–1964 (i.e., 1896–1905, 1897–1906, 1898–1907, and so on) including the assumption that 1896 would follow 1964 so that each annual flow was used the same number of times.

There is a 78-percent chance that the mean virgin flow over the next 10 years will be 13,400,000 acre-feet (assumed to be enough to fill Lakes Powell and Mead surface storage to 30 million acre-feet) and a 54-percent chance that the mean virgin flow over the next 10 years will be 14,600,000 acre-feet (assumed to be enough to fill Lake Powell and Mead surface storage to 40 million acre-feet.)

The present water year, 1965, is a fine runoff year (the virgin flow will be about 17,500,000 acre-feet). This year's runoff improves the percent chance of reaching the 30 million and 40 million acre-feet levels by September 30, 1974, by about 10 percent over the estimates based on reservoir contents of a year ago. The provisional data for August 31, 1965, content of Lake Powell was 8,548,000 acre-feet (total surface storage) and of Lake Mead was 14,659,000 acre-feet (active surface storage), for an aggregate increase of 5,377,000 acre-feet above the storage used in the basic study.

2. Probability of 1 year, 35- and 69-year mean virgin flows, Colorado River at Lee Ferry

The 1959 U.S. Geological Survey Circular 410 "Probability Analysis Applied to a Water-Supply Problem," was used as the guideline for preparation of the attached chart entitled "Probability of One Year, 35- and 69-Year Mean Virgin Flows, Colorado River at Lee Ferry."

To demonstrate the use of these probability curves, or lines, the following items have been identified on the chart.

(*a*) The 1965 and 1964 virgin flows are indicated on the 1-year line. The probability of the 1965 flow being exceeded is about 30 percent, and of the 1964 flow being exceeded, about 85 percent.

(*b*) The 35-year mean annual virgin flow for the period 1896–1930 is estimated as 17 million acre-feet which has only a 5-percent chance of being exceeded. The mean annual amount for 1931–65 is about 13 million acre-feet which has a 94-percent chance of being exceeded.

(*c*) The 9-chance-in-10 limits for the 35-year means are shown, i.e., 12,800,000 and 17 million as are the 9-chance-in-10 limits for the 69-year means, i.e., 13,300,000 and 16,500,000 acre-feet. The 9-chance-in-10 limits correspond to the 5- and 95-percent probability lines.

Circular 410 incorporates explanation and equations which enable the direct computation of the slope of lines indicating the probability of 35- and 69-year means (or the slope of the lines of the probability of the means of any length periods between 2 years and 69 years). Circular 410 outlines procedures for calculations of confidence limits, if those data are desired.

Confirmation of our interpretation of the procedure outlined in Circular 410 was obtained in correspondence of August 20 and 27, 1965, between Mr. Dallas E. Cole and the Acting Director of the U.S. Geological Survey. The correspondence was placed in the record of the subcommittee hearings by Congressman Udall on August 27.

3. Upper basin depletions

	Unit, 1,000 acre-feet				
	Present	1975	1985	1990	2000
Most recent estimates by—					
(*a*) Upper basin	2,777	4,513	5,837	----------	[1] (7,351)
(*b*) Bureau of Reclamation	2,787	4,220	----------	5,100	5,430
(*c*) Colorado River Board of California	2,700	4,400	5,200	5,400	5,700
(*d*) Arizona	----------	3,850	----------	----------	4,950
Pacific Southwest water plan, January 1964	(1963) 2,550	4,000	4,550	(4,900)	5,430
Colorado River Storage Project financial and economic analysis, September 1960	(1960) 2,550	(4,010)	(4,330)	(4,490)	(4,810)

[1] The upper basin estimate of its requirements without regard to water availability is 7,351,000 acre-feet. The Tipton report, which assumes a repetition of historic sequence of flows and no obligation for the upper basin to deliver water to meet the Mexican Treaty obligation recognizes a depletion limitation of 6,300,000 acre-feet per annum. With the water supply of 14,900,000 acre-feet derived in the joint lower basin study and if it were possible for the upper basin to limit releases from Lake Powell to 75,000,000 acre-feet in every consecutive 10-year period plus ½ of the Mexican Treaty burden, including associated losses, the depletion limitation would be 6,500,000 acre-feet per year.

NOTE.—Utilizing these estimates the lower basin engineering group adopted a value of 5,500,000 acre-feet per year as the upper basin depletions around the turn of the century.

REFERENCES

(*a*) Tipton and Kalmbach, Inc., report of July 1965, "Water Supplies of the Colorado River," table A-1, pt. II.
(*b*) U.S. Department of the Interior estimates as of July 12, 1965. Earlier estimates of upper basin depletions by the Department in 1960 and 1964 are also shown (bracketed figures are interpolations).
(*c*) Colorado River Board of California estimates printed in California Assembly Interim Committee Report, vol. 26, No. 13, "Arizona Versus California and Pacific Southwest Water Problems," December 1964.
(*d*) Arizona estimates as contained in memorandum of July 20, 1963, to Senator Carl Hayden from W. S. Gookin, State water engineer.

4. Net river gains less tributary depletions and reservoir losses—Lee Ferry to Hoover Dam—plus usable inflow from Bill Williams River

	Acre-feet
(*a*) Average annual net gain Lee Ferry to Hoover Dam (1906–64)	930,000
(*b*) Usable average annual inflow from Bill Williams River	55,000
(*c*) Total of net river gains and usable inflow	985,000
(*d*) Average annual evaporation losses from Lake Mead (assuming present operation)	800,000
(*e*) Average annual evaporation losses for the proposed Marble-Bridge Canyon Reservoirs	100,000
(*f*) New depletions on tributaries to Colorado River between Lee Ferry and Hoover Dam	130,000
(*g*) Total of depletions and evaporation losses	1,030,000
(*h*) Net gains (item (*c*)) less net depletions and losses (item (*g*))	−45,000
Round to	0

NOTES

(*a*) The 1906–64 mean represents the longest period for which estimated net gains—Lee Ferry to Hoover Dam—are available. That period nearly corresponds with the period of 1896–1964 used in the probability analysis of the virgin flow at Lee Ferry. The estimate of net gain was made by the Colorado River Board of California.
(*b*) The estimate of usable Bill Williams flow depleted for future conditions is the same as shown in the report on the Pacific Southwest water plan, tables 13 and 16.
(*d*) The estimate of evaporation loss at Lake Mead is the present loss shown in the report on the Pacific Southwest water plan, table 16A.
(*e*) The evaporation loss for the proposed Marble-Bridge Canyon Reservoirs is the loss estimated in the report on the Pacific Southwest water plan, table 13.
(*f*) The new depletions on tributaries to the Colorado River between Lee Ferry and Hoover Dam are the future depletions estimated in the report on the Pacific Southwest water plan, table 13 (i.e., 390,000 (year 2000) −260,000 (present) =130,000 acre-feet).

5. Net river and regulatory losses below Hoover

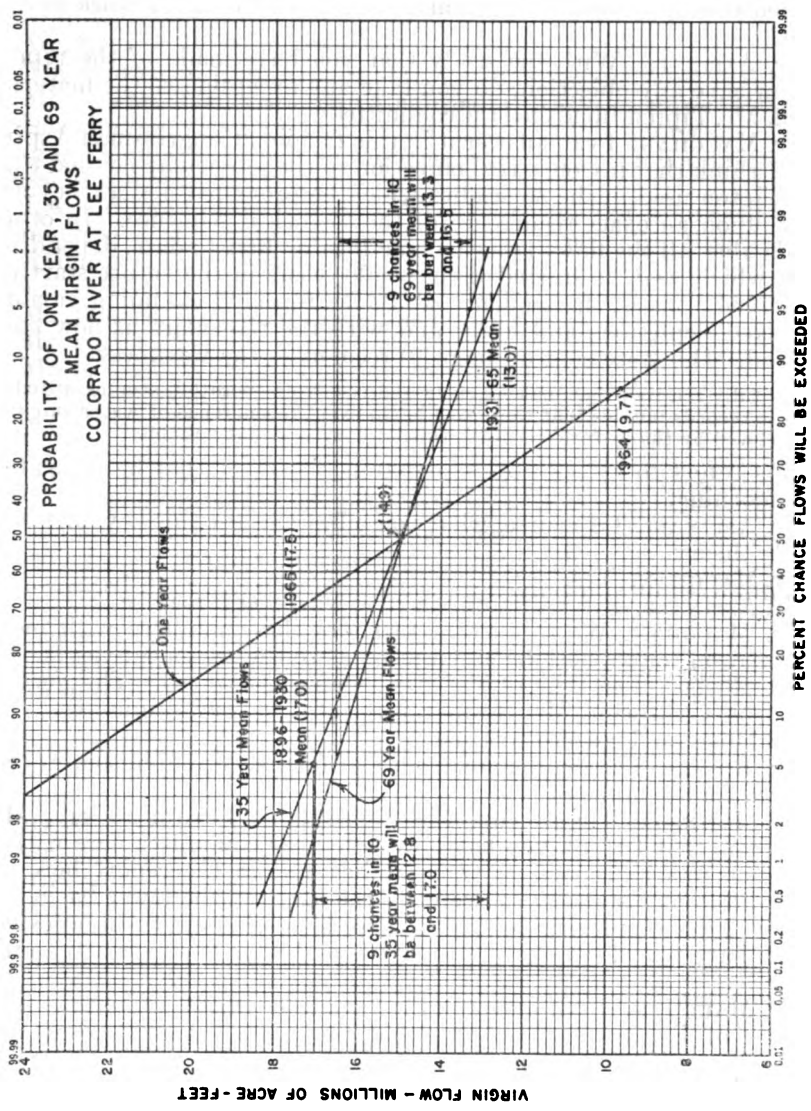
Estimates by	Unit—1,000 acre-feet per year		
	Present	Salvage	Net after salvage
(a) Bureau of Reclamation	1,270	680	590
(b) Upper basin	1,270	460	810
(c) Colorado River Board of California	1,200	200	1,000
(d) Arizona	1,155	680	475
Midvalues (approximate)	1,250	450	800

REFERENCES

(a) Report on the Pacific Southwest water plan, tables 13 and 16.
(b) Tipton and Kalmbach Report, pt. I, pp. 15–17.
(c) Colorado River Board of California estimates printed in California Assembly Interim Committee Report, vol. 26, No. 13 *Arizona* v. *California and Pacific Southwest Water Problems*, December 1964.
(d) Arizona estimates as of July 20, 1963.

6. Aggregate of net river, reservoir evaporation, and regulatory losses below Lee Ferry and Mexican Water Treaty burden

Estimated by—	*Million acre-feet per year*
(a) Arizona (0.5 plus 1.5)	2.0
(b) Bureau of Reclamation (0.6 plus 1.5)	2.1
(c) Colorado River Board of California (1.0 plus 1.5)	2.5
(d) Upper Basin (0.8 plus 1.5)	2.3
Midvalue (approximate)	2.3



Mr. ASPINALL. Mr. Maughan, have you or any of those associated with you had the opportunity to study in detail the Tipton report which has just been made a part of the record together with the indexes that were made a part of the file?

Mr. MAUGHAN. I have had the opportunity of reading it. I am fairly familiar with these types of studies. I wouldn't say that I have studied it in great detail but I am quite familiar with the work he has done.

Mr. ASPINALL. With the study that you have made of the report do you have any objection, do you take any exception to the material which Mr. Tipton furnished the committee?

Mr. MAUGHAN. I can answer it in this fashion, Congressman Aspinall. I think that my only real objection to the particular method that Mr. Tipton used in the 36 studies which he presented is that they are based upon an exact recurrence of the historical sequence. In other words, that all the flows from 1906 or 1921 or 1912 to date, depending upon which year he started with, would occur in the future starting with 1966, that is, the sequence would be repeated assuming various projected depletions and losses and with the reservoirs as now constituted. His statement on page 10 recognizes the weakness:

> It is fully realized that making river and reservoir operation studies utilizing historic records implies that there will be an exact reoccurrence of water supplies as disclosed by the historic records; this, of course, is not possible.

This refers to Mr. Tipton's prepared statement that he presented this morning.

Mr. ASPINALL. Of course, what you offset against this is your probability theory.

Mr. MAUGHAN. Yes.

Mr. ASPINALL. Fifty-fifty or 1 in 20 or whatever it may be.

Mr. MAUGHAN. We think that provides the committee with more information than a specific assumption as to the sequence; yes, sir.

Mr. ROGERS. The time of the gentleman has expired. The gentleman from California, Mr. Hosmer, is recognized for 3½ minutes.

Mr. HOSMER. I reserve my time.

Mr. ROGERS. The gentleman from California, Mr. Johnson, is recognized for 3½ minutes.

Mr. JOHNSON. Thank you, Mr. Chairman. I want to say, Mr. Maughan, that I think you have presented the committee here with a very fine precise report on your studies and in the report here on three different instances, you refer to the losses in the lower basin.

Now, I am wondering just what those losses amount to in acre-feet as you have found through your studies and what they are attributed to.

Mr. MAUGHAN. I can give you the various estimates of losses. The Bureau of Reclamation assumes that the present annual losses are 1,270,000. This is the net loss considering inflow. The Colorado River Board of California has used about a million, assuming that there will be some salvage. The Bureau of Reclamation, I should add, believes that there will be 680,000 acre-feet of salvage, reducing the 1,270,000 to approximately 600,000 acre-feet.

The studies presented by Mr. Tipton assume that part of that salvage will take place and that the net losses after salvage will be about 800,000 acre-feet. So do we, in our report. The net loss after

salvage estimates range from around 600,000 to a million acre-feet per annum.

Mr. JOHNSON. That is all, Mr. Chairman. I yield back the balance of my time.

Mr. ROGERS. The gentleman from Kansas, Mr. Skubitz.

Mr. SKUBITZ. Mr. Chairman, I ask unanimous consent to yield my time to Mr. Udall.

Mr. ROGERS. Without objection so ordered.

The gentleman from Arizona, Mr. Udall, is recognized for 7 minutes.

Mr. UDALL. Thank you, Mr. Chairman. I have so many friends on this committee that I am very grateful for and I do appreciate my colleague's kindness. I will do the same when we have a Kansas project. I assure you of that.

I would like to take this time, Mr. Chairman, first to present to the committee a statement of the Honorable Ernest W. McFarland—unanimous consent was received the other day to have this included in the record, but I would like to put it before the committee at this time.

Mr. ROGERS. You want this in the record?

Mr. UDALL. Yes.

Mr. ROGERS. Without objection, so ordered.

(The document referred to will be found on p. 265.)

Mr. UDALL. Mr. Maughan, I wanted to compliment you and all these other fine engineers from California who have worked so hard and so diligently and so cooperatively with us. It has been a great thing for us in Arizona to work constructively with you good people in California and I think you have made an excellent presentation here this morning and I congratulate you for all that you have done.

I wanted to say particularly that for engineers who have different backgrounds and different points of view to be able to sit down together and take all of these variable assumptions on which there are honest and sincere professional differences, and to be able to resolve them into the kind of synthesis of views as you have described in this statement you read, is most commendable.

You would agree, of course, that there were differences in approach and differences in judgment factors as among the group of you on some of these points.

Mr. MAUGHAN. Yes, sir.

Mr. UDALL. And what you have arrived at here is a professional synthesis of these views.

Mr. MAUGHAN. Yes, it is.

Mr. UDALL. Fine. Now, let me ask Mr. Gookin, particularly, who is with you here, a question that relates to Arizona. It was said the other day or suggested the other day that Arizona has been most improvident in the use of its water. It would be my own opinion from traveling all over the State, and personal knowledge, that more than 95 percent of the domestic water that is sold in Arizona communities is metered. Would you agree with that proposition, Mr. Gookin?

Mr. GOOKIN. Yes, I would.

Mr. UDALL. And would you agree that the State of Arizona is taking rather vigorous actions to conserve water, to salvage water, to do all of the things that we ought to be doing?

Mr. GOOKIN. Most assuredly. The Salt River project, as one example, is spending a million dollars a year to line canals and reduce losses.

The Roosevelt Irrigation District, as another example, is spending almost as much despite the fact it is a much smaller project. The Roosevelt Water Conservation District is undertaking a similar program of lining canals. The time is fast coming, I feel sure, when all of our canals will be lined.

Mr. UDALL. As I recall, this legislation requires that the Secretary before he contracts for any of this water require the contracting organizations to have linings.

Mr. GOOKIN. That is correct. We have the highest irrigation efficiency of any State or any place in the world that I am familiar with.

Mr. UDALL. Mr. Maughan referred again, Mr. Gookin—I will ask you this, to salvage possibilities in the lower basin and the fact is now that we lose, I think he mentioned a million point two acre-feet through evaporation, loss through phreatophytes, loss through canal losses, and things of this kind. Is that about your figure?

Mr. GOOKIN. I think that the loss was a little bit less than that. But that's the present. Then we have our salvage programs, some that are in progress.

Mr. UDALL. All right. Let me get right to the salvage program. The Bureau of Reclamation has a very vigorous and very active salvage program along the lower Colorado right now?

Mr. GOOKIN. That is correct.

Mr. UDALL. What does this consist of?

Mr. GOOKIN. It consists of channelization in an attempt to eradicate phreatophytes and evaporation. Ultimately there is a proposal for recovery of water by ground water pumping adjacent to the river, and in the aggregate it is proposed to conserve approximately 680,000 acre-feet of water per year.

Mr. UDALL. Is it your professional opinion that this can be done before this crunch comes along when the upper basin is using its ultimate uses and the crunch comes on central Arizona project, that we could save as much as 680,000 feet of water?

Mr. GOOKIN. Clearly.

Mr. UDALL. And this would augment the amount available for central Arizona project in what ever amount we are able to make these salvages?

Mr. GOOKIN. That is correct, yes, sir.

Mr. UDALL. Now, Mr. Tipton said that he doesn't place too much stock in the salvage operations relating particularly to lining of canals because some of this water that seeps out through the bottom of the canal goes into underground storage where it can be pumped out. In the area of Yuma, however, some of the water seeps on across into Mexico and augments their supply and we could save part of it by lining canals, is that not correct?

Mr. GOOKIN. That is correct. There is always the loss to phreatophytes or water-loving vegetation which grows along canal banks which can be materially reduced by lining canals and it is appreciable.

Mr. UDALL. That is the second point I wanted to nail down. Along the lower Colorado there are acres and acres of saltcedar which drink up great quantities of water and send it out into the air through transpiration. Do you agree with Mr. Tipton this is water that can be saved? We do save that when we cut down the phreatophytes or channel the river so the water does not get out.

Mr. GOOKIN. This is water that can be saved and I did not refer to that in the 680,000 acre-feet figure that I mentioned.

Mr. UDALL. The Bureau of Reclamation has plans and has a program to do this.

Mr. GOOKIN. For the 680,000?

Mr. UDALL. Yes. And Arizona is cooperating in every way with that program?

Mr. GOOKIN. That is correct, sir.

Mr. UDALL. Some reference has been made in these hearings to the so-called illegal uses and we recognize that there are some in Arizona and in California along the river. What is your estimate as to the present amounts of what we might term illegal uses?

Mr. GOOKIN. Naturally it is very difficult to find the precise quantity of illegal uses because of being illegal. First you have to define the term "illegal." Second, you have to determine what uses are and obviously the illegal users don't want you to measure them.

Mr. ROGERS. The time of the gentleman has expired. The Chair recognizes the gentleman from California, Mr. Reinecke, for 3½ minutes.

Mr. REINECKE. On page 2 in your statement you indicate net losses of 800,000 acre-feet, Mr. Maughan. Is this just the lower basin or is this the upper and lower?

Mr. MAUGHAN. This is just the loss below Lee Ferry, in the lower basin.

Mr. REINECKE. The chart also indicates consumptive uses or commitments, rather, in the upper basin as well.

Mr. MAUGHAN. I am dealing with the whole supply as at Lee Ferry and these are subtractions from the supply measured at Lee Ferry, depletions upstream and losses downstream.

Mr. REINECKE. Have you made any studies of surplus water outside the basin?

Mr. MAUGHAN. No, I have just reviewed other people's plans. I have not made any myself.

Mr. REINECKE. Mr. Chairman, I yield the balance of my time to Mr. Udall.

Mr. UDALL. I thank my friend.

Mr. Gookin, you were about to finish a sentence and give me a significant figure of the illegal uses.

Mr. GOOKIN. My estimate of total diversions without contracts is about 160,000 acre-feet on both sides of the river of which I would estimate at least one-third returns. This would make a total of 120. Part of this is from pumping. It is debatable whether the pumps come from the river or not. I would say that from the river there is probably diverted about 120,000 acre-feet of which about one-third returns for a total of about 80,000 depletion on both sides of the river, would be my estimate.

Mr. UDALL. To your knowledge is the Interior Department and the Department of Justice taking action against some of these people.

Mr. GOOKIN. Yes, sir. They certainly are.

Mr. UDALL. I think Mr. Tunney will join me in saying we have many constituents who have been harassed by agencies of the Federal Government to terminate what the Government calls illegal uses and some of our constituents don't necessarily think are illegal uses.

My friends from California remind me, and I would remind my friend from New Mexico here, that Congress passed a substantial appropriation here last year which we all supported, an authorization to undertake a rather extensive phreatophytes control program in southern New Mexico, and these things are programs that can work and do from an engineering standpoint save wet water for beneficial uses.

Mr. GOOKIN. They certainly do; yes, sir.

Mr. UDALL. I take it, Mr. Maughan, from what you said, that all of you respect Mr. Tipton as a sound and reputable professional engineer. He is one of the real outstanding men in the Western United States.

Mr. MAUGHAN. Yes.

Mr. UDALL. And you also agree with his statements made to me that you can have honest, sincere engineers who differ on many of these judgment factors and on basic approach.

Mr. MAUGHAN. That is certainly correct.

Mr. UDALL. One of the key points of difference in your analysis against his is that the studies he submitted to the committee assumed—he goes back, say, to 1914, he assumes that the flow in the river in 1966 will be exactly the same as 1914, 1967 will be the same as 1915, 1968 will be the same as 1916, and so on.

Mr. MAUGHAN. Yes. The same distribution of historic flow with depletions projected on the basis of what the development then will be.

Mr. GOOKIN. Yes.

Mr. UDALL. And present reservoirs and future reservoirs and all that.

Mr. ROGERS. The time of the gentleman has expired. The Chair recognizes the gentleman from California, Mr. Burton, for 3½ minutes.

Mr. BURTON of California. I reserve my time.

Mr. ROGERS. The gentleman reserves his time.

The Chair recognizes the gentleman from California, Mr. Tunney.

Mr. TUNNEY. I would like to congratulate Mr. Maughan on a very interesting statement. This is the first time that I have ever been aware of these probabilities and it certainly was enlightening.

I would like to yield the balance of my time to Mr. Udall.

Mr. ROGERS. Mr. Udall.

Mr. UDALL. I thank my friend, Mr. Tunney.

Going back to what I was just covering here, in fairness to Mr. Tipton, this is a traditional sound method many hydrologists use. I am not attacking his method at all.

Mr. MAUGHAN. There are variations of that method which I won't go into because of time limitations, but it is a standard method; yes.

Mr. UDALL. Is another standard method to reverse the sequence? In other words, let's assume 1966 there is going to be exactly what 1965 was, 1967 will be 1964, 1968 will be 1963.

Mr. MAUGHAN. Some engineers have done that.

Mr. UDALL. Would you get different results or the same results if you reversed?

Mr. MAUGHAN. Considerably different in this case because the fact is that, in going backward that way, the lesser flows occur at the beginning. If you start with 1914, you start with a high-flow period.

Mr. UDALL. If you reverse it you would be getting some high flows

when the crunch comes when we really need high flows. Back in the 1920's would be projected into the 1980's and the others——

Mr. MAUGHAN. I might add Mr. Tipton said there is enough water to approximately 1995 or thereabouts and then it drops off rapidly. I think the reason for the dropoff is the fact that he hit a dry cycle in his procedure.

Mr. UDALL. At about the same time as what I referred to as "the crunch" would come here.

Mr. MAUGHAN. Right.

Mr. UDALL. I had my ears pinned back on tree-ring studies the other day and I am reluctant to mention them again, but don't these tree-ring studies show that if they have any validity—and I am not arguing that they necessarily do—but if they have any validity, isn't the period of the last 30 or 40 years the driest period in this basin over the last 700 or 800 or 900 years?

Mr. MAUGHAN. Well, it is pretty difficult to answer that question. I do know there were several real dry periods dating back to around 1200 or 1300, which is a long time ago, which might appear to be drier, but the 1930–64 period is among the driest.

Mr. UDALL. Is it your judgment as a professional engineer and hydrologist that we do have cycles on the river in a general way or is it just something that comes without any pattern?

Mr. MAUGHAN. I don't think there is any indication that there have been any cycles on the Colorado.

Mr. ROGERS. The time of the gentleman has expired. The Chair recognizes the gentleman from Washington, Mr. Foley.

Mr. FOLEY. Mr. Maughan, what amount of augmentation does your study indicate will be needed in the latter part of the century?

Mr. MAUGHAN. Well, the only figure we put in our joint memorandum is the total basin requirement, approximately 18 million acre-feet. This is an equivalent at Lee Ferry in the year 2000.

Mr. FOLEY. And what amount over the expected——

Mr. MAUGHAN. Well, on a 50–50 basis we expect 14.9 million acre-feet. The difference would be 3.1 million acre-feet.

Mr. FOLEY. Now, were you present when Attorney General Lynch testified the day before yesterday?

Mr. MAUGHAN. Yes, I was.

Mr. FOLEY. Did you hear the testimony that California has projected needs of 50 million acre-feet in a projected total availability of 70 million acre-feet.

Mr. MAUGHAN. Within the boundaries of the State of California; yes, I heard that.

Mr. FOLEY. That would be well within the—the difference there would be well within the amounts necessary to supplement the waters of the Colorado River Basin.

Mr. MAUGHAN. If it were possible to develop it; yes, sir.

Mr. FOLEY. You are talking about 20 million acre-feet possible for development.

Mr. MAUGHAN. Well, as I say, if it were possible to develop all the supply, every drop of it, what you say would be true. I don't think there is that possibility, however.

Mr. FOLEY. If that were possible, there would be 20 million acre-feet available, would there not?

Mr. MAUGHAN. The difference between the ultimate estimated requirements and the estimated annual supply is 20 million acre-feet.

Mr. FOLEY. Mr. Gookin, I was a little confused by Mr. Udall's questions that implied that everything was being done in Arizona to conserve water and at the same time Mr. Tipton's estimates of salvage were low.

Your testimony is that 20 percent of the communities of Arizona do not meter their water?

Mr. GOOKIN. I believe it was closer to 10 or less.

Mr. FOLEY. I thought the testimony was 80 percent metered.

Mr. GOOKIN. Metered, yes.

Mr. FOLEY. And 20 percent do not?

Mr. GOOKIN. No. No. I believe it was 85 percent or 85 to 90 percent metered.

Mr. UDALL. If the gentleman would yield, my statement was that over 95 percent of the water delivered in Arizona to domestic users is metered and I will stand by it.

Mr. FOLEY. Now, did you hear the testimony of the Governor yesterday or the day before that he had recommended to the State legislature certain improvements in the Arizona water code.

Mr. GOOKIN. I heard that; yes, sir.

Mr. FOLEY. And they were not enacted by the legislature?

Mr. GOOKIN. They have not been acted upon; that is correct.

Mr. FOLEY. Do you have appreciable salt cedar in Arizona?

Mr. GOOKIN. Yes, sir. We have a serious problem.

Mr. FOLEY. One of the worst water wasters in existence, is it not?

Mr. GOOKIN. It is certainly a serious water waster and we are working hard to remove it.

Mr. FOLEY. Would you argue with the statement that there is a substantial program that could be undertaken in the State of Arizona and other States of the Southwest to salvage water?

Mr. GOOKIN. Not at all, sir. It is in progress.

Mr. FOLEY. And considerably more than is in present progress could be done?

Mr. GOOKIN. Yes, sir.

Mr. FOLEY. I yield back the balance of my time.

Mr. ROGERS. Let the Chair make this observation. Mr. White, only those members who were present were to be recognized. However, the Chair will yield to you a minute and a half of his time if you have a question.

Mr. WHITE of Texas. If I had any time I would have yielded it to Mr. Udall, Mr. Chairman. Thank you.

Mr. ROGERS. The Chair may do that same thing. The Chair recognizes the gentleman from California, Mr. Hosmer, for his reserved time, three and a half minutes.

Mr. HOSMER. Mr. Maughan, if in the lower basin there were 100 percent of compact water, it still would not be enough to take care of the future needs, would it?

Mr. MAUGHAN. It wouldn't come close to that, sir.

Mr. HOSMER. California is a State that is how many miles long?

Mr. MAUGHAN. Oh, I imagine around 800 or 900 miles.

Mr. HOSMER. At least. And part of it is in the Lower Colorado River Basin and part of it is out, is that correct?

Mr. MAUGHAN. Most of it is outside of the basin.

Mr. HOSMER. When you consider the matter of water importation, it is not a matter of political boundaries but a matter of supply of water and the cost of moving it.

Mr. MAUGHAN. I think it is; yes, sir.

Mr. HOSMER. Very well. Now, you have used that figure 14.9 million acre-feet at Lee Ferry. Would you again say what that figure is?

Mr. MAUGHAN. It is the virgin flow. That would be the flow undepleted by man's activity and it represents a 69-year average, even chance, flow at that point.

Mr. HOSMER. And as I understand Mr. Tipton's chart appended to his testimony, figure 5, it, too, arrives at the 14.9?

Mr. MAUGHAN. Exactly the same figure.

Mr. HOSMER. However, you arrive at circa 1995 as the period that central Arizona project would be in trouble and he arrived at the year circa 1985. I want to ask you what the difference is based on, simply an estimate of the rapidity with which upper basin users are brought in?

Mr. MAUGHAN. That is one of the factors. Congressman Hosmer, he has studies which show this deficiency arriving as early as 1975, some as late as 2000. He has various answers and in our study we say about the turn of the century, not trying to identify the exact year.

Mr. HOSMER. So irrespective of who the expert is, we arrive sometime at this necessity for imports.

Mr. MAUGHAN. Yes; that is certainly true.

Mr. HOSMER. And is it your contention that inasmuch as the time is not predictable, that the business of imports should be gone about as early as possible?

Mr. MAUGHAN. In my opinion I don't think there are even a few months to waste to get on to the road of finding a way to augment the Colorado River supply.

Mr. HOSMER. Now, let's assume that the supply actually is augmented at a time several years before this emergency exists. In that event, would it be a wasteful advance of the project and expenditures on it or would this water have had some use? What would be the situation?

Mr. MAUGHAN. No. An example comes to mind. Southern California has grown the way it has because long-range planners for many decades actually developed supplies and facilities to meet not only current but projected requirements. The city of Denver has done the same. There is some risk of making investments too soon, but there are greater risks of not getting water soon enough.

Mr. HOSMER. And it is paid for.

Mr. MAUGHAN. It is paid for.

Mr. HOSMER. And the project paid out.

Mr. MAUGHAN. Right.

Mr. HOSMER. And paid for at a cost calculated within the total project to bring about that payout?

Mr. MAUGHAN. Yes, sir.

Mr. HOSMER. And the availability of that water generates economic and other activity of benefit not only to the region involved but to peripheral regions and the entire country; is that correct?

Mr. MAUGHAN. I am sure that history has shown that to be true.

Mr. ROGERS. The time of the gentleman has expired. The Chair recognizes the gentleman from California, Mr. Burton, for 3½ minutes.

Mr. BURTON of California. I yield as much of my time as he may need to Congressman Hosmer.

Mr. HOSMER. I don't desire it at the present time, thank you.

Mr. BURTON of California. The same to the chairman of the full committee.

Mr. ASPINALL. Thank you very much.

Are you gentlemen advised as to the contents of the amendments proposed by Mr. Goslin for the upper basin commission?

Mr. MAUGHAN. Well, I can speak for myself. Maybe Mr. Gookin for himself. I am advised of the contents but I don't think I am qualified to speak on them.

Mr. ASPINALL. You haven't taken any position on them as yet.

Mr. MAUGHAN. No, sir.

Mr. ASPINALL. Mr. Gookin?

Mr. GOOKIN. I have seen the draft which was submitted about 4 days ago. I am aware of the contents. I, too, am not qualified to take a position on them.

Mr. ASPINALL. Before we go to the markup on this bill, we would kind of like to know, at least the chairman of the full committee would like to know, the decision of representatives of the lower basin States on these amendments.

Mr. Maughan, in your statement, next to the last paragraph, you make this statement:

> In other words, on the basis of our joint memorandum, sufficient water will not be available to provide 1.2 million acre-feet per annum for the central Arizona project together with other main stream commitments in the lower basin after upper basin depletions reach 5.5 million acre-feet.

Why did you use the figure of 5.5 million acre-feet when the recognized figure for consumptive use available in the upper basin under the compact with existing storage is 6.3 million acre-feet?

Mr. MAUGHAN. Congressman Aspinall, it is not intended that we are slighting the rights of the upper basin. We arrived at the figure of 5.5 by subtraction. It was determined by the three States that 7.1 million acre-feet would be required to meet California's 4.4 million acre-feet, the existing uses in the lower basin, the central Arizona project, and the southern Nevada water supply project.

The aggregate of those needs is 7.1 million acre-feet.

We also decided that the 50–50 chance at Lee Ferry was 14.9. We deducted the Mexican Treaty and the midvalues of the losses and that indicated, then, that the lower supply basin will be cut to 7.1 when the upper basin reaches 5½ million. This is not to say they cannot go higher than that. We didn't try to handle that particular problem.

Mr. ASPINALL. If upper basin depletions go higher than that in accordance with the entitlement, then the central Arizona project is short of water.

Mr. MAUGHAN. But that will not occur until after the—about the turn of the century and we so state that.

Mr. ASPINALL. According to your probability concept.

Mr. MAUGHAN. According to our probability, the even chance situation.

Mr. ASPINALL. Has anybody in the lower basin, Mr. Maughan, ever considered the cost of a concrete canal for the controlled Colorado River below Parker Dam in order to salvage the water?

Mr. MAUGHAN. I have heard it stated that maybe some day that is what will happen, that there will be a concrete lined canal. I don't know the cost. I don't know if anyone has computed it.

Mr. ASPINALL. When you suggest the importation of water from some far away place, at least a thousand miles, don't you think, as compared with the importation from that distance away, somebody should be thinking about saving water? How many hundred thousand acre-feet of water do you think is lost?

Mr. MAUGHAN. We assume that only a net loss of 800,000 including regulatory losses would be the ultimate under the figures we presented which is not enough to forestall the need for imports for very many years; and certainly there are a great number of benefits to fish and wildlife and other people down there as it is right now.

Mr. ROGERS. The time of the gentleman has expired. The Chair would ask unanimous consent to yield his time to the chairman of the full committee, Mr. Aspinall. Without objection, so ordered.

Mr. ASPINALL. When you use a figure of 5.5 million acre-feet for depletions in the upper basin, then that means that, at that time, the proposed central Arizona project is going a reach the place where it is no longer using the amount of water as proposed for use in this legislation. If you have 800,000 acre-feet of water to add by that time to the amount that you might be securing of unused water from the upper basin or might not be securing from the upper basin, your project then would become more feasible, in answer to Mr. Foley's question as far as an irrigation project is concerned, than it would be if you depended upon imported water and didn't have any imported water, isn't that correct?

Mr. MAUGHAN. I think it certainly should be considered and every effort should be made to make the maximum conservation as consistent with the balanced approach to river basin development. Yes, sir, that is one of the alternatives.

Mr. ASPINALL. Really there isn't too much water that goes down below Parker Dam if you control the river completely above that. A canal may sound strange when you are thinking about an uncontrolled Colorado River which really led to this legislation. As I said in the beginning of the hearings, one of the reasons that we have a compact is because California couldn't use the water without a controlled river, but now we have the river controlled and the construction of such a canal shouldn't be infeasible if judged in accordance with the amounts of water that are transported from the Sacramento area down into the upper reaches of the San Joaquin Valley and are now proposed to go over the Tehachapi.

Mr. MAUGHAN. Certainly I am in favor of conservation to the maximum extent possible but I do consider there are balancing factors. There are millions of people who use the lower Colorado for recreation and fish and other purposes.

Mr. ASPINALL. I understand that and I understand that is at the heart of what is involved here. The lower basin wants the upper basin water because the upper basin can't put that water to use at the present time and at the same time the lower basin wants to protect the users along the Colorado River for recreation.

Now, the question is who is going to protect whom in this operation? The only good thing as far as the upper basin is concerned that has come out of these hearings is the statement by those present here today that they are willing to let the upper basin go ahead and build its projects as they are ready and as they are proposed.

Outside of that the upper basin is taking a complete gamble.

You talk about a 50–50 probability. What if you were in the upper basin? What would you say about the probability of the upper basin once getting back its water after it has been put to use under recognized authorized federally constructed projects in the lower basin?

Mr. MAUGHAN. A lot of things have to go into that answer. I think that personally—and I am only speaking personally—I think the chances are reasonably good.

Mr. ASPINALL. Reasonably. Do you think it is 50–50 or 1 in 20?

Mr. MAUGHAN. I think it is better than 50–50.

I might add that the city of San Diego built an aqueduct on the basis of interim use of surplus Colorado waters with expectation that the California water project would be approved by the voters to furnish a permanent supply when the Colorado River supply runs out. The city went ahead and built this project and reaped many benefits, and I think the city as a whole has a million people. The Engineering News-Record recently in an editorial says in engineering you don't guarantee against all odds. You guarantee against reasonable odds, and I think that is true.

Mr. ASPINALL. I understand your probability theory. I just want to be sure that it is probably successful for all of us.

Mr. ROGERS. The time of the gentleman has expired. The Chair has accumulated a few minutes and would ask unanimous consent to yield to the gentleman from Oregon, Mr. Wyatt, who was here when the witness commenced and the question-and-answer period started.

Mr. WYATT. I appreciate it, Mr. Chairman, but I believe I have no questions.

Mr. FOLEY. Will the gentleman yield to me?

Mr. WYATT. Yes.

Mr. FOLEY. Mr. Maughan, would you feel in line with the chairman's question that such things as a concrete canal below Parker should be first explored before exploring the question of bringing the water in from great distances by importation?

Mr. MAUGHAN. My own view is that all of these should be explored concurrently.

Mr. FOLEY. Would you agree with the general proposition that a basin should first try to solve its own water needs before seeking water from outside?

Mr. MAUGHAN. I think it should be amply demonstrated that all the supplies within the basin are going to be used before any importation is made.

Mr. FOLEY. And all the techniques of augmenting water to that basin should be first utilized before going to other basins?

Mr. MAUGHAN. I think these should all definitely precede it but I think this has definitely been done in the Colorado Basin.

Mr. FOLEY. Have studies been made of the lining of this area?

Mr. MAUGHAN. I know of no plans to concrete line the river. It may have been mentioned but rejected for reasons of balanced development.

Mr. FOLEY. But you know of no study?

Mr. MAUGHAN. No, sir.

Mr. FOLEY. Going back to the question of metered water, are you able to give us a figure, Mr. Gookin, as to the general character of metering water in the Southwest and in the Colorado River Basin in California?

Mr. GOOKIN. Outside of Arizona?

Mr. FOLEY. Yes.

Mr. GOOKIN. No, I have no knowledge.

Mr. FOLEY. Do you know if there are any studies available or any information?

Mr. GOOKIN. I think Mr. Maughan would be better able to answer that question than I with regard to California.

Mr. MAUGHAN. I think practically all of it is metered.

Mr. FOLEY. I would like to have for the record if possible the extent to which communities in the entire Colorado River Basin area and California meter water.

Mr. MAUGHAN. I would be happy to get that information for you.

(The information follows:)

STATE OF CALIFORNIA RESOURCES AGENCY,
DEPARTMENT OF WATER RESOURCES,
Sacramento, September 14, 1965.

Hon. WALTER ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation, Committee on Interior and Insular Affairs, House of Representatives, Washington, D.C.

DEAR MR. ROGERS: At the subcommittee hearings on H.R. 4671, Lower Colorado River Basin project, Congressman Foley requested data on the extent water is metered in communities of the entire Colorado River Basin, and in California.

The only source of data known to us which covers the seven Colorado River Basin States is an American Water Works Association staff report "A Survey of Operating Data for Water Works in 1960." The AWWA sent out survey questionnaires to all utilities in the United States serving 5,000 or more people. More than 1,300 replies were received, including responses from utilities serving most of the large cities in the seven Colorado River Basin States. Even so, fairly complete data on metering are available only for about 55 percent of the total population in those States.

The staff report lists, among many things, the total amount of water used in 1960, the percentage of the residential services metered (but not for industrial, commercial, or public entities), and the population served by each utility. A tabulation was prepared listing all cities and towns in the seven States for which the above data are available. A summary by State taken from that tabulation is given below:

AWWA survey report

State	Total population, 1960 census	Population served	Total water used (acre-feet per year)	Percent of residential services metered
Arizona	1,302,000	758,500	155.700	100
California	15,717,000	8,870,000	1,727,600	95
Colorado	1,754,000	984,600	228,500	32
Nevada	285,000	165,800	60,200	43
New Mexico	951,000	130,400	27,900	100
Utah	891,000	307,900	79,400	98
Wyoming	330,000	127,300	27,700	90
Total	21,230,000	11,344,500	2,307,000	88

The last column represents an approximate weighted average for each State, based on total water use of each community.

Although data for Arizona from another source has been placed in the record by Mr. Gookin and similar data are being compiled for California, it has been decided to furnish the subcommittee data for each of the seven States obtained from the same source.

Sincerely yours,

W. DON MAUGHAN,
Regional Planning Staff Specialist, Staff and Services Management.

Mr. FOLEY. I yield back the balance of my time.

Mr. ROGERS. The Chair has about 2 minutes left. If anyone has a question that won't consume more than 2 minutes——

Mr. UDALL. I would like to put in my application for that time. The members have been more than generous with me.

Let me say, in response to questions raised by the chairman of the full committee, two things. The question of probability goes to water supply where no man can tell how much rain will fall, and so forth. The question of protecting the upper basin rights as far as I am concerned, and I think I speak for the other Arizona House Members over here as well, is we don't want to give you probability but we want to give you certainty as near as the mind of man can devise.

Mr. ASPINALL. If my colleague will yield, how can my colleague assure me that 40 years from now, 35 years from now, people in his State will be as openminded and broadminded as my colleague and my colleagues who are not members of this committee?

Mr. UDALL. I can't, but the history of my State is such that the kind of people who have been sent to Congress should give the gentleman confidence.

Mr. ASPINALL. This is where I take exception to what you have to say because of the action of my cousin down there.

Mr. HALEY. Will the gentleman yield to me?

Mr. UDALL. Let me get one more point before the chairman bangs the gavel. Let me say on behalf of we three Arizonans, we have studied the Goslin draft, upper basin draft language, and there are many good things in there, many constructive things, many things we accept, and we hope that we can work out a bill that we can totally accept before we get to the point of markup. And now I yield to my friend from Florida.

Mr. HALEY. May I say to my distinguished friend that I have a very easy solution to all of this controversy. Let the people in Arizona, and the Southwest, move down to Florida. We have plenty of water.

Mr. UDALL. I would only suggest as a text this morning to my minister friend from Florida, if they do that, I would say: "Oh, Lord, forgive them for they know not what they do." [Laughter.]

Mr. ROGERS. The time of the gentleman has expired.

Let the Chair thank you, Mr. Maughan and Mr. Gookin, for your presentation to the committee.

Mr. ROGERS. Our next witness is the distinguished former Member of the Senate and Governor of Colorado and the Chair will recognize the distinguished chairman of the full committee, Mr. Aspinall, to introduce him.

Mr. ASPINALL. Mr. Chairman, members of the committee, Governor Johnson is coming to the stand and I again state, as I have so often, that here is one of the great public servants of Colorado, of the West, of the Nation, and of the world. He is almost 81 now, is serving diligently and effectively as he always has.

If it had not been for this Governor, this great distinguished servant of Colorado, Colorado would not today be talking very much about saving an entitlement in the upper basin. It is because of what he did that the Santa Fe meeting in 1955 provided the means by which the Colorado storage project came into being.

Ed, I am glad to see you.

STATEMENT OF HON. ED C. JOHNSON, COLORADO COMMISSIONER, UPPER COLORADO RIVER COMMISSION, AND FORMER GOVERNOR AND U.S. SENATOR FROM COLORADO

Mr. JOHNSON. Thank you, Mr. Chairman.

Mr. Chairman, and the chairman of the full committee, in order to save time, I should like to ask that my whole statement go into the record as it appears here in my statement and I desire to emphasize some points here today.

Mr. ROGERS. Without objection, Governor, your statement will be included in the record the same as if read in full, and you may summarize it as you please.

Mr. JOHNSON. Thank you, Mr. Chairman.

I have spent many winters in Arizona; am a modest water user and taxpayer in that State, and know that the water level in a large productive area in central Arizona is receding rapidly and that new water must be brought in without delay. For years and years I have hoped that central Arizona might be built while Carl Hayden was a Member of Congress. No one has done more for the West than he. I have wanted to see this project the crowning glory of his illustrious services to the West. This project should be known as the Carl Hayden Reclamation Project.

Indeed, central Arizona could be the world's greatest reclamation project. It has the salubrious climate, the fertile soil, the beautiful landscape, and the broad magnitude to make it so. Central Arizona is nothing short of spectacular. It took big men to perceive it and took courageous men of broad vision to undertake it.

That is reason enough to name it "Carl Hayden."

But the sponsors of central Arizona must be realistic too. They should know that water supply in any reclamation project must come first.

You can't build billion-dollar projects on hopes, political pressure, and weather forecasts. The most elaborate reclamation project on earth without water would be a hideous monstrosity and a cruel hoax for its trusting supporters. I have ranched in the Upper Colorado River Basin for more than 50 years and know firsthand how grievously short upper basin water actually is.

If we had the water and the money. And we would look to this committee for the money, we could use all the water our mountains produce, and Colorado produces more water than the other six compact States in the Southwest United States produce. We produce more than all of them put together.

As a member of the Colorado Legislature in 1923, I voted to ratify the Colorado River compact. So I have been virtually interested in this problem for over 40 years.

If this able committee is to do something constructive with this terrific problem assigned to them for solution, they must begin with an available water supply. This huge project will not produce in itself one drop of water. Until the water factor is solved, nothing is solved; and the project remains completely infeasible. First things must come first, I repeat.

I am completely convinced that all the water for central Arizona must come from outside sources. If this be true the sooner we make such an objective basic to the consideration of central Arizona, the better it will be for all concerned. Time is wasting.

There simply are not sufficient dependable supplies of uncommitted water above Lee Ferry which would warrant any construction whatever in the lower basin. I have prepared a document on the water supply of the upper basin which I should like to attach to my statement. My calculations are either correct or incorrect, and I invite close examination and sharp criticism of these calculations I have submitted.

The urgency of importing additional water into the Colorado River is not an exercise in expansive daydreaming, nor is it indulgence in a futile series of mental gymnastics and debate. It is facing, and I mean it is facing, the hard, stubborn facts of a desperate situation.

Central Arizona, representing a tragic necessity and a glorious future for a great and a good State, hangs in the balance. If the importation of water is not feasible, if it must be ruled out, then central Arizona is a dead duck and the sooner we remove it from the trestleboard, the better for all concerned. But if we agree to importation, central Arizona is destined to become the symbol of national togetherness and international cooperation.

There are extravagant estimates that the Columbia River dumps 160 million acre-feet of fresh water into the sea. Colorado River Americans and Colorado River Mexicans would like to borrow 5 million acre-feet of it until such time as our good neighbors, the States of the Northwest, are ready to use this priceless God-given blessing of theirs.

When the Northwest States are ready to use this water, the Southwest States in good faith promise, and make a solemn pledge, and agree to import water into the Columbia River and return by replacement the water they have borrowed. We of the Southwest are not asking for a gift. In our misery we are pleading for a loan of water which will save our economy. Without importation the Southwest faces stagnation. With it the Southwest will become the envy of the world.

That is the proposition the Honorable Secretary should lay before you. We talk about an importation of 2½ million acre-feet most likely advanced as a clever way for the Southwest to get its foot in the door. For instance, if the cost of importing 2½ million acre-feet would be a billion dollars, and I pick that figure out of the air, the cost of importing 5 million acre-feet would be only 20 percent additional.

I think any competent engineer would agree. But the Southwest needs 5 million acre-feet, and if we are going to do a job we should settle for nothing less than a creditable program which is realistic and absolutely sound and which does the job.

And now if you will turn to the last page, I have prepared the record for 34 years above Lee Ferry and I have shown distributions and calculations——

Mr. ROGERS. Governor, let the Chair, with unanimous consent, insert your calculations in the record as a part of your statement so that the record will be complete.

Mr. JOHNSON. Yes.

(The document referred to follows:)

THIRTY-FOUR-YEAR RECORD, COLORADO RIVER SYSTEM ABOVE LEE FERRY AND DISTRIBUTION CALCULATIONS

[Factors are expressed in acre-feet used in this calculation]

	Acre-feet
Total virgin flow Oct. 1, 1930, to Oct. 1, 1964	438, 964, 000
Average annual virgin flow for these years	13, 000, 000
Compact required delivery at Lee Ferry (annual)	7, 500, 000
Upper basin portion Mexican burden (annual)	750, 000
Evaporation upper basin (estimated annual)	600, 000
Present depletions upper basin States annual (Interior Department)	2, 788, 000
Interior Department projection of such depletions, year 1975	4, 140, 000
Arizona upper basin apportionment (annual)	50, 000

Calculations

Average annual flow for last 34 years	13, 000, 000
Less required delivery Lee Ferry (annual)	7, 500, 000
Total	5, 500, 000
Less upper basin share Mexican burden	750, 000
Total	4, 750, 000
Less evaporation and stream loss upper basin	600, 000
Total	4, 150, 000
Less Interior Department projected depletions by consumptive uses upper States in year 1975	4, 140, 000
Total, water available from upper basin for central Arizona, year 1975	10, 000

My own conservative estimates of upper basin depletions are more than a million acre-feet higher than the projections of the Interior Department.

The Tipton and Kalmbach report indicates that upper basin existing depletions, plus depletions of projects which have been authorized, plus the depletions of projects now under construction rests with 4,714,000 acre-feet. The progress of this construction rests with this committee. No one could have better judgment of the time factor than you.

Mr. JOHNSON. I want this report to go in because I think it is very important. I have heard argument this morning about the 5.5 million, and so on, and I carried these calculations along to the year 1975, and there is no water left. Absolutely no water left, Mr. Chairman, after you make these deductions which are provided for by law.

And I want to say this, too. There is no provision whatever in my calculations for storage water. Mr. Hoover pointed out in 1945 that the upper basin States must provide for 20 million acre-feet of storage water in order to take care of the dry years and on account of the flow of the river being so unpredictable.

I have noticed that in these 34 years, and those are the latest years, Mr. Chairman, that there were 8 years when the total volume of virgin flow of the Colorado River did not yield enough water to satisfy the lower basin and give nothing whatever to the upper basin: 8 million acre-feet.

For 24 percent of these 34 years there was no water for the upper basin unless we had storage. And I want to say, too, to the lower basin that if they will leave our storage water alone in the upper basin, we will deliver their 75 million every year, every year.

Mr. ROGERS. Every 10 years.

Mr. JOHNSON. Yes, sir.

And now, Mr. Chairman, I had planned to discuss the proposed amendments to H.R. 4671. The Secretary has submitted some and the upper basin representatives have proposed many. I favor every amendment which safeguards the water shortage of the upper basin and I oppose every effort of the Secretary to seize the upper basin Colorado Commission's labor and responsibility to deliver water to the lower basin at Lee Ferry.

It should be called to the attention of Congress that there is a slick method of extracting water from the upper basin to provide water for central Arizona. It is the double deal solution.

This is how it would operate: Tipton & Kalmbach indicate that existing depletions in the upper basin, plus depletion of upper basin projects under construction, plus upper basin projects which have been authorized total a depletion of 4,714,000 acre-feet. Unless the flow of Federal funds is halted to depletion of the upper basin in 1957 it will be at least 4,714,000 acre-feet.

So, to obtain additional water for central Arizona, block Federal funds for the upper basin until the year 2000 or better still until 2020. Congress could authorize central Arizona and advance $800 million more or less for its construction and at the same time reduce depletion in the upper basin by halting the flow of Federal funds to it. Juggle Federal funds and juggle upper basin depletion and obtain upper basin water for central Arizona. A mighty slick trick. But this Subcommittee on Irrigation and Reclamation does not operate that way. It will spurn such a cop-and-robbers solution. That I know.

I thank the committee.

Mr. ROGERS. Thank you, Governor Johnson.

The Chair will recognize each member for not to exceed 2 minutes. The Chair recognizes the gentleman from Colorado, Mr. Aspinall.

Mr. ASPINALL. Mr. Chairman, I have no questions of the Governor. He has made a wonderful statement here for his position and anyone who knows Governor Johnson knows that he has made this statement in all sense of fairplay because his friends in the State of Arizona and elsewhere in the Southwest are just as numerous as they are in the area where he himself lives and which he has represented for so long.

Thank you, Governor, for your contribution.

Mr. ROGERS. Mr. Hosmer.

Mr. HOSMER. Governor, according to your calculations, the upper basin is water bankrupt as of the present authorized project; is it not?

Mr. JOHNSON. 1975. My calculations are for the year 1975.

Mr. HOSMER. Based on projects that have now been authorized.

Mr. JOHNSON. Based on the factors which I have expressed here in my report on the side there, the various factors which I think are agreed upon.

Mr. HOSMER. Now, you took the average annual flow for the last 34 years at 13 million in making your calculations rather than the 70-

year flow that averaged 14.9 million acre-feet—what caused you to choose this period?

Mr. JOHNSON. My figures are based on the last 34 years of records. I didn't take the last year, the present year, because that is not concluded until October 1.

Mr. HOSMER. What is the virtue of this 34-year period you have selected over any other 34-year period or a longer period, for instance, the 70-year period, that they have kept records on the stream.

Mr. JOHNSON. I think the last year period is the safer one to calculate on.

Mr. HOSMER. How about the last 20 years instead of the last 34 years? That would make the calculations even more severe and restrictive; would it not?

Mr. JOHNSON. I would want to use the latest and best records that we have and therefore I took the last 34 years.

Mr. ROGERS. The time of the gentleman has expired. The gentleman from Florida, Mr. Haley.

Mr. HALEY. Mr. Chairman, I have no questions. I merely want to welcome the distinguished Governor here. He has been an outstanding man not only in the western part of the United States but in the entire Nation. I remember very favorably the impression that he made on a subcommittee when he and the chairman of the full committee appeared before that subcommittee in behalf of his veterans of that State, and the Governor and the chairman were able to save, so to speak, your fine installation at Grand Junction to continue to give the service out there to the veterans of your State.

So not only in water resources but in everything else pertaining to his great part of the Nation, he has been an outstanding gentleman and I welcome him here today.

Mr. JOHNSON. I thank the gentleman for those very kind remarks.

Mr. ROGERS. The Chair recognizes the gentlemen from Kansas, Mr. Skubitz.

Mr. SKUBITZ. Governor, it is good to have you here today. I have only one question. Did I understand you to say that unless we are willing to commit ourselves to a water importation program, we ought to forget about this program?

Mr. JOHNSON. I didn't quite get that.

Mr. SKUBITZ. Unless we are willing to commit ourselves to a water importation program, we might as well forget about the central Arizona project.

Mr. JOHNSON. That is my opinion.

Mr. SKUBITZ. Thank you, Mr. Chairman.

Mr. JOHNSON. Thank you, Joe.

Mr. ROGERS. Mr. Johnson.

Mr. HAROLD T. JOHNSON. I have no question, Mr. Chairman. But I, too, welcome the Governor here and certainly he has been a very fine leader in our country. He is well respected by all. California thinks a great deal of Governor Johnson. And I realize that you have taken the 34-year period of history on the river in the upper basin, the flow of the river, and we have had the statements here of Mr. Tipton and also Mr. Maughan, of California, where they have taken a much longer period of time in coming up with the analysis that the flow of the river was 14.9 million as against your figure of 13 million plus.

Mr. EDWIN C. JOHNSON. Well, I should think that this committee, preparing to spend $800 million, would want to be pretty safe in knowing that the water was aavilable and I think 34 years of experience, the latest 34 years, ought to be taken into consideration. I know the upper basin takes it into consideration and I think that the lower basin, and I believe this committee, of course, I think this committee is wise enough to make their own decisions, but I would think that this committee would be very interested in finding out what had happened in the last 34 years.

Mr. ROGERS. The time of the gentleman has expired. Mr. Wyatt.

Mr. WYATT. Governor Johnson, as a new member of this committee I want to tell you I enjoyed your statement thoroughly and I feel it is an honor to sit here as a member of the committee and have you testify before us. Thank you for your appearance.

Mr. JOHNSON. Yes, sir.

Mr. ROGERS. Mr. Udall.

Mr. UDALL. Governor Johnson, I wanted to join with the remarks Chairman Aspinall has made about you. We in the West recognize the great service you have given to your State and to the West and I particularly wanted to welcome you as being a part-time resident of Arizona and as a water user and taxpayer down there as you expressed it.

Mr. JOHNSON. Thank you very much.

Mr. UDALL. On behalf of Arizona I wanted to thank you for your very generous comments about Carl Hayden. I know you worked with Carl Hayden so many years and I certainly concur with everything you said about him. He is one of the real greats in the history of the Congress.

Mr. JOHNSON. Thank you.

Mr. UDALL. There is another gentleman we have had here today that is an old friend of yours, Ernest MacFarland. You served with him in the U.S. Senate and we were proud that you voted for the central Arizona project on two occasions back in the late forties and early fifties, and we wanted to thank you for that support, too, while you are here with us today.

Mr. JOHNSON. Yes. I am very proud to remember the 12 years that Senator McFarland and I spent together in the Senate. He is a fine, well-informed citizen, and we relied on him in the Senate to represent the water interests of Arizona and the Southwest and he became quite an expert in that matter.

Very able man.

Mr. UDALL. Thank you, sir. You now serve on the Upper Colorado Commission as Colorado's representative.

Mr. JOHNSON. Yes. I am the Colorado commissioner.

Mr. UDALL. And it was the Colorado Commission that authorized the Tipton report.

Mr. JOHNSON. That is correct.

Mr. UDALL. And has this report been approved by the Colorado Commission, the Upper Colorado Commission?

Mr. JOHNSON. Well, we have paid a great deal of attention to it. We rely on it for the facts.

Mr. UDALL. I thank you, sir.

Mr. ROGERS. The time of the gentleman has expired. Mr. Reinecke.

Mr. REINECKE. I would like to associate myself with the remarks of my colleague. I have no questions.

Mr. ROGERS. Mr. Burton.

Mr. BURTON of California. No questions.

Mr. ROGERS. Mr. Tunney.

Mr. TUNNEY. As a freshman member of the committee, I want to thank the Governor for his eloquent presentation and for having enlightened our deliberations.

Thank you. I have no questions.

Mr. ROGERS. Mr. Foley.

Mr. JOHNSON. Thank you, Congressman.

Mr. FOLEY. Governor Johnson, there is in my State a contemporary of yours and a distinguished former U.S. Senator, C. C. Dill. He has been a determined champion of resource development, as have you. I would certainly like to join with the chairman of the full committee and my colleagues in welcoming you here today. I think for us new members of this committee, it is quite an inspiration to see a man such as yourself who has had such a full life in public affairs and is still so vitally involved as are Senator Dill and Senator Hayden.

I would like to ask you just one question. Would you feel that it would be appropriate for the States of the Colorado River Basin, both the upper and lower States, and California to make a clear showing that there are not resources within those areas to supply any water deficiency projected in the future before seeking importations of water outside of the region?

Mr. JOHNSON. Yes. I think there is a woeful lack of information that has been presented here to this committee in support of the very large project and I think that all these questions ought to be resolved before you commence dishing out that hundred million. I am satisfied, and I have made a very careful study of it, that there isn't water in the upper basin, and if we are going to have central Arizona, and I hope we are going to have central Arizona, I hope it is approved, I hope it is built, but if it is to be built, the water must come from some other place than the upper basin. We simply don't have the water.

It is that simple.

Mr. FOLEY. Thank you, Governor. I just want to say to you and to my colleagues here that no one in the Northwest has anything but a desire to see the central Arizona project built.

It is only our concern that there first be a clear showing of a need that cannot be met within California and the basin States before the subject of importation from outside of the region is raised.

Thank you, Governor.

Mr. JOHNSON. I thank you for what you said about Senator Dill. I have great admiration for Senator Dill. We worked together on many important projects for the Nation.

Mr. ROGERS. The time of the gentleman has expired. Are there any further questions from any of the members.

We have about a couple of minutes. Thank you very much, Governor Johnson, for your presentation.

Mr. JOHNSON. Thank you.

Mr. ASPINALL. Mr. Chairman, before we adjourn we have several witnesses for this afternoon and I would suggest that—I would ask unanimous consent that the first witness, Mr. Ely, representing the California water users organizations, be limited in his presentation and

questioning to an hour and 15 minutes and that the remaining time until not later than 5 o'clock be divided equally among the rest of the witnesses scheduled for today.

Mr. ROGERS. Is there objection?

The Chair hears none. The subcommittee will proceed in that order.

The subcommittee will stand in recess until 2 p.m.

(Whereupon, at 12:15 p.m., the subcommittee was adjourned, to reconvene at 2 p.m. of the same day.)

AFTERNOON SESSION

Mr. ROGERS. The Subcommittee on Irrigation and Reclamation will come to order to consider further pending business.

Mr. HOSMER. With respect to the comparative photographs of Glen Canyon Dam that were submitted yesterday by the Commissioner of Reclamation, I would ask unanimous consent that a suitable number of pairs of these for illustrative purposes be reproduced in the record at the appropriate place, subject to the ability of the printers to reproduce them satisfactorily.

Mr. ROGERS. Is there objection?

The Chair hears none. The request is granted.

(The photographs referred to are on p. 170.)

Mr. UDALL. Mr. Chairman, at this point may I offer for the record a letter from Mr. Ival V. Goslin, executive director, Upper Colorado River Commission?

Mr. ROGERS. Is there objection?

The Chair hearing none. The request is granted.

(The letter follows:)

UPPER COLORADO RIVER COMMISSION,
Salt Lake City, Utah., August 27, 1965.

Hon. MORRIS UDALL,
House of Representatives,
Cannon House Office Building, Washington, D.C.

DEAR CONGRESSMAN UDALL: Immediately following today's morning session of the hearing on H.R. 4671, you asked me why the Upper Colorado River Basin fund should be relieved from paying for the diminutions in power generation at Hoover Dam power plants attributed to the filling of upper basin reservoirs, and if the upper basin people would accept a method of providing this relief other than charging a part of the costs of substitute energy and generating capacity to operation and maintenance at Hoover Dam.

A. Reasons for relieving the upper basin fund from the obligation to pay for diminutions in power generation at Hoover Dam include the following:

1. The Hoover Dam power contracts are between the Secretary of the Interior and the power contractors. They in no way involve entities in the upper basin as third parties, or otherwise. There is nothing in the Boulder Canyon Project Act, or Adjustment Act, or the Colorado River Storage Project Act that gives the Secretary clear-cut authority to use upper basin energy or revenues for the purpose of filling contracts with the Hoover power allottees.

2. The Hoover power contracts provide for diminutions in generation at Hoover Dam powerplants. This provision was made at the time the contracts were negotiated, and it was based upon the best water supply records available at that time. The average river flows prior to the time the contracts were signed were higher than they have been since. The fact that the Secretary in the mid-1930's made a bad guess as to future river flows should be no excuse for passing the penalty for his bad judgment, which was due to the vagaries of nature, to the upper basin development program. The record shows that certain of the Hoover power contractors freely admitted during the contract negotiations that the Secretary could not guarantee a specific amount of water or power during the life of the contracts.

3. Since the contracts were between the Secretary and the Hoover power allottees, the Secretary should have looked to devices involving lower basin facilities instead of looking to the upper basin in the fulfilling of his contracts. For instance, the Boulder Canyon Project Adjustment Act empowers the Secretary to adjust Hoover power rates. It also empowers him to add contingent charges to the end of the present contracts, and, thus to extend their period. Either of these devices could have been used to provide the contract energy needed while filling upper basin reservoirs. As you can see, the second would have involved no increase in power rates.

4. The initiation of filling of upper basin reservoirs came during a drought period—one of the vagaries of nature. This circumstance compounded the problem, it is true; but it is upper basin water that is being stored—water that in the past has been used by the lower basin for spinning the Hoover generators. Now, at a time when the upper basin is using less than half its compact apportionment it not only receives protests against storing its own water but is being penalized millions of dollars worth of development revenues at the same time. It seems that the Colorado River compact is not clear concerning the rights of either basin to store water. Apparently this is one of the gray areas of the compact—but shouldn't the upper basin enjoy the same privileges of water storage as the lower basin—especially when its future resource development must be based upon holdover water to be delivered to the lower basin?

5. The water being accumulated in upper basin reservoirs is being stored for future consumptive use in the upper division States by the familiar water exchange principle. It is being stored also for regulating the future deliveries to the lower basin. It is not being stored for the sole purpose of obtaining power head as has been alleged; although the early attainment of power head and production of revenues is important to water development programs in Colorado, New Mexico, Utah, and Wyoming. Again, the upper basin should enjoy the same privileges of storing its water as is enjoyed by the lower basin—even if the compact is gray on this point. It must be remembered that it is gray for both basins—not for the upper basin alone. The lower basin is not given the exclusive right to store water by any of the documents constituting the "law of the river."

6. The diversion of power revenues from the upper basin fund to purchase substitute energy and capacity for Hoover power contractors has the same adverse effects of curtailing the rate and amount of water resource development as if the upper basin were prevented from using its own water because it was in the possession of another. Enough revenues have already been diverted from the upper basin fund to pay for one or more upper basin projects.

7. The effects of diverting revenues from the upper basin fund are compounded by the fact that, because those revenues are unavailable to pay for capital costs of project features, many more millions of dollars of interest will be charged against the Upper Colorado River Basin Fund. This further injures upper basin development.

8. The Secretary's Glen Canyon Reservoir filling criteria approved on April 2, 1962, were not satisfactory to the upper basin. These criteria express an intent to use Hoover power revenues after 1987 to return the dollars used from the upper basin fund to purchase substitute energy for the power diminutions at Hoover Dam while keeping Lake Mead at rated head or above—if Congress so directs. The value of the energy supplied from the Glen Canyon powerplant as substitute energy to the Hoover power allottees is not included in this intent. Neither are the interest charges against the upper basin fund included. Thus, if Congress so directs, and this direction is not likely to materialize in the light of the growing political power of the lower basin, a very small part of the charges might be returned after 1987.

9. During the drought year, 1964, the Secretary released part of the water in Glen Canyon dead storage space in order to maintain rated head at Lake Head. Due to the storm of protests that followed he adopted certain procedures for implementing his filling criteria under which he resumed filling Glen Canyon Reservoir, and allowed Lake Mead to fall below the rated head on the Hoover powerpants. His implementing procedures also required further use of revenues of the upper basin fund to pay for impairment to capacity, impairment to energy, and extraordinary operation and maintenance caused by drawing Lake Mead below rated head while retaining water in Glen Canyon. There is no intent to ever return these costs to the upper basin fund. This action was taken in spite of

the fact that Lake Mead had been drawn well below rated head before Glen Canyon Dam was on the river.

The water people in the upper basin only want equity with respect to this problem. They believe that the validity of the Hoover power contracts and their fulfillment is a matter between the Secretary and the Hoover power allottees, and that upper basin development should not be adversely affected by resolving problems related thereto. They are asking for two things: First, legislation to authorize a lower basin project must stipulate that the upper basin fund will be divested of all responsibility for diminutions in power generation at Hoover Dam; and, second, that all of the money that has been diverted from that fund for the purposes described must be returned. The upper basin's proposed amendments do not include the return of the interest charges or the value of the upper basin energy that has been used as substitute energy to date.

The upper basin does not propose to wait until 1987 for the resolution of a part of this problem. The whole problem must be resolved now in the pending legislation.

Marble and Bridge Canyon powerplants will be dependent upon Glen Canyon Reservoir for river regulation and silt retention. The Commissioner of Reclamation has testified that the energy output at Bridge Canyon will be doubled by having Glen Canyon Dam on the river. In the interest of equity, a very good case could be made that large payments from the lower basin development fund should go to the upper basin fund for benefits created by the upper basin's storage unit at Glen Canyon. I am not pleading that case here.

From the above explanation you can undoubtedly sense another reason for the upper basin's concern about the possible effects of H.R. 4671, unless it is amended to provide for recall of upper basin water to be temporarily used in the lower basin. We thought that the right to construct the Colorado River storage project was adequately protected by the Colorado River compact. We had to fight opposition from part of the lower basin with whom that compact was made. Due to a prognostication by the Secretary in the 1930's of future water supply that failed to materialize, the upper basin has been stuck with paying for the so-called power "deficiencies" at Hoover Dam. Another bad guess now about the water supply of the 1980's and beyond could jeopardize the upper basin even more severely.

B. As for the second part of your question, I'm relatively certain that the upper basin people will accept any reasonable solution to this problem that will stop the use of the upper basin fund for paying for "deficiencies" in generation at Hoover Dam and will return the charges already accrued against the upper basin fund. It is my understanding from recent conversations with some of the Hoover power allottees that they object to charging costs of "deficiencies" as operation and maintenance of Hoover Dam because to do so would raise their power rates. Several years ago I suggested the use of the $500,000 per year Colorado River Development Fund between now and 1987 for this purpose. This should not be objectionable because its use would not affect the power rates at Hoover Dam. As you know, the CRD Fund was established by the Boulder Canyon Project Adjustment Act and in recent years has been used about half in each basin for the investigation of projects.

From a copy of a memorandum recently supplied by the Bureau of Reclamation it appears that the "deficiencies" might amount to about $2 million per year from 1966 through 1974. Therefore, the CRD Fund for 1966 through 1987 might be short of the amount required. Part of this shortage might be filled by using surplus, unsalable energy from the Colorado River storage project. The balance could come from the Lower Colorado River Development Fund. It has been suggested that if those interested would agree to this procedure, it might be accomplished by providing in the LCRBP legislation for a separate fund to which the receipts of the CRD Fund would be transferred each year to be used as needed. If the accumulated CRD Fund proved inadequate in a given year, appropriations would be made from the general fund to the separate fund for the balance. The general fund money would be reimbursed in the future from the Lower Colorado River Development Fund. The CRD Fund moneys would be nonreimbursable.

If your question had been asked during the hearing I would have answered it as I have here. If you wish further information about this subject, please let me know.

Sincerely yours,

IVAL V. GOSLIN, *Executive Director.*

Mr. ROGERS. Our first witness this afternoon is the Honorable Northcutt Ely, representing the Colorado River Board of California and the six-agency committee of California water users.

Mr. Ely, it is always nice to have you before the subcommittee.

STATEMENT OF NORTHCUTT ELY, SPECIAL COUNSEL, COLORADO RIVER BOARD OF CALIFORNIA; ACCOMPANIED BY RAYMOND R. RUMMONDS, CHAIRMAN; AND DALLAS E. COLE, CHIEF ENGINEER, COLORADO RIVER BOARD OF CALIFORNIA; CHARLES E. CORKER, ASSISTANT ATTORNEY GENERAL, AND BURTON J. GINDLER, DEPUTY ATTORNEY GENERAL; WESLEY E. STEINER, ASSISTANT CHIEF ENGINEER, AND W. DON MAUGHAN, REGIONAL PLANNING STAFF SPECIALIST, DEPARTMENT OF WATER RESOURCES; AND THOMAS M. STETSON, CONSULTING ENGINEER TO THE ATTORNEY GENERAL

Mr. ELY. Thank you, Mr. Chairman.

Mr. Chairman and members of the committee, my name is Northcutt Ely. I am a lawyer, a member of Ely, Duncan & Bennett, Washington, D.C.

Last week I had the honor to appear before you, accompanying Attorney General Thomas Lynch, of California, in my capacity as special assistant attorney general in charge of the case of *Arizona* v. *California*. I shall therefore not repeat the analysis of that case given you by Attorney General Lynch, nor the historical background and statement of the issues which Senator Kuchel gave you on the opening day.

I appear before you today as special counsel for the Colorado River Board of California and the six California agencies that have rights to Colorado River water. These are the Metropolitan Water District of Southern California, the city of Los Angeles, and the San Diego County Water Authority, which are included within Metropolitan; Imperial Irrigation District; the Coachella Valley County Water District, and the Palo Verde Irrigation District.

At this point, Mr. Chairman, I have the honor to introduce my colleagues who are appearing with me.

On my right, Mr. Raymond R. Rummonds, who is chairman of the Colorado River Board and ex officio Colorado River commissioner for the State of California, charged by statute with responsibility for interstate negotiations under the general direction of the Governor. On my left, Mr. Charles E. Corker, assistant attorney general of the State of California, and my right arm during the trial of *Arizona* v. *California*.

Behind me, Mr. Dallas E. Cole, chief engineer, Colorado River Board; Mr. Burton J. Gindler, deputy attorney general; Mr. Wesley E. Steiner, assistant chief engineer; Mr. W. Don Maughan, regional planning staff specialist for the department of water resources, and Thomas M. Stetson, consulting engineer to the attorney general.

These California agencies receive water through three great projects. The Colorado River Aqueduct serves Metropolitan and its constituent agencies, which encompass the major portion of the southern California coastal basin. The All-American Canal and Imperial Dam,

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which is its diversion structure, serve both Imperial Irrigation District and Coachella Valley County Water District. These are located in the Salton Sink in the southeast corner of California. The All-American Canal also serves the portion of the Yuma project in California. The Palo Verde Irrigation District, which is located along the Colorado around Blythe, diverts its Colorado River water by use of its Palo Verde diversion dam. In addition to these projects, there are also certain other rights to Colorado River water in California: small Federal rights—primarily Indian reservations—and minor rights of individuals, including riparians, independent of the organized districts.

Dallas E. Cole, chief engineer of the Colorado River Board, has prepared an excellent statement for you, describing these six agencies and their relationship to the economy of California. I ask that it be printed with my own.

(Mr. Cole's statement will be found on p. 598.)

In my presentation today, Mr. Chairman, I shall devote my attention primarily to the amendments proposed by the upper basin States and the suggestions made by the Bureau of the Budget and the Secretary. I shall comment on these, indicating those which I think are improvements, those which we have objections to, and those which we think are subject to negotiation.

Before I do that, I would like to direct your attention to the five features of the pending bills.

The bills before you—of which H.R. 4671 is a counterpart—embody a compromise between the water users of California whom I represent here today and the sponsors of the central Arizona project in Arizona.

The bill has five main features—one of primary concern to Arizona, one of primary concern to California, two which affect all seven States of the basin, and one which primarily affects the States from which water might be imported into the Colorado. California is one of these.

The feature of overriding importance to Arizona, of course, is authorization of construction of the central Arizona project, which appears in sections 302 and 303 of the bill. Section 302 describes the main stream reservoir unit, consisting of Bridge and Marble Canyon Dams and powerplants, while section 303 authorizes the central Arizona aqueduct unit. Arizona has made her case in support of the aqueduct and made it well. I shall not repeat it.

A feature of primary concern to California water users appears in section 304 (a) and (b), commencing at page 7, line 19. This is protection of the existing uses of California projects up to 4.4 million acre-feet per annum as against the central Arizona project until at least 2.5 million acre-feet of water is imported into the main stream of the Colorado below Lee Ferry from sources outside the natural drainage basin of the Colorado River. Attorney General Lynch of California, who, as much as any other man, helped to develop this compromise, spelled out the basis for this provision in his statement. In addition to protecting California's projects up to 4.4 million acre-feet, section 304 also protects existing uses in Arizona around the Yuma area and existing uses in Nevada, which are primarily in Clark County.

A third major feature, one which concerns all seven States in the basin, is title II. This authorizes the Secretary to investigate the water requirements of both the Upper and Lower Basins of the Colorado River to year 2020, and the sources from which the deficiencies might be supplied. I will return later to the conditions placed upon him in this investigation for the protection of States of origin of imported water.

The fourth major feature, one which concerns all seven basin States, is title IV. This creates a basin account, into which the revenues from Marble Canyon and Bridge Canyon powerplants are to be paid, along with revenues from Hoover, Davis, and Parker Dams, after payout of those structures, to finance importation works as well as help pay out the cost of the central Arizona project. Of these, the principal revenue producer is Bridge Canyon.

The fifth major feature, one which affects the potential States of origin of imported water, is of particular concern to California as a possible State of origin, as well as to the States dependent upon the Columbia River system. This is so in view of the Secretary's statement during these hearings that the two major stream systems which he would investigate are northern California rivers and the Columbia downstream from its lowest dam.

California, as a potential State of origin, has pioneered in protection-of-area-of-origin law. It is a pillar of our State water plan which has successfully reconciled regional differences as sharp as any which exist in the West. We are gratified by the direction to the Secretary in section 201(a), which is at page 3, line 19, that in making his investigation:

> * * * 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.

California is pleased also by the direction to the Secretary in section 201(b), page 4, line 18:

> * * * the Secretary shall, after submission of his reports thereon to the affected States in accordance with section 1 of the Flood Control Act of 1944, recommend to the President and the Congress an initial group of projects and programs for authorization pursuant to paragraphs (2), (3), (4), and (5) of subsection (a) and shall submit feasibility reports on such projects and programs * * *

The Flood Control Act of 1944 gives the affected States a right to see and comment upon the proposed plans, and requires the Secretary to forward these comments to Congress along with his project report.

California, as a potential State of origin, also welcomes the provisions of section 601(a)(2), page 24, line 14, directing the creation of a Federal-State regional planning commission, to include not only members from the five lower basin States (they would thus have for the first time a commission comparable to the Upper Basin Compact Commission), but also a member from every affected State. This would include the States of origin.

We were particularly careful, in the section which would terminate the priority protection of existing projects as against the central Arizona project, to write it in terms which, in our opinion, fully protect

California as a potential State of origin, as well as the other possible States of origin. It reads:

(b) The limitation stated in paragraph (a)—

that is, the restriction upon diversion by the central Arizona project—

"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 hundred 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."

As I indicated earlier, my statement today will deal primarily with the changes in the bill suggested by the Bureau of the Budget and the Secretary of the Interior, the upper basin States, and the members of this committee during these hearings. I will tell you which of these changes, in my opinion, are improvements, which ones seem to be acceptable, and which ones require further negotiation. Before I do, however, I would first like to discuss the seven-State "consensus."

Congressman Udall and others have reported to the committee the consensus reached last week by a group of representatives from the seven Colorado River Basin States. We participated in the discussions that led to this consensus, and we are in accord with it. It is an important document. I quote from its four points:

The consensus, without affecting the accord heretofore arrived at among the lower basin States, as set forth in H.R. 4671, 89th Congress, expresses certain principles with respect to the rights, obligations, and requirements of each basin as against the other. These principles are:

1. The upper basin's right to the use of water of the Colorado River, pursuant to the Colorado River compact, shall not be jeopardized by the temporary use of unused upper basin water by any lower basin projects.

2. The importation of substantial quantities of water into the Colorado River Basin is essential to the adequate development of both the upper and lower Colorado Basins. It is recognized that this importation must be accomplished under terms which are fair to the areas of origin of the water so imported. The pending legislation should authorize the Secretary to construct importation works which will deliver not less than 2,500,000 acre-feet annually, upon the President's approval of the Secretary's finding of feasibility.

3. Such importation works should be planned and built so as to make the imported water available, if possible, not later than 1980. Water supply prospects on the Colorado River, based in part upon the temporary use of water allocated to the upper basin, appear adequate to furnish a full supply to the central Arizona project accompanied by the safeguards for existing projects agreed to by Arizona and California, until sometime during the last decade of the present century. Thereafter, the central Arizona project supply would diminish unless supplemented by importation.

4. Satisfaction of the Mexican treaty burden should be the first priority to be served by the imported water. The costs of importation allocable to the satisfaction of that burden, which is a national obligation, should be nonreimbursable.

We are prepared to sit down immediately with representatives of the other six States and draft amendments to H.R. 4671 to carry out those principles. I will return in a moment to the amendments that the upper States submitted to the committee this morning.

First, however, I should like to refer to the Budget Bureau recommendations.

The Budget Bureau has approved the bill in principle, with these four reservations (all of these recommendations were accepted by the Secretary of the Interior):

First, the Budget Bureau recommends against present authorization of Bridge Canyon Dam and powerplant, suggesting that the dam's effects on scenic values and its need as part of the overall regional project be studied further by a commission. The California water users believe that Bridge Canyon Dam should be authorized now. Commissioner Dominy's testimony shows that the reservoir will not harm scenic values, but, to the contrary, would make accessible to millions of ordinary visitors the incomparable beauty heretofore restricted to a few hundred people with time and money enough to "run the river" in special boats. And the Commissioner has testified that, over a period of 75 years, the Bridge Canyon powerplant would put about $1 billion into the development fund to help finance import projects. This committee is quite competent to resolve the issues without the aid of a commission. We would prefer to face up to this issue right now and have it decided.

Second, the Bureau of the Budget recognizes that the Mexican treaty burden is a national obligation which should be nonreimbursable. It equates this burden with the quantity which must be delivered at the boundary, 1.5 million acre-feet annually. The burden is greater than that, because the delivery of the Mexican treaty water also involves a pro rata share of evaporation losses in conveying that water downstream through the river channel and reservoirs to the delivery point at the boundary, and unavoidable regulatory losses. Davis Dam, for example, is a treaty structure, and large quantities of water evaporate from the reservoir which it created.

The nonreimbursable treaty allocation should be related to the full treaty burden, to be determined by the Secretary, and not just 1,500,000 acre-feet.

Third, the Budget Bureau objects to the principles of guaranteeing Colorado River prices for the imported water required to firm up a supply of 7.5 million acre-feet for the lower basin, even though the guarantee is limited to the availability of funds in the basin account. It believes that if the costs allocable to the Mexican treaty are made nonreimbursable, this will have the same effect, at least for a protracted period of time. I would recommend that we concede this point, repeating here that the burden properly allocable to the treaty, however, is greater than 1.5 million acre-feet.

Fourth, the Budget Bureau recommends that any study of importation works be undertaken by a National Water Commission as part of a full-scale study of the entire Nation's water problems, instead of by the Secretary. We think this proposal should be reconsidered.

Time is of the essence. The Colorado River's problems have already been thoroughly studied by the Secretary of the Interior, and the responsibility for the Colorado should remain in that Department, where the Congress has placed it. It would be a mistake to submerge the immediate, critical problems of the Southwest in the broader problems of the entire Nation. New York City should not wait on the Colorado, and the Colorado should not wait on Lake Erie.

I come now to the upper basin amendments which were presented to you this morning.

The Upper Colorado River Compact Commission and the Colorado Water Conservation Board have proposed today a number of specific amendments to H.R. 4671, some of them encompassed by the prin-

ciples in the seven-State "consensus," some going beyond them. They kindly gave us advance copies. In my view, all of the upper basin proposals are proper subjects of negotiation, although some of the language presently proposed is not acceptable. They deal with seven subjects, which are as follows:

1. Conditional authorization for importation works.—The proposal is that this act authorize the Secretary to construct works to import not less than 2.5 million acre-feet annually into the Colorado, on condition that he finds that such a project has a favorable benefit-cost ratio, and the President approves his findings. This has been objected to by a number of committee members as a blank check for taking the decision out of the hands of Congress and of the affected States, including the States of origin.

I suggest a compromise. Section 9(a) of the Reclamation Project Act of 1939 gave the Secretary this authority (as did the 1902 Reclamation Act). The Grand Coulee project in the State of Washington was first authorized in this way, by the Secretary, in his capacity as Public Works Administrator, in a feasibility finding approved by the President, later by act of Congress. Davis Dam, the Salt River project, and many others were authorized by feasibility findings. But this authority, in the 1939 act, was made conditional on a finding, among others, that the project's revenues will repay the reimbursable allocations of the Government's investment, not merely that it has a favorable benefit-cost ratio. And in 1944, in section 1(c) of the Flood Control Act of 1944, Congress amended section 9(a) of the 1939 act by requiring the Secretary to submit his proposal to each affected State for comment, requiring him to forward the States' comments along with his report to Congress, and directing that if the Governor of any affected State disapproved the proposal, the project should only be built if thereafter authorized by Congress. This seems a fair solution here. I would have no objection to a further condition requiring the Secretary, even if no State objected, to submit his proposal to this committee and to its counterpart in the Senate, to remain under submission for a specified period subject to disapproval by either committee or by its House. This is the pattern of the Reorganization Act, followed by several others.

2. *Allocation of imported water.*—The upper basin States propose that imports be subject to the following priorities:

(1) A first priority to satisfy the Mexican Treaty burden. This is quite proper.

(2) A second priority to firm up the annual main stream supply for Arizona, California, and Nevada to the 7.5 million acre-feet of main stream water which Congress thought it was dividing among those three States in 1928. H.R. 4671 is designed to do this, and we welcome the upper basin's concurrence, if this is what it means. But Governor Love's statement reads as though this 7.5 million, to be firmed up, includes Arizona's uses on the tributaries, leaving us only 5.5 million on the main stream. The three States are already using more than 5.5 million acre-feet from the main stream, and, of course, could not agree to this if such is intended. I do not think it is.

(3) A third priority to firm up 7.5 million acre-feet of consumptive use for the upper basin as contemplated by the Colorado River compact. The principle is fair, if the upper basin can pay for the added 2 million acre-feet of importations that the Tipton report indicates may

be needed (that is, 6.3 million acre-feet depletion as forecast by Tipton for the upper basin, less reservoir evaporation, equals about 5.6 million acre-feet of consumptive use (diversions less returns) for the upper basin).

But there are a number of practical difficulties. If the imported water is delivered into the Colorado below Lee Ferry the upper States would presumably reduce their article III(d) deliveries below 75 million acre-feet per decade to the extent that they buy and deliver to lower basin users imported water in excess of, and not as part of, the first 2.5 million. This is because the 2.5 million is necessary to supply the lower States 7.5 million even if 75 million acre-feet per decade is delivered at Lee Ferry. The upper basin will probably not begin to need imported water until near the turn of the century, according to point 3 in the "consensus" of August 20, which I have previously quoted. Meanwhile, imported water above 2.5 million, which is required for priorities 1 and 2 of the present upper basin proposal, will be needed in the lower basin commencing as early as 1975. This is so because the Metropolitan Water District of Southern California will get only 550,000 acre-feet, under the priorities set out in the Hoover Dam water contracts, even if the lower basin's annual consumptive use from the main stream is as much as 7.5 million. Thus, imported water in addition to the 2.5 million acre-feet required to firm up the 7.5 million in the main stream in the lower basin is needed to enable Metropolitan to recover the 662,000 acre-feet that it is now using but must relinquish as the central Arizona project goes into operation. The problem is to match up, on one hand, security of the right to use the imported supply with, on the other hand, the obligation to pay for it. Perhaps some special consideration for Metropolitan's existing capacity and need for 662,000 acre-feet annually can be worked out.

The upper States also propose that imports available in the lower basin in excess of 2.5 million acre-feet be allocated in such fashion as Congress may later direct. H.R. 4671 provides that such excess be allocated in accordance with article II(B)(2) of the decree in *Arizona* v. *California*, that is, 50 percent to California, 50 percent to Arizona and Nevada. We are content that the Supreme Court's decree be made applicable to imported water within the lower basin in the same way the decree now applies to the natural Colorado supply, insofar as these formula figures are concerned.

The upper basin amendments would strike out the proposal in section 304(c) of H.R. 4671 to make the 2.5 million acre-feet of imports available at Colorado River prices. I have already indicated my views with reference to the Budget Bureau's recommendation on this point.

3. *Bridge Canyon.*—The upper basin disagrees with the Budget Bureau's recommendation to delete the Bridge Canyon authorization. So do we, for the reasons indicated earlier.

4. *The upper basin's Mexican Treaty obligation under article III (c) of the Colorado River compact.*—The obligations of the upper and lower basins under article III(c) of the Colorado River compact present an exceedingly complex legal problem. We had hoped to have this question decided by the Supreme Court in the *Arizona* v. *California* litigation, but the upper States' successful resistance to our effort to

join them as parties in that suit prevented the resolution of that problem.

The upper division States seek immediate relief from whatever obligation article III(c) of the compact imposes upon them with respect to the Mexican burden. Article III(c) says, in substance, that the 1944 Mexican Treaty burden (its extent and form being unknown when the compact was written in 1922) shall be satisfied first out of surplus over the quantities specified in articles III (a) and (b) of the compact. If that surplus is insufficient, the two basins shall bear the deficiency equally, and the upper division will add water to make up its half of the deficiency to the 75 million acre-feet which it must deliver each decade under article III(d).

The first question, therefore, is this: Is there any surplus, and, if so, how is it calculated? The compact defines surplus, for this purpose, as the excess over the quantities specified in articles III (a) and (b). Articles III (a) and (b) allocate 8.5 million acre-feet to the lower basin and 7.5 million to the upper basin, a total of 16 million acre-feet. In a footnote I explain in more detail how these are stated.[1] Arizona says that the lower basin's 8.5 million must all be supplied from the main stream. If so, there is no surplus. The upper basin says that these specified quantities are to be supplied from the main stream plus the tributaries. If so, there may be surplus. While there is not 16 million acre-feet available for consumptive use in the entire basin, there is, however, a surplus over the 8.5 million in the lower basin, so say the upper basin States, because Arizona's tributaries support some 2 million acre-feet of consumptive use along those streams.

If this issue goes to court, I think Arizona—and California will support her—will win it, for two reasons: First, Arizona presents the interpretation of the Colorado River compact that Congress gave in 1928 when it approved the compact. Second, even if the upper basin is right as a matter of law, nevertheless, as a matter of fact, the Mexican Water Treaty, when finally formulated 22 years after the compact, requires daily delivery to Mexico of specified quantities, 365 days per year, whereas the flow of the Gila, coming down in great floods only a few days in the year in a state of nature, would not have been usable to any appreciable extent in satisfying these fixed daily requirements. There is no site for a regulatory reservoir in Mexico. Consequently, even if the Gila's potential contribution to satisfaction of the Mexican Treaty were to be credited against the quantities that the lower basin could otherwise demand from the upper States under article III(c), the reduction might not amount to much.

Moreover, if the interpretation of the compact has to be litigated, the upper basin might remember that the Special Master in *Arizona* v. *California* determined that the Colorado River compact is not a grant of rights to the upper basin, but a ceiling on the appropriations in both basins. Hence, each basin would be free to appropriate any quantity of water up to the respective ceilings—7.5 million acre-feet in the upper basin and 8.5 million acre-feet in the lower basin.

[1] Art. III(a) apportions 7.5 million acre-feet of beneficial consumptive use to the upper basin and the same quantity to the lower basin. Art. III(b) permits the lower basin to increase its beneficial consumptive use by 1 million acre-feet.

In short, if this issue remains unresolved, some very expensive litigation will be required over an insignificant quantity of water. It would be an even sadder result to have that question over just a little water hold up legislation involving potentially many millions of acre-feet for all the States.

I believe that a satisfactory compromise can be worked out.

5. *Immediate relief of the upper basin from any obligation to deliver water in excess of 75 million acre-feet each 10 years required by article III(d).*—The upper basin States propose this as a technique to eliminate immediately any obligation under article III(c) to deliver water at Lee Ferry to supply the Mexican Treaty in addition to the article III(d) delivery. I have already discussed that. But the language proposed—although probably not the intent—clearly does more than this. It writes articles III(e) and IV(b) out of the compact.

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 upper division must thus deliver more than 75 million—deliver whatever quantity exceeds its own domestic and agricultural uses—if required for like uses in the lower basin. Some of the upper basin statements implicitly recognize this.

I will come to article IV(b) in connection with the next upper basin proposal.

6. *Drawdown of Glen Canyon Reservoir below rated power head.*—The upper basin States propose that Glen Canyon Reservoir shall never be drawn down below rated power head, except to meet the upper division's III(d) obligation or by consent of the Upper Colorado River Compact Commission.

This proposal would violate not only article III(e), but also IV(b), which says:

Subject to the provisions of this compact, water of the Colorado River system may be impounded and used for the generation of electric power, but such impounding and use shall be subservient to the use and consumption of such water for agricultural and domestic purposes and shall not interfere with or prevent use for such dominent purposes.

Glen Canyon Reservoir must be drawn below rated power head if that is necessary to enable use of water for agricultural and domestic purposes in the lower basin.

The proposal, moreover, might result in Lake Mead being drawn below rated power head (or even emptied) to enable Glen to stay above that minimum, a result which would be unacceptable to the lower basin. We think the task is to develop equitable operating criteria which will prevent either Lake Powell or Lake Mead from being drawn down solely to benefit power operations at the other. But in any event, power operations at both dams should remain subject to consumptive use requirements in each basin, as articles III(e) and IV(b) of the Colorado River compact require.

Upper basin representatives have argued that in order to make the consumptive uses that their present projects require and still meet the article III(d) requirement, Glen Canyon must be kept at least at rated power head. I do not see the connection. Rated power head is the

reservoir level, that is, the head, required for the turbines to provide their nameplate power production. I have seen no figures that show why rated power head is the measure of the minimum carryover storage required to permit the upper basin to meet the article III(d) requirement and still make its present or future consumptive use requirements. So far as I know, rated power head is relevant only to power production, and power production, article IV(b) says, is subservient to the use of water for domestic or agricultural purposes.

7. *Reimbursement to the upper basin fund for payments to Hoover Dam power allottees.*—The upper States propose to have the upper basin fund reimbursed for payments heretofore made to Hoover Dam power allottees, in accordance with the Glen Canyon filling criteria, for impairment of power operations at Hoover caused by filling operations at Glen Canyon. We might have no objection to making such payments out of the $500,000 per year which these same allottees now pay as a surcharge on Hoover power rates for channeling into the Colorado River development fund, which was set up pursuant to the Boulder Canyon Project Adjustment Act. However, we would strongly oppose tapping Hoover revenues after payout in 1987, as the upper basin proposes. Instead, if the committee sees fit, any remaining deficit may be paid to the upper basin fund from the General Treasury, to be repaid to the Treasury from the new development fund created by H.R. 4671.

The problem will probably not recur, but, if it does, the existing power contracts at Hoover Dam must be honored, or the contractors compensated if the Government does not perform them.

During the course of these hearings, many of the States' representatives have been asked if they would support or oppose the bill if one provision or another were omitted or added.

To some extent, these questions can be answered because they have been carefully studied by the States before the hearings. For example, the California water users would oppose any central Arizona project bill that did not contain a provision like section 304 to protect our existing projects up to 4.4 million acre-feet annually.

To a great extent, however, many of the questions from the committee members cannot be answered now. For example, California's Attorney General Lynch made clear that he could not answer now the question whether California would support the bill without title II, which authorizes the study of importations. I can give a categorical answer that we will oppose the elimination of title II, with all the resources at our command. Of course, an investigation of ways to avoid disaster in the Southwest is necessary, just as it is in New York City. Of course, all available sources of water should be investigated, concurrently and rapidly, and not in leisurely sequence. Who's afraid of facts? Naturally, all reasonable safeguards for areas of origin, including California, must be obeyed in planning projects based on these investigations, as I indicated earlier in my statement. In short, we are not contemplating defeat on this issue, and the question of what we would do next if we lost it is an "iffy" question.

On some issues, however, other reasons prevent an immediate answer. For example:

First. It is often necessary to consult with many persons on major policy questions. Attorney General Lynch, for California, made it

clear that he would have to consult Governor Brown on several questions of policy that he was asked about. Governor Hansen, of Wyoming, indicated, quite properly, that he would have to consult with his experts.

Second. It is impossible to evaluate a proposed amendment without seeing its language and perhaps other language changes in the bill.

Third. The decision on some issues is primarily Arizona's, not ours. For example, if Arizona wants to stand and fight for Bridge Canyon Dam, even with a consequent delay in the central Arizona project authorization—so will we, and with determination. If she will not, then with great regret we will retreat with her on that particular issue. But, as Arizona knows better than most, we have had very little practice in retreating.

I conclude with this comment. The most important lesson of the past several months is this: We can work out mutually acceptable solutions to our problems; and we have the kind of people throughout the West to do so.

We all need this regional legislation, either for present or for future needs, or for both. I can say to the upper basin that this legislation may be as vital to their aspirations as it is to ours. Arizona's overdraft or New York City's shortage of today may be yours or ours tomorrow unless all seven States work together to bring more water into the Colorado. We face a common challenge and it requires a united response.

"Never send to know for whom the bell tolls; it tolls for thee."

Mr. ROGERS. Thank you, Mr. Ely.

Mr. ELY. Mr. Chairman, I shall hope before the record is closed to submit drafts of possible amendments, returning the courtesy shown by the upper basin representative. If there is time, we will have those reviewed by our clients and superiors in California, which I would prefer to do. If there is not, I shall submit them as entirely tentative proposals.

I would like, Mr. Chairman, to place in the record, if I may, the statement by Dallas E. Cole, the chief engineer and executive officer of the Colorado River Board of California, to which I referred earlier. I have read it. I vouch for it. It is a much better statement than I could prepare of the facts relating to our projects.

May this be inserted in the record?

Mr. ROGERS. Is there any objection?

The Chair hears none. And it will be included.

(The complete statement of Dallas E. Cole will be found on p. 598.)

Mr. ELY. I would also ask your permission, Mr. Chairman, to include a short letter to me from Mr. Justice Stanley Mosk of the California Supreme Court, former attorney general of California.

May the full text of that be incorporated in the record?

Mr. ROGERS. Without objection, that will be received.

(The material referred to will be found on p. 590.)

Mr. ELY. One additional item, Mr. Chairman.

Reference has been made to the figures involved in the exchange of money for power between Glen and Hoover Dam. I should like your permission to place in the record a memorandum giving the statistics on that.

Mr. ROGERS. Is there objection?

The Chair hears none.

(The material referred to will be found on p. 594.)

Mr. ELY. I think it may be useful to place in the record a table of the lower basin uses in response to Chairman Aspinall's figures that he read to me the other day, and to which I responded from memory.

Mr. ROGERS. Without objection, the data will be received for the record.

(The material referred to will be found on p. 597.)

Mr. ELY. May I introduce also a table of the investments by California agencies in their Colorado River projects, aggregating as of December 31, 1963, $674,810,991.

Mr. ROGERS. Without objection, it will be received.

The material referred to will be found on p. 590.)

Mr. ELY. Thank you, Mr. Chairman.

Mr. ROGERS. The Chair will recognize the members for questions in accordance with unanimous consent requesting each member to be recognized for approximately 3 minutes.

The Chair recognizes the gentleman from Colorado, Mr. Aspinall.

Mr. ASPINALL. Thank you, Mr. Chairman.

As usual, Mr. Ely, you have a carefully prepared and very understandable statement.

Without seeming to be facetious, in regard to your statement about not being inclined to retreat, I might say that you have been stopped once or twice.

Mr. ELY. Yes. You might call it a grinding halt, now and then.

Mr. ASPINALL. I shall not question you as far as the amendments are concerned, but I do not wish my silence in this respect to indicate that I agree with you in your position or in the position that you take with respect to the amendments proposed by the upper basin.

What would be the loss of water, Mr. Ely, by evaporation if Bridge Canyon and Marble were both constructed?

Mr. ELY. It is my understanding, Mr. Aspinall, it is of the order of 100,000 acre-feet annually.

Mr. ASPINALL. Would this be in addition to the 1,200,000 acre-feet of water that has been suggested as necessary to make the central Arizona project a successful project?

Mr. ELY. No. My recollection is that the losses from Bridge Canyon evaporation are within the general range of the estimate of losses that Mr. Maughan gave you. He gave a consensus of lower basin engineers of a future net loss of about 800,000 acre-feet, between Lee Ferry and Mexico, net of the tributary inflow in the lower basin. This, in turn, is a middle figure between higher and lower estimates. Mr. Tipton also used 800,000 acre-feet for these future losses, but I do not know how he treated Bridge Canyon Reservoir operation.

Mr. ASPINALL. What you are saying is if Bridge Canyon were constructed that the loss would be approximately what it is at the present time, with the water flowing down to Lake Mead and evaporating from a larger water surface, is that correct?

Mr. ELY. Yes; within limits of measurements and varying estimates of salvage. Present net losses, Lee Ferry to Mexico, are about 1 million.

Mr. ASPINALL. Well, I understand from your statement that the Mexican entitlement may be in excess of 1,500,000 acre-feet depending upon later determinations as to the provisions of the treaty.

Mr. ELY. The Mexican entitlement is no greater than 1,500,000 acre-feet at the boundary, but the burden resting on the United States to deliver that guaranteed entitlement is greater than 1,500,000 because of the losses in transit and regulatory losses.

Mr. ASPINALL. Are they not considering the question of necessity of releasing additional water in order to improve the quality?

Mr. ELY. Not that I know of. All seven States have opposed this. That is an important point, too, Mr. Aspinall. I have assumed that the addition of the minimum of 2½ million acre-feet would solve water quality questions.

Mr. ROGERS. The time of the gentleman from Colorado has expired. The Chair recognizes the gentleman from California, Mr. Hosmer.

Mr. HOSMER. I will reserve my time.

Mr. ROGERS. The gentleman from California, Mr. Johnson.

Mr. JOHNSON. Thank you, Mr. Chairman.

I want to commend you, Mr. Ely, for a fine statement and a very clear statement of the entire matter that is before us today, including the latest amendments that were suggested by the upper basin States.

Now, if there was to be 2½ million acre-feet brought in that would be brought in below Glen Canyon and above Hoover Dam, I presume?

Mr. ELY. Probably so.

Mr. JOHNSON. Now, in bringing in 2½ million acre-feet, it would be pretty costly just to bring in that amount of water, would it not?

Mr. ELY. That is right.

Mr. JOHNSON. Now, in your suggestion of Bridge Canyon remaining in the project, it would probably make this more feasible if that revenue was involved in the overall operation, would it not?

Mr. ELY. Exactly.

Mr. JOHNSON. Now, if northern California was to be looked at as the source of the 2½ million acre-feet, how would that go into the Colorado River?

Mr. ELY. That particular importation probably could come in below Hoover Dam. At least the Secretary in his Pacific Southwest plan gave a tentative routing of an aqueduct which would drop water from northern California into the river below Hoover Dam.

Mr. JOHNSON. But that in no way would jeopardize the progress and improvement in the saline water program if saline water was to be made available in southern California? That would have no effect upon your 4.4 that you want protection for?

Mr. ELY. None whatever, and I want to make that very clear, that the delivery of water from northern California sources to southern California is in no way whatever a substitution for the 2½ million that must go into the main river to terminate the priority protection of our 4.4 million. California needs and is now in the process of getting water from northern California in addition to, and not in substitution for, its Colorado River supply.

Mr. JOHNSON. You people would also support the protection of counties of origin for the northern part of California under our existing State laws?

Mr. ELY. We would indeed. We would be at least as diligent as any Columbia River State in protecting areas of origin. This is a sensitive subject in California.

Mr. JOHNSON. Now, it has been told to us from various sources that if water was to be brought in from the Columbia it would probably be

brought in in greater quantities than the 2½ million acre-feet and there would be power drops to assist the financing of this aqueduct; is that not right?

Mr. ELY. Yes.

Mr. JOHNSON. That is all, Mr. Chairman.

Mr. ROGERS. Mr. Wyatt?

Mr. WYATT. I will yield my time to the chairman of the full committee if he desires any more time.

Mr. ASPINALL. Thank you very much, Mr. Wyatt.

I do have some questions. I wanted to be sure that I understood Mr. Ely's position.

On page 9 of your statement where you are talking about writing off the cost of furnishing treaty water, your third premise—and I do not wish to take the time to read it, but I understand that your position is for the benefit of your clients who are there at the table with you; is that right?

Mr. ELY. I did not quite hear your question.

Mr. ASPINALL. I understand that your position as stated in this third item is for the benefit of your clients who are at the table with you.

Mr. ELY. The third item relating to the nonreimbursement of the treaty allocation?

Mr. ASPINALL. That is right.

Mr. ELY. It is for the benefit of the entire program; not only California users, but those in Arizona and elsewhere. It is intended to apply with respect to the first 2½ million acre-feet, which would in effect be used in the lower basin or Mexico.

Mr. ASPINALL. On page 17 you have a statement:

> Moreover, if the interpretation of the compact has to be litigated, the upper basin might remember that the special master in *Arizona* v. *California* determined that the Colorado River compact is not a grant of rights to the upper basin, but a ceiling on the appropriations in both basins.

Would you explain in a little more detail than you have in your statement what you mean?

Mr. ELY. That holding was a complete surprise and shock to everyone. I never thought of the compact in these terms. I do not think anybody had, but it indicates the uncertainties of litigation. If a man of Judge Rifkind's acumen construed the compact in that way, I have no way of forecasting what the Court would do if it reached the same point.

Mr. ASPINALL. Even though the decision was not a unanimous decision—there were three dissenters of this particular provision; is that not correct?

Mr. ELY. No, Mr. Aspinall. This particular point was a special master's conclusion, his interpretation of the compact. The Court did not construe the compact——

Mr. ASPINALL. In other words, there is not any Court decision on this particular matter?

Mr. ELY. That is correct. This is simply an indication of what might happen.

Mr. ROGERS. The time of the gentleman has expired.

The Chair recognizes the gentleman from Arizona, Mr. Udall.

Mr. UDALL. Mr. Ely, I want to compliment you on a very fine statement. I had intended to attempt to summarize where we are when

the hearings concluded. You have already done it for me and far better than I could hope to do.

I would say to you that we in Arizona think you are a most capable adversary and we think you are an ally without peer. And if I had to select one person to be on my side in this struggle, out of all of the people in your area I think your name would probably be at the top of the list.

Mr. ELY. I am more honored than I can say, sir.

Mr. UDALL. I certainly concede for Arizona that California has had very little practice in retreating. You are like the old general who said, "Retreat? No! We are only advancing in the opposite direction."

I think we have recalled earlier in the hearings where Arizona called out the National Guard at one point and what Navy we could muster in that arid State to try to prevent the building of one of the dams on the Colorado River, but fortunately those days are gone.

I wanted to enlarge on what you have said, and you reinforce it on page 21, about the objections to the suggestion of having a study of California made first, a study of desalting made first and then perhaps a study of other areas of origin. Would you agree that time is of the essence in this thing and that all of these studies, as you say in your statement, really must go forward not in leisurely sequence, but as one. Having several alternatives, he looks at all of them at the same time.

Mr. ELY. Exactly; so they can be appraised and weighed against each other.

Mr. UDALL. I would comment, or ask you perhaps to comment. You have attempted to predict, and all of us recognize the dangers in predicting what the Supreme Court might do in the very unfortunate situation of being forced to adjudicate the compact as between the upper basin and the lower basin—would you agree that it might be a bit awkward for California for the Court to hold that the Arizona tributaries are not taken into account in allocating the lower basin water, but a holding on the contrary that the tributaries have to be taken into account as between the two basins?

Mr. ELY. I am not a dependable oracle as to what the Supreme Court will do. I can prove this. But I agree with you completely that the Court would have great difficulty in construing article III(a) of the Colorado River compact in a diametrically opposite direction from its construction of what those same words, paragraph (a) of article III of the Colorado River compact, meant when used in the Boulder Canyon Project Act. If the tributaries are out in one, they are out in the other. If they are in in one case, they are in in the other. The Court has said they are out, in our case. And California would find itself in an intolerable position if the lower basin's right to claim water from the upper basin was diminished by Arizona's use of her tributaries in a basin versus basin accounting, whereas in an accounting between Arizona and California, Arizona is relieved from accounting for those same tributaries, as the Court has held. Justice Douglas pointed this out in his dissenting opinion. It is a situation that I do not think the Court would impose upon any lower basin State in a suit between the two basins.

Mr. UDALL. To do this the Court would have to say that certain words mean black at Boulder City and they mean white up at Lee Ferry.

Mr. ELY. That is right, but I am just the man to tell you that they might do exactly that. [Laughter.]

Mr. ROGERS. The time of the gentleman has expired.

The gentleman from Idaho, Mr. Hansen.

Mr. HANSEN. Three brief questions, Mr. Ely. There is a point I would like to establish.

Do you see sufficient water at all in California for your needs in southern California and in the area in question now, or do you feel that you will have to go beyond to the Columbia Basin or elsewhere?

Mr. ELY. Mr. Hansen, we look to an objective study of that question to reach the answer. If the northern California rivers are the place to go to get water under the most favorable economic terms and with the least damage to the areas of origin, that is where the water should come from. If the Columbia is the place, then with the exactly similar treatment or protection of areas of origin, that is where it should come from. Perhaps there are others. That should be examined.

Mr. HANSEN. Do you feel that there should be an examination of ways for replenishing of water, desalination, and other such programs, before proposals to get water from other basins are built, or at least submitted.

Mr. ELY. Not built, but before decisions are submitted, of course, this should happen. We should plug the holes in our own bucket before deciding how much water we should take with that bucket from any other river.

Mr. HANSEN. And the final question I would like to put before you is, Do you think there is any danger if the southern Colorado River Basin is allowed to use surplus water that at such time as the northern basin would like to use this water, there might develop a frantic demand to go elsewhere even if means are not established that are feasible. Would this legislation create problems that would not have been created if the door had not been opened?

Mr. ELY. No. Let me give you a precise example.

In 1928 California had projects, cited by Senator Hayden in debates, that required in excess of 6 million acre-feet. We had been using water since 1877 on one project, since 1901 on another. There were other fine projects with very low pump lifts. The metropolitan aqueduct program was already on paper, and later materialized. Nevertheless, we accepted a limitation in order to get the project act passed, 4,400,000 acre-feet of the water apportioned to the lower basin by paragraph (a) of the article III in perpetuity, plus one-half of the excess or surplus, which means water temporarily available. The Metropolitan Water District aqueduct was built at a cost of hundreds of millions of dollars to carry that excess water to California, 662,000 acre-feet of it, along with only 550,000 of the water protected by the perpetual apportionment. The day now comes when our bargain made in 1928 must be respected and our use of 662,000 acre-feet lost, if the central Arizona project is built. If the central Arizona project is not built, then this surplus remains. It would be to our selfish advantage therefore, to oppose the central Arizona project and hang on to that 662,000 acre-feet. We are not here to do that. We are here to tell

you that we are keeping our bargain and we expect to cut back Metropolitan to 550,000 acre-feet on the Colorado River and honor our agreement, yield that water to Arizona, and look to this expensive program of replacement.

This is an example of a lower basin State keeping its bargain. I predict with equal confidence that if Arizona gives you the same commitment that we have given you in this seven-State consensus, namely, that upper basin water temporarily used in the lower basin shall not be lost to the upper basin, Arizona will keep her word just as we have kept ours. Our 4.4 million, like the upper basin's use of its apportioned water, is at stake on the expectation that Arizona will do that.

Mr. ROGERS. The time of the gentleman has expired.

The gentleman from California, Mr. Tunney.

Mr. TUNNEY. Mr. Ely, does not the proposed legislation for this committee, and also the rules of organization of the Western States Water Council formed recently by the Governors of the 11 Western States, propose that protection be afforded to the States of origin in any interstate transfer of water?

Mr. ELY. I believe you are correct, and that is to California's interest as well as to the Columbia States.

Mr. TUNNEY. I would expect that if there was any decision by the Secretary of the Interior that it was most feasible to transfer water from northern California to the Colorado River Basin, that California would want the same protection that any other State would want?

Mr. ELY. Exactly so. If they want to meet some really diligent fellows in the business of protecting areas of origin, they should be our guests.

Mr. TUNNEY. What do you feel is the validity of the proposal that we heard several times yesterday that the States should complete their own water study before the Secretary of the Interior should conduct a general regional water study?

Mr. ELY. This study should go forward as a Federal-State cooperative venture simultaneously and as parts of one whole. We are accustomed to doing that. They should not be piecemeal and in series.

Mr. TUNNEY. Do you think that there is any truth to the suggestion from some quarters that California is trying to solve its own political problems by casting an eye on the water from the Columbia River Basin?

Mr. ELY. I think we have many political problems that are simply not exportable.

Mr. TUNNEY. I yield the balance of my time to the chairman.

Mr. ROGERS. Mr. Reinecke?

Mr. REINECKE. I would like to congratulate you, Mr. Ely, on a very fine, forthright statement and a very honorable one. I think it certainly displays the cooperative attitude which our State holds in this regard.

For the record, I think it would be well if you could expand for us a little bit on the justification of making that first 2.5 million acre-feet for importation a nonreimbursable cost. It seems to me that the compact was drawn up on the basis of figures that did not hold water, and on this basis we were overly optimistic and find ourselves in a short position. It is a question to me as to whether this should be a Federal cost rather than a regional cost.

Mr. ELY. It is a fair question. The treaty was negotiated by the Federal Government with Mexico under Federal authority and with Federal responsibility. California opposed the treaty. So did Nevada. It was a wartime expedient. Ordinary considerations did not prevail. In 1930 similar negotiations had developed a firm position on behalf of the United States and all seven Basin States that in any treaty with Mexico the quantity to go to Mexico should be restricted to what she could have used out of the unregulated river, and that she should have that and no more. Later, in 1945, the States modified their position to say perhaps Mexico could have a percentage of stored water. But the Boulder Canyon Project Act in section 1 in 1928 had directed that the stored water should be used exclusively for lands in the United States.

As I say, in 1944, under wartime conditions, this generous treaty was made with Mexico in which we guaranteed her the availability of 1,500,000 acre-feet at the boundary in perpetuity. There were assertions then before the committee that this would in fact create bankruptcy in the water supply of the Colorado River. This was denied by the State Department. We now have, released 20 years after the event, some of the memoranda exchanged between our State Department and Mexico during the negotiation of the treaty. One of them is a communication from our Government to the Mexican Government saying that any delivery to Mexico in excess of about 1,100,000 acre-feet would automatically create a built-in shortage in the United States. Notwithstanding this, the treaty guaranteed perpetually the delivery of 1,500,000. We think that the United States having undertaken this as a national obligation for a valid international reason, should not require the farmers, the water users, the cities of the Colorado River Basin, to make good on this any more than when it gives away millions of tons of wheat from the Middle West it should expect the farmers to furnish that wheat without proper compensation.

Mr. ROGERS. The time of the gentleman has expired.

The gentleman from Washington, Mr. Foley.

Mr. FOLEY. Mr. Ely, California being now the largest State in the Union in population and certainly the largest and richest in the West, it has the financial resources and the governmental skill, I would assume, to completely and adequately study their own resource problems, at least to the extent that the Federal Government through the Department of the Interior could study them.

Mr. ELY. I cannot draw comparisons, but the State has been doing this on a large scale under very competent leadership. Mr. Steiner, who sits with me, has been in charge of a great deal of that work, assisted by Mr. Maughan.

Mr. FOLEY. And I think this morning Mr. Maughan stated that one of the great achievements of California was long-range planning.

Mr. ELY. We like to call attention to our merits. That is quite true. You are quite right.

Mr. FOLEY. And there have been many allusions by the Secretary of the Interior and others to the existence in northern California of surplus waters for possible diversion to the Colorado or to southern California.

Now, in view of that, my question is, why has not California been able to come before this committee and advise this committee to what

extent California can provide from within its boundaries surplus water sufficient to meet the objectives of this legislation? In other words, why has not California with all of its resources, with all of its manpower, with all of its money, and with its pride in long-range planning been able to come in here and say whether or not it has so many million acre-feet surplus to its needs available to its sister States of the Colorado Basin?

Mr. ELY. Mr. Foley, that is certainly a fair question. To give you a general answer, there is very grave doubt as to the cost involved in harnessing the short rivers that plunge from the mountains almost precipitately into the sea, and how much of that water, large though the flood quantity may be, can in fact be captured and transported over two or three mountain ranges into the Colorado River.

Mr. Steiner is far more the expert on this than I am, and I will ask him to supplement that answer.

Mr. STEINER. We do not believe that there are permanent surpluses capturable in California. You have thrown back, Congressman, several times at us the fact that we have a mean seasonal water supply in California of 70 million acre-feet versus what we consider to be, with our limited crystal ball, a future requirement of 50 million acre-feet. Now, this 70 million acre-feet is not all physically and certainly not economically feasible of capture. We have planned out into the future——

Mr. ROGERS. The time of the gentleman has expired. I am sorry. The Chair recognizes the gentleman from California, Mr. Hosmer.

Mr. HOSMER. Mr. Steiner, will you continue your answer?

Mr. STEINER. Yes. Thank you, Mr. Congressman.

We have programed our needs out sufficiently far into the future, and similarly, the development potential of our resources to match those needs, and we find that waters that are within economic reach will be needed within California and any water that the State of California can make available to Arizona, Utah, Nevada, etc., could only be provided on a basis of interim use, in our judgment. Mr. Ely has stated quite eloquently here that, if the areas of origin are given the protective guarantees we seek in the legislation for States of origin, California would be willing to let Arizona, Nevada, and so forth, use these waters on an interim basis.

Mr. HOSMER. Mr. Ely, do you have any further answer to that previous question?

Mr. ELY. No. I simply say that if the Secretary investigates northern California rivers in comparison with the Columbia or other sources, and if he concludes that the place to get this water is northern California, we are as much at the hazard of the type of report he renders as the Columbia Basin States are.

Mr. HOSMER. Is it not true, Mr. Ely, as I pointed out before, I believe, that the water utility business is a matter of economics, and not the happenstance of the political boundaries of the States?

Mr. ELY. You are quite right. There is no Chinese wall around any of these States. No one desires to impose one around California when our tax revenues are flowing out for the benefit of other States. We do not think the country is benefited by putting a Chinese wall around any of our resources.

Mr. HOSMER. I yield the conclusion of my time for a unanimous-consent request by the gentleman from Kansas.

Mr. SKUBITZ. Mr. Chairman, I ask that there be placed in the record an exchange of correspondence between Mr. Cole and Mr. Ely and the Geological Survey of the Department of Interior and a letter signed by the Acting Director relating to the probability studies about which we have had testimony earlier this morning.

Mr. ROGERS. Is there objection?

The Chair hears none. That information will be received for the record.

(The material referred to follows:)

STATE OF CALIFORNIA,
COLORADO RIVER BOARD OF CALIFORNIA,
Los Angeles, August 20, 1965.

DIRECTOR, U.S. GEOLOGICAL SURVEY,
G.S.A. Building,
Washington, D.C.

DEAR SIR: My office has been engaged in certain studies of flows of the Colorado River using portions of the techniques outlined in U.S. Geological Survey Circular 410. In connection with our studies, it would be helpful if you would furnish me answers to the following questions:

1. Why an estimate with confidence limits should be used instead of a simple average in evaluating the water supply of the Colorado River.

2. The chances, expressed for example as 9 out of 10, that the average annual virgin flow of the Colorado River at Lee Ferry over the next 69 years will fall between million and million acre-feet; and that the average over the next 35 years will fall between million and million. The 35 years is important because of the relatively low flow in the past 35, which determines in large degree the results of traditional safe yield studies.

3. The percent chance that the average annual virgin flow at Lee Ferry over the next 10 years will equal or exceed (a) 14.5 million and (b) 13.0 million acre-feet. These are our estimates of the average flows needed in order that Lakes Powell and Mead be at certain assumed stages when presumably the Central Arizona project would be ready to operate.

I would appreciate your prompt response addressed to me at the Jefferson Hotel, 1200 16th Street NW., Washington, D.C.

Yours very truly,

DALLAS E. COLE, *Chief Engineer.*

DEPARTMENT OF THE INTERIOR,
GEOLOGICAL SURVEY,
Washington, D.C., August 27, 1965.

MR. DALLAS E. COLE,
Colorado River Board of California, Los Angeles, Calif.

DEAR MR. COLE: In answer to your letter of August 20, 1965, the staff of our water resources division, under the leadership of Chief Hydrologist Luna B. Leopold, has prepared the following statements to the three technical questions which you posed.

You mentioned that you and your colleagues have been engaged in studies of water yield, particularly in the Colorado basin. Anyone making such flow studies recognizes that the figure for the arithmetic mean discharge at a gage station varies slightly, depending upon the length of record used and the particular years which are included in the period studies. The reason for such variations in the value of the arithmetic mean stems from the fact that stream gaging is a sampling procedure. The mean of any sample drawn from a population will differ from the true mean of the whole population, if it were known, by a determinable amount expressed as a confidence limit. This, then, is the basis for answering your first question.

You ask us to explain why the arithmetic mean of a sample should be expressed with confidence limits instead of merely presenting a simple arithmetic average in evaluating the water supply of the Colorado River. The reason for expressing future flows in probabilistic terms is explained in Geological Survey Circular 410. Statement of the sample means in terms of confidence limits gives direct expression to the fact that river flows are variable. In contrast, a "simple average," or arithmetic mean only, conveys no information about the

variability of the river. There is small likelihood that future flows will duplicate exactly the mean of the past available record. One can, however, make an estimate of the range of flows to be expected within stated probability limits. This, then, allows the selection of a value for the mean flow in terms of risk, which, in reality, is the way it must be used.

The answers that follow—to your questions 2 and 3—are based on statistical analysis of 69 years of records (1896–1964). Geological Survey Circular 410, with which you are familiar, was based on the 61 years of record that were available at the time the analyses for the circular were completed. Taking account of the additional 8 years of record since then has resulted in a decrease in the average flow and an increase in the variance of the annual flows.

Your second question asks, for a 9-out-of-10 probability, within what range will the average annual virgin flow for the next 69-year period, and for the next 35-year period, fall. Based on an analysis of the annual virgin flows of the Colorado River at Lee Ferry, there is a 9-out-of-10 chance that the true mean is between 13.6 and 16.2 million acre-feet. This statement applies to any 69-year period in the future. The equivalent figures for a 35-year period are 13.1 and 16.7 million acre-feet, respectively.

Your third question asks the percent chance that the average annual virgin flow at Lee Ferry over the next 10 years will equal or exceed (a) 14.5 million acre-feet, and (b) 13.0 million acre-feet. Our analysis indicates that the chance that the average annual virgin flow at Lee Ferry over the next 10-year period (or any 10-year period in the future) will equal or exceed 14.5 million acre-feet is 60 percent. The chance that a 10-year average will exceed 13.0 million acre-feet is 89 percent.

Sincerely yours,

ARTHUR A. BAKER, *Acting Director.*

Mr. ROGERS. And the time of the gentleman from California has expired.

The Chair yields his time to the chairman of the full committee, Mr. Aspinall.

Mr. ASPINALL. Mr. Chairman, I have two questions.

Is it your understanding, Mr. Ely, that we cannot by legislation such as is before this committee directly or indirectly change the Colorado River compact provisions?

Mr. ELY. Well, I wish that were true. I am not certain that it is.

Mr. ASPINALL. Well, I wanted to know whether you thought that Congress could change either the Colorado River compact or the upper Colorado River compact. If I were referring to a later decision by the Court in order to interpret it, then, of course, I would accept your answer.

Mr. ELY. I wish the law was such that a compact were not subject to subsequent unilateral amendment by the Congress. I am not sure that is so, when the act of Congress is in the exercise of a constitutional power, such as control of navigation. You may want to have a citation, Mr. Aspinall. I will give it to you later.

Mr. ASPINALL. I would be pleased if you would furnish us not only with a citation, but at your convenience within the reasonable future, your answer to this question.

Mr. ELY. I will try.

Mr. ASPINALL. And, Mr. Chairman, I ask that that be placed in the record.

Mr. ROGERS. Without objection it will be received.

(The document referred to will be found on p. 586.)

Mr. ASPINALL. Now, Mr. Chairman, we have had the consensus between the States referred to and we know the history of the river, and as I understand it, a consensus is supposed to be an understanding in harmony.

Mr. Ely, if you were fortunate enough to represent the upper basin States rather than the clients that you do represent, do you think that the consensus would still be the same as far as your reputation is concerned?

Mr. ELY. It would, Mr. Aspinall. I would be honored to have that responsibility. I am not sure the upper States would think they were equally fortunate.

Mr. ASPINALL. I am not so sure but what they do not respect your knowledge in this matter as much as anybody else.

May I say, Mr. Chairman, as I told our colleague, Mr. Hosmer, before noon, I could listen here all afternoon to Mr. Ely's thoughts and thinking on these matters such as this, and I would not only be entertained but I would also be instructed.

Mr. ELY. Thank you very much.

Mr. ROGERS. The time of the gentleman has expired. All time has expired. And we want to thank you, Mr. Ely.

Mr. ELY. On behalf of my colleagues and myself, I want to express our deep appreciation to this committee.

MATERIAL ACCOMPANYING STATEMENT OF NORTHCUTT ELY, SPECIAL ASSISTANT ATTORNEY GENERAL, STATE OF CALIFORNIA, AND SPECIAL COUNSEL, COLORADO RIVER BOARD OF CALIFORNIA

1. Letter, Northcutt Ely to Chairman Aspinall, September 14, 1965, in answer to chairman's inquiry re power of Congress to legislate with respect to an interstate compact.
2. Resolution of the Colorado River Board of California, January 6, 1965.
3. Resolution of the Colorado River Board of California, February 10, 1965.
4. Letter, Hon. Stanley Mosk, associate justice, Supreme Court of California and former attorney general of California, to Northcutt Ely, August 16, 1965.
5. Table, "Investments by California Agencies in their Colorado River projects as of December 31, 1963."
6. Material re Glen Canyon-Hoover Dam power problems: (1) Extract from report of the Colorado River Board of California, 1963–64, pages 36–42 inclusive; (2) "Record of Deficiency Energy and Impairment Energy and Capacity at Hoover Dam Powerplant Due to Operation of Upper Colorado Basin Projects" (prepared by Ivan L. Bateman, assistant chief engineer, Department of Water and Power of the City of Los Angeles).
7. Memorandum by Thomas M. Stetson, consulting engineer to the attorney general of California, "Present Consumptive Use of Main Colorado River Water and Flow to Mexico for Calendar Year 1963."
8. Statement of Dallas E. Cole, chief engineer, Colorado River Board of California.
9. Memorandum, "Water Requirements, Colorado River Service Area in California," by Dallas E. Cole, August 22, 1965, accompanied by the following data on water requirements:
   (*a*) Statement of water requirements, Palo Verde Irrigation District, by J. E. Blakemore, manager.
   (*b*) Statement of water requirements, Imperial Irrigation District, by R. F. Carter, general manager.
   (*c*) Statement of water requirements, Coachella Valley County Water District, by Lowell O. Weeks, general manager-chief engineer.
   (*d*) Statement of water requirements, the Metropolitan Water District of Southern California, by Robert A. Skinner, general manager.

(Item 1 accompanying statement of Northcutt Ely)

ELY, DUNCAN & BENNETT,
Washington, D.C., September 14, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs,
House of Representatives, Washington, D.C.

DEAR MR. ASPINALL: During the hearings before the Irrigation and Reclamation Subcommittee on H.R. 4671, "a bill to authorize the construction, operation,

and maintenance of the Lower Colorado River Basin project, and for other purposes," you asked me to supply for the record my opinion whether Congress can or cannot "by legislation such as is before this committee directly or indirectly change the Colorado River compact provisions." The answer, in my view, is:

(1) Congress cannot unilaterally change the contract among the States evidenced by the Colorado River compact; but (2) Congress can legislate in terms which are inconsistent with the provisions of the compact, and such legislation, being in fields (interstate commerce and foreign relations) in which the powers of Congress are plenary, would supersede the compact's inconsistent provisions.[1]

The reasons for this answer are as follows:

A valid constitutional enactment of the United States is controlling over inconsistent terms of an interstate compact to which Congress has earlier consented (*Pennsylvania* v. *Wheeling and Belmont Bridge Co.*, 59 U.S. (18 How.) 421 (1856)). The reason, as the court pointed out in the *Wheeling Bridge* case, supra, 59 U.S. at 433, is manifest:

"The question here is, whether or not the compact can operate as a restriction upon the power of Congress under the Constitution to regulate commerce among the several States. Clearly not. Otherwise Congress and two States would possess the power to modify and alter the Constitution itself."

I know of no authority or body of opinion to the contrary.[2]

Accordingly, Congress' consent to the Colorado River compact in the Boulder Canyon Project Act does not preclude its power to legislate inconsistently with the terms of that consent.

I reach this conclusion in the light of the holding in *Arizona* v. *California*, 373 U.S. 546 (1963), that Congress has plenary power to apportion the waters of the Colorado River. In addition, Congress may control, as it sees fit, the operation of the reservoirs which it has authorized on the Colorado River; and the United States has plenary power to regulate the river to perform its treaty with Mexico. These three facets of power—interstate apportionments, control of the Federal reservoirs, river regulation to meet the treaty burden—just about blanket the subject matter of the Colorado River compact.

In *Arizona* v. *California*, the Court construed the project act's use of compact terms. Hence, it may quite soundly be argued that, in granting its consent to the compact in the project act, Congress impressed its gloss upon the meaning of the compact. Examples: Exclusion of the lower basin tributaries from the article III (a) and (b) allocations; exclusion of the Gila River from the Mexican Treaty burden;[3] exclusion of main stream reservoir evaporation losses from "consumptive use"; definition of consumptive use as diversions less returns to the river. To the extent that Congressional understanding of compact terms in 1928, as now discovered by the Court, may have differed from the contemporary understanding of the Colorado River Basin States, the congressional interpretation would appear to be controlling (*Petty* v. *Tennessee-Missouri Bridge Commission*, 359 U.S. 275 (1959)).

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[1] Apart from the controlling effect of the Federal legislation, a question would remain as to the continued efficacy of the compact as a contract among the States. That question is not discussed in this letter, as the answer would depend, inter alia, on the meaning of the compact itself, the materiality of the change accomplished by the Federal legislation, and the action of the States in expressly or impliedly either acquiescing in or rejecting the change.

[2] The Attorney General of the State of Washington has reached a similar conclusion that Federal legislation would supersede provisions in the proposed Columbia River Basin compact prohibiting out-of-basin diversions (CCH Util. Reg. Rep., par. 19863 (Mar. 4, 1964)).

See also Frankfurter and Landis, "The Compact Clause of the Constitution—A Study in Interstate Adjustments," 34 Yale L. J. 685 (1925).; Zimmerman and Wendell, "The Interstate Compact Since 1925" (1951).

Cf. *Thomas* v. *Gay*, 169 U.S. 264 (1898), holding that Federal legislation which contravenes the terms of a treaty to which the Senate had earlier consented is controlling as domestic law.

[3] Sec. 4(a) of the act authorizes the States of Arizona, California, and Nevada to enter into a compact, which would become effective without further action by Congress. One of its terms, clause (1), would apportion from the main stream, alone, the entire 7.5 million acre-feet "apportioned to the lower basin by par. (a) of art. III of the Colorado River compact." The first paragraph of sec. 4(a) and clause (2) of the second paragraph would appear to authorize Arizona and California each to take from the main stream one-half of any "excess or surplus waters unapportioned" by the compact. Clause (4) provides "that the waters of the Gila River and its tributaries, except return flow after the same enters the Colorado River, shall never be subject to any diminution whatever by any allowance of water which may be made by treaty or otherwise to the United States of Mexico," but that Arizona and California would each bear, out of the main stream, one-half of the lower basin's share of any deficiency under art. III(c) of the compact.

Whether Congress should now exercise its powers over the Colorado River, in intentional contradiction of the Colorado River compact, is quite another matter. The decision as to whether or not that power should be exercised imposes an awesome responsibility on this committee. A great deal of water has gone over the dam since 1928. My personal view, for whatever you may think it worth, is that for Congress to now deliberately supersede the compact, absent agreement by all seven States, would be a mistake of the first magnitude. I refer, for example, to the upper division's proposal that Glen Canyon Reservoir shall not be drawn down below rated power head except in discharge of the upper division's obligation under article III(d) of the compact to deliver a minimum of 75 million acre-feet in each period of 10 consecutive years. This would wipe out article III(c), which embodies the upper division's Mexican Treaty obligation, in addition to articles III(e) and IV(b), which subject all power operations to the domestic and agricultural uses in both basins.

That is not to say that the compact is crystal clear in all respects. We all know that it is not, and further that it does not attempt to resolve a number of other problems. These are discussed in my statement before the subcommittee August 27, in which I suggested these areas for consideration:

(1) Legislative solutions in fields that the compact leaves unresolved; e.g., balancing of equities between power operations at upper basin and lower basin reservoirs;

(2) Clarification in fields that the Supreme Court's recent opinion has clouded; e.g., exclusion of upper basin reservoir evaporation losses from calculation of the 7.5 million acre-feet of consumptive use apportioned by article III(a), since that is the mandate given the Secretary with respect to operation of lower basin reservoirs; and

(3) Compromise in other areas left unsettled by the Court; e.g., the Mexican Treaty burden, and the effect of lower basin tributaries in the calculation of "surplus" dedicated to the satisfaction of the treaty obligation. I proposed that both basins be relieved of the treaty burden simultaneously by dedicating importations to that purpose. As long as the treaty burden would be serviced by imported waters, article III(c), which applies to Colorado River waters, would simply become irrelevant. This solution would not adversely affect any compact provision, and further illustrates that importations provide the only effective answer to the vexing problems on the Colorado.

I trust that I have answered your inquiry. If you have further questions, I will be happy to try to respond further.

Respectfully,

NORTHCUTT ELY.

(Item 2 accompanying statement of Northcutt Ely)

RESOLUTION OF THE COLORADO RIVER BOARD OF CALIFORNIA

The Colorado River Board recommends that if the central Arizona project is to be authorized, that authorization should be contained in a Pacific Southwest plan, as one of the following three interrelated provisions:

1. Authorization for the construction, operation, and maintenance of works to import not less than 2.5 million acre-feet [1] annually into the main stream of the Colorado River below Lee Ferry, as the first stage of a regional importation plan adequate to protect existing economies and provide water for filling upper basin reservoirs and refilling Lake Mead, as well as providing water for the central Arizona project. The congressional authorization may be made conditional, as has been done in several other statutes, on the promulgation by the President or Secretary of the Interior of findings of feasibility. A portion of the cost, fairly related to the relief of shortages occasioned by the Mexican Treaty burden, should be nonreimbursable. To the extent that importation of water into the Colorado River system is necessary in order to make sufficient water available for release, as determined by the Secretary of the Interior pursuant to article II(B)(1) of the decree of the U.S. Supreme Court in *Arizona* v.

[1] Two million five hundred thousand acre-feet is the quantity which must be added to the Lee Ferry deliveries required by art. III(d) of the compact (75 million acre-feet per decade), if 7.5 million acre-feet is to be made available for consumptive use from the main stream. Put another way, 2.5 million of imports will offset the sum of the treaty requirement at the Mexican boundary (1.5 million) and net losses between Lee Ferry and the boundary (1 million). Two million five hundred thousand is thus the portion of the Lee Ferry flow which is not available presently for use in the lower basin.

California, et al., to satisfy annual consumptive use of 2,800,000 acre-feet in Arizona, 4,400,000 acre-feet in California, and 300,000 acre-feet in Nevada, respectively, the Secretary shall make such imported water available to the holders of contracts with the United States for the storage and delivery of main stream water in those States at the same cost, 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.

2. Authorization for construction of the central Arizona project, with a diversion capacity of 1.2 million acre-feet annually as planned, subject to the following condition:

3. The Secretary of the Interior shall administer article II(B)(3) of the Supreme Court's decree (which relates to the insufficiency of water to supply 7.5 million acre-feet in consumptive use), as follows: diversions for the central Arzona project shall be limited to the extent necessary to assure the availability of water to satisfy 4.4 million acre-feet of consumptive use in California, plus the satisfaction of present perfected rights in Arizona and Nevada and the satisfaction of the Government's contracts with water users in those two States made before passage of the act, until the President proclaims that works have been completed and are in operation, which are (i) capable of continuously delivering water in aggregate annual quantities of not less than 2.5 million acre-feet into the main stream below Lee Ferry, (ii) from sources outside the natural drainage area of the Colorado River system which are adequate, in the President's judgment, to permanently supply such quantities, (iii) without adverse effect upon the satisfaction of the foreseeable water requirements of the States from which such water is imported into the Colorado.

STATE OF CALIFORNIA,
County of Los Angeles, ss:

I Harold F. Pellegrin, executive secretary of the Colorado River Board of California, do hereby certify that the foregoing is a true copy of a resolution unanimously adopted by said board at a regular meeting thereof, duly convened and held at its office in Los Angeles on the 6th day of January 1965, at which a quorum of said board was present and acting throughout.

Dated this 6th day of January 1965.

HAROLD F. PELLEGRIN,
Executive Secretary.

(Item 3 accompany statement of Northcutt Ely)

RESOLUTION OF THE COLORADO RIVER BOARD OF CALIFORNIA

The Colorado River Board of California endorses the principles of proposed legislation introduced in the 89th Congress (H.R. 4671 and companion bills: S. 1019) to authorize a Lower Colorado River Basin project which the board believes to be fair and equitable to all States affected and which would accomplish the following results, among others:

1. In the event of shortages in the lower Colorado River water supply, diversions for the central Arizona project would be so limited as the assure California's existing projects a minimum of 4.4 million acre-feet per annum of consumptive use, with similar protection to existing projects in Arizona and Nevada.

2. Such protection would continue until works are in operation to import at least 2.5 million acre-feet of water annually into the lower Colorado River from sources outside the natural drainage area of the Colorado River system. To the extent that such imported water was used to assure the beneficial consumptive use annually of 4.4 million acre-feet in California, 2.8 million acre-feet in Arizona and 0.3 million acre-feet in Nevada, it would be supplied at the same cost and on the same terms as Colorado River water.

3. With such protection, construction of the central Arizona project would be authorized.

4. A sound beginning of a cooperative State-Federal approach, founded on a development fund concept of financing, would be provided to resolve water problems regionwide, including those of the entire Colorado River Basin.

5. Legal and economic protection would be provided to areas of origin from which surplus water may be exported to areas of deficiency.

Unanimously adopted February 10, 1965.

(Item 4 accompanying statement of Northcutt Ely)

SUPREME COURT OF CALIFORNIA,
San Francisco, August 16, 1965.

NORTHCUTT ELY, Esq.,
Ely, Duncan & Bennett,
Tower Building, Washington, D.C.

DEAR MR. ELY: I am happy to respond to your inquiry about the pending legislation before Congress on the Colorado River. I am heartily in favor of it.

You will recall that at the request of the late M. J. Dowd, chairman of the Colorado River Board, I prepared, while attorney general of California, an amendment to S. 1658 in the 88th Congress which proposed to authorize the central Arizona project. That amendment proposed to protect the rights of all existing projects in Arizona, California, and Nevada against demands of the new project. As attorney general, I testified in favor of that amendment, which was offered by Senator Kuchel, in hearings before the Senate Interior Committee on April 11, 1964.

I concluded that testimony with this statement, at page 368 of the hearings (pt. II):

"If the amendment I have proposed becomes the law, I shall, so long as life and health remain, appear before any committee of Congress, if requested, and testify in favor of appropriations to complete as rapidly as possible the proposed central Arizona project. Mr. Ely has asked me to make that assurance on his behalf, as well. I think that is the general assurance of most people of good faith in California."

The substance of that amendment is incorporated in S. 1019 and its counterpart bills introduced by 34 of California's 38 Congressmen and all 3 of Arizona's Congressmen. While the protection is limited to the period until not less than 2.5 million acre-feet is actually imported into the main river, to be available to Arizona, California, and Nevada, it provides both the substance of the protection which I urged for existing projects and the incentive of the entire region to prevent water shortage.

This legislation, if passed, will mark a new era in water resource development. It will mark a new era in interstate relations. I want you to convey to the committees considering the legislation, and to the congressional sponsors, my enthusiastic approval of the steps thus far taken. The future of our region rests in the regional plan before Congress.

Sincerely,

STANLEY MOSK,
Associate Justice, California Supreme Court.

(Item 5 accompanying statement of Northcutt Ely)

Investments by California agencies in the Colorado River projects
(as of Dec. 31, 1963)

Agency	Bonds	Taxes, water revenues, and other investment	Contracts with United States and other government agencies	Total
Metropolitan Water District	$297,400,000	$187,477,429		$484,877,429
Imperial Irrigation District	54,000,000		$25,000,000	79,000,000
Coachella Valley County Water District			26,958,562	26,958,562
San Diego County Water Authority	32,000,000		20,300,000	52,300,000
Palo Verde Irrigation District	30,000,000		1,675,000	31,675,000
Total	413,400,000	187,477,429	73,933,562	674,810,991

(Item 6 accompanying statement of Northcutt Ely)

PROBLEMS OF RIVER OPERATION

[Extract from annual report, Colorado River Board of California, 1963-64, pp. 36-42]

After the initial filling of Lake Mead, which was completed in 1941, the river continued to produce more average flow than was needed for consumptive uses and could be operated on a basis of surplus supplies. Operation problems were relatively minor. After 1952, the surpluses vanished, temporarily at least, and midway in the 4 consecutive dry years 1953-56 it became apparent that more careful operation must be exercised in order to meet the consumptive requirements. Although conservation practices were initiated immediately, the active content of Lake Mead nevertheless dropped to an alltime minimum of 10.7 million acre-feet on April 25, 1956. Almost simultaneously the Congress passed the Colorado River Storage Project Act authorizing construction of approximately 35 million acre-feet of new storage capacity.

The driest 4 consecutive years of record, the prospect of major new storage capacity, and the rapidly increasing demands on Colorado River flow combined to present difficult river operation problems which have continued with increasing intensity into 1964. Since 1960, the annual releases of water from Lake Mead have been restricted to the quantities required to meet downstream consumptive uses.

The new Colorado River storage project reservoirs started to store water on the following dates:

Navajo on June 27, 1962.
Flaming Gorge on November 1, 1962.
Lake Powell on March 13, 1963.

Owing to subnormal runoff in water years 1963 and 1964, storage accumulated slowly in each of those reservoirs, and only at the expense of equivalent drawdown of Lake Mead. By early 1964 it seemed unlikely that minimum power operating level could be attained in Lake Powell that year (6.1 million acre-feet of surface storage) without drawing Lake Mead water surface below the elevation of 1,123 feet needed for rated power head (14.5 million acre-feet of active surface storage), a circumstance that would violate the provisions of the upper basin reservoir filling criteria of April 4, 1962.

Upon the receipt of the March 1, 1964, streamflow forecast the engineering staff reported the situation and the staff's observations to the board substantially as follows:

"It is necessary that guiding principles promulgated by the Secretary of the Interior in April 1962 be adhered to during the attempted filling of Lake Powell behind Glen Canyon Dam and other major new reservoirs in the upper basin. Formulation of the principles and operating criteria was done primarily because engineers foresaw the need of an insurance policy against what was then considered a bare possibility, the coincidence of a series of low runoff years with the time when the new reservoirs would be ready for initial filling.

"The long-chance coincidence occurred in 1963 and 1964 with the 1963 runoff less than 60 percent of the longtime average, and the forecasted flow for 1964 much below average. This situation amply justifies the concern of lower basin interests and their insistence now that the principles and criteria announced in 1962 by the Secretary be firmly applied.

"The criteria provide that until Lake Powell can be brought to minimum operating content, 6.1 million acre-feet, any water stored there shall be subject to withdrawal as needed to maintain at least 14.5 million acre-feet in Lake Mead. (Lower basin interests sought a 17 million minimum but were unsuccessful.) Lake Powell near the middle of March contained only a little more than 3 million acre-feet and Lake Mead was only 0.2 above the 14.5 million prescribed. Forecast for the April-July period was only 4.7 million acre-feet, or less than 60 percent of the longtime mean of 8.1 million.

"The mean forecast would not permit both the accumulation of 6.1 million acre-feet in Lake Powell and the retention of at least 14.5 million in Lake Mead."

Despite the obvious, the upper basin States urged the Secretary of the Interior to continue to withhold water from Lake Mead in order to build up storage in Lake Powell. On March 25, the following telegram was sent to the Secretary of the Interior by the board chairman:

"Colorado River Board of California strongly protests any tendency to yield to move by upper basin States to upset filling criteria for Lake Powell promul-

gated by you April 4, 1962. After lengthy cooperative study and negotiation with your representatives, lower basin States accepted those criteria as a compromise even though they did not provide all the safeguards that lower basin interests deemed essential. The criteria as announced are the minimum that lower basin power and water users can live with. Their abandonment now would be unfair and a violation of a self-contained principle.

"Paragraph 2 of the criteria requires a declaration by the Secretary at least a year in advance of the date when the criteria are to be no longer applicable. The current proposal violates that requirement.

"We respectfully urge the necessity of increasing immediately the rate of water release from Glen Canyon Dam in order to avoid violation of paragraph 7 of the criteria which provides that the accumulation of minimum power pool storage in Lake Powell will not cause Lake Mead to be drawn below elevation 1123."

Governor Brown sent a similar message. On March 26, 1964, the Secretary of the Interior ordered the outlet gates at Glen Canyon Dam opened in order to maintain storage in Lake Mead at a minimum of 14.5 million acre-feet. The chairman of the board expressed appreciation in a letter of April 6 and encouraged the Secretary to maintain his position of adherence to the Glen Canyon filling criteria of April 1962.

The following letter was received by the chairman from Floyd Dominy, Commissioner, U.S. Bureau of Reclamation on April 14:

"Thank you for your recent telegram to Secretary Udall regarding release of water from Lake Powell behind Glen Canyon Dam to maintain storage in Lake Mead at a minimum of 14.5 million acre-feet.

"As you well know, this matter is of vital concern to all the varied interests in the water resources of the Colorado River Basin. Our interim determination to increase the outflow from Lake Powell to maintain the rated head at the Hoover powerplant was implemented on March 26, and was based simply on economics. The runoff outlook at the present time is such that it is more economical to maintain the rated head on the Hoover turbines than to reduce the output there in an attempt to reach a minimum operating head at Glen Canyon.

"For your convenient reference, enclosed is a copy of a news release dated March 26, 1964, describing the interim plan of reservoir operation in the Colorado River Basin. You may be assured that any further decision regarding the operation of Lake Mead, and the upstream reservoirs affecting Lake Mead, will receive our most careful consideration. We appreciate your interest in this most critical and complex water situation."

During March and April, the upper basin spokesmen, in the interest of early initiation of power generation at Glen Canyon, maintained a steady barrage of publicity including such ideas as:

1. The Secretary's filling and operating criteria favor the lower basin.
2. Increments of recent water releases from Lake Mead were made solely for power generation, and discharged into Mexico.
3. California wastes water into the Salton Sea.
4. The only controversy is over power operation.
5. The only obligation of the States of the upper division is to deliver at Lee Ferry 75 million acre-feet, in each period of 10 consecutive years.
6. California uses should be trimmed at once to not more than 4.4 million acre-feet per annum, in order to permit accumulation of storage and collection of power revenues at the upper basin plants.

The board and its staff publicized the facts on the above subjects:

1. Five years of State-Federal cooperative study went into the filling and operating criteria and when the criteria were announced upper basin spokesmen commended them.
2. Lake Mead has always been operated on a priority schedule:

(1) river regulation and flood control; (2) irrigation and domestic use, and (3) power. Owing to the low priority of power, Hoover releases have generated contract firm power in only 2 of the past 10 years. Lake Mead contents on January 1, 1963, were at the highest level permissible under flood control regulations, the most favorable condition for the beginning of operations under the filling criteria. The high level was obtained even though total Colorado River flow in the decade 1953–62 was near the record low.

3. Comparison of irrigation efficiencies of projects throughout the West shows that the Imperial Irrigation District and the Coachella Valley County Water District rank near the top. This has been accomplished under two handicaps, large soil-leaching requirements resulting from the relatively high salt concentrations in Colorado River flow at Imperial Dam, and absence of regulatory facilities near points of use.

4. Low reservoir storage is not only a power problem, it may result in restrictions on consumptive water use as well as power output.

5. Article III(e) of the Colorado River compact provides:

"The States of the upper division shall not withhold water and the States of the lower division shall not require the delivery of water, which cannot reasonably be applied to domestic and agricultural use."

Many years ago, California agencies made water-right appropriations, signed water contracts with the Secretary of the Interior and constructed works to utilize at least 5,362,000 acre-feet of water per annum from the Colorado River. California's diversions have been in strict compliance with her contracts, and measurements and records have been carefully kept of the amounts of use.

Inasmuch as the upper basin publicized investigation into possible court action to force the Secretary of the Interior to close the gates at Glen Canyon, the board unanimously moved that the attorney general be requested to consider steps that might be taken to prevent closure of the gates at Glen Canyon Dam. The board on May 6 reaffirmed its previous position that the Secretary of the Interior should adhere to filling and operating criteria announced in April 1962, and directed that letters of appreciation be sent to California's congressional delegation thanking them for their positive support in this matter. Background material and comments on the filling problem were also sent to the delegation.

The May 1 streamflow forecast was somewhat higher than the April 1 forecast, and U.S. Bureau of Reclamation engineers in conferences with the board staff indicated that the Secretary of the Interior might change the position announced on March 26 and again lower the gates at Glen Canyon. Therefore, the chairman on May 8 sent another telegram to the Secretary reaffirming the position stated in the telegram of March 25.

At noon on May 11, 1964, the Secretary of the Interior ordered the outflow at Glen Canyon Dam reduced to not less than 1,000 cubic feet per second, with the certain knowledge that Lake Mead water surface elevation would accordingly fall below 1123 feet (rated head at Hoover). Excerpts from the Secretary's statement follow:

"* * * I have concluded that the calculated risk involved in resumption of storage in Lake Powell is warranted under certain conditions. These assure that, in attempting to bring Lake Powell to minimum power operating level in what is still a year of very poor runoff, the objectives of the filling criteria will be fulfilled.

"This can be done by acquiring and furnishing replacement capacity and energy to the Hoover power allottees in the same quantities and having the same characteristics they would obtain from Lake Mead operating at elevation 1,123."

After making the above announcement, Secretary Udall met with the Governors and water officials of the upper basin States in Salt Lake City on May 15 and of the lower basin States in Las Vegas, Nev., on May 16. Despite arguments by Governor Brown and the board, the Secretary held to his decision of May 11 and furthermore announced mandatory 10-percent cuts in all water uses from the Colorado River below Hoover Dam. He agreed that the United States would replace, at the expense of the Upper Colorado River Basin fund, the deficiencies in Hoover capacity and energy that would result from drawing Lake Mead below elevation 1,123 feet; that the construction diversion tunnels at Glen Canyon would not be permanently plugged until Lake Mead was restored to elevation 1,123 feet (14.5 million acre-feet); and that in no event would Lake Mead be drawn below elevation 1,083 feet (10.8 million acre-feet) by reason of operations at Lake Powell.

The Secretary also acknowledged that resort operators at Lake Mead should be compensated for damages resulting from low water levels.

Power Problems

GLEN-HOOVER OPERATION

The April 4, 1962 announcement by the Secretary of the Interior of filling criteria for Lake Powell included provision that the United States would recompense either in power or money any deficiency in firm energy generation at Hoover powerplant caused by the initial filling of Colorado River storage project reservoirs (Lake Powell, Flaming Gorge, Navajo, and Curecanti). If made monetarily the allowance would come from the Upper Colorado River Basin fund, to be repaid after 1987 from Hoover Dam power revenues. The criteria also provided that until Lake Powell was brought to minimum power operating content, 6.1 million acre-feet, any water stored there would be subject to withdrawal as needed to maintain at least 14.5 million acre-feet of active storage in Lake Mead, corresponding to elevation 1,123 feet or rated head on Hoover powerplant.

Table 2 shows the Hoover firm energy deficiencies caused by the accumulation of storage in the upper basin reservoirs, computed according to the formula set up in the criteria.

TABLE 2.—*Deficiency in Hoover firm energy*

[Unit: Million kilowatt-hours]

	Total deficiency	Accumulated		Total deficiency	Accumulated
March 1963	0	0	January 1964	27	308
April	3	3	February	31	339
May	8	11	March	21	360
June	35	46	April	44	404
July	−23	23	May	94	498
August	9	32	June	53	551
September	43	75	July	25	576
October	80	155	August	93	669
November	89	244	September	116	785
December	37	281	October	84	869
			November	123	992
			December	122	1,114

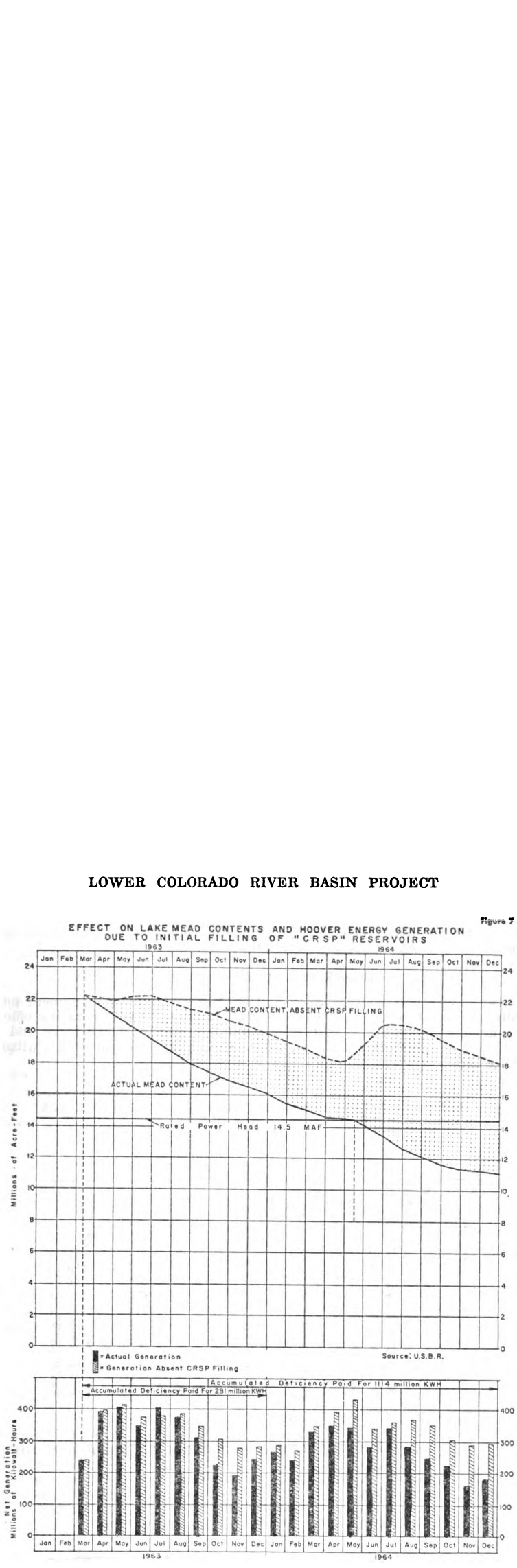
In his announcement of May 11, 1964, modifying the 1962 criteria the Secretary set a new minimum Lake Mead elevation, 1,083 feet, but agreed that Hoover power allottees would be compensated for impairment of kilowatt capacity and kilowatt-hour generation below rated head (1,123 feet elevation), at the expense of the Upper Colorado River Basin fund.

Early in June 1964, the Bureau of Reclamation furnished the board copies of reservoir operation and economic studies which purported to show an economic advantage of the May 1964 modification of the criteria. The studies were based on assumed average runoff in the river after 1964 and ignored the economic loss to recreation interests that would result from low water levels in Lake Mead.

Studies by the board staff allowing for the probability of runoff conditions other than average and for recreation damages cast considerable doubt on the conclusions of the Bureau. The staff studies, projected through June 1966, showed that there would be no economic advantage in the modification unless the inflow to Lake Powell after the summer of 1964 was within a narrow range equivalent to annual rates that have occurred in few of the last 43 years. For annual rates outside that range the original criteria would have the economic advantage.

The board staff participated in preparatory studies and attended as observers a series of Hoover power integration committee meetings in June and July at which time the details of Glen-Hoover operation were worked out. Figure 7 depicts the operation of Lake Mead and makeup of deficiencies in Hoover generation over the period March 13, 1963, to December 31, 1964. Compensation for capacity impairment began May 11 when the water surface elevation at Lake Mead dropped below 1,123 feet, and will continue until that elevation is regained.

Figure 7



The April–July, 1964 runoff proved to be half a million acre-feet higher than the mean forecasted on May 1. Minimum power operating level was attained in Lake Powell during August 1964 and energy generation began in September. At the end of water year 1963–64 (September 30), the aggregate contents above minimum operating levels in Lakes Powell and Mead and in the other major regulatory reservoirs in the upper basin were as shown in the following table:

	Elevation, Sept. 30	Million acre-feet		
		Sept. 30	Minimum operating	Difference
Lake Mead (active)	1,093.5	11.62	[1] 10.68	0.94
Lake Powell (total)	3,491.7	6.21	6.12	.09
Flaming Gorge (total)	5,967.4	1.53	.27	1.26
Navajo (total)	5,950.5	.43	[2] .18	.25

[1] Storage corresponding to minimum level of drawdown stated in provisions to Glen Canyon filling criteria as announced May 1964.
[2] Dead storage at Navajo. Minimum for irrigation operation will be 670,000 acre-feet.

By December 31, 1964, the aggregate storage in those four reservoirs was reduced 1 million acre-feet below the September 30 quantity, to only 1.5 million above the aggregate minimum operating quantities.

HOOVER POWERPLANT EFFICIENCY

Hoover powerplant was designed and authorized and the repayment pattern established on the basis of an estimated 83 percent overall operating efficiency of the generating units. Because the plant has been operated more and more for peaking and for other reasons, this efficiency has seldom been realized, as shown by figure 8.

Figure 8

ASSUMED & ACTUAL OPERATING EFFICIENCIES HOOVER POWER PLANT

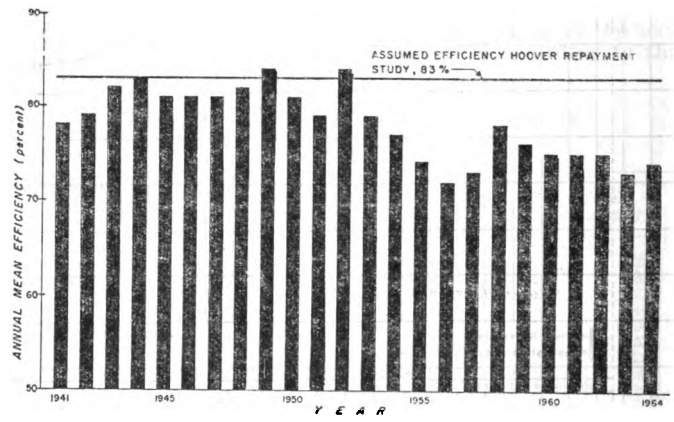


Figure 9

HOOVER CONTRACT FIRM ENERGY AND ACTUAL GENERATION

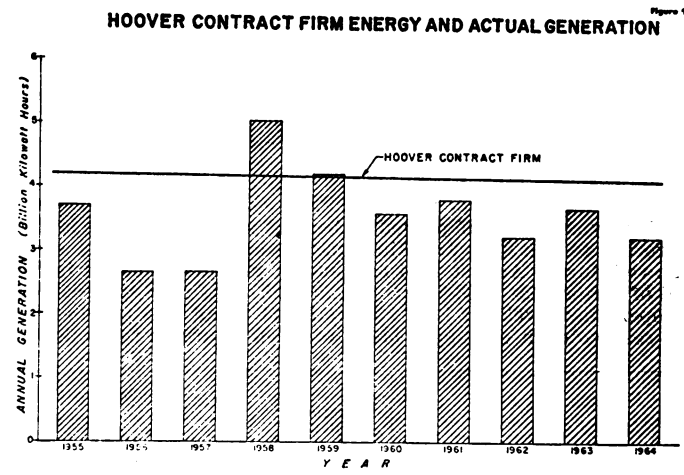


Figure 9 depicts for recent years the contract firm energy generation, actual generation, and all deficiencies regardless of cause.

Record of deficiency energy and impairment energy and capacity at Hoover Dam powerplant due to operation of upper Colorado Basin projects

Operating year	Deficiency energy	Impairment energy	Capacity impairment
1962–63	$34,199.85		
1963–64	1,833,791.06	$3,924.28	$8,475.70
1964–65	1,779,103.61	672,507.01	2,906,595.56
June 1965	0	7,947.97	52,805.00
Total	3,647,094.52	684,379.26	2,967,876.26

COMPONENTS

	Kilowatt-hours	*Kilowatt-hours*	*Kilowatt-months*
1962–63	11,000,000	0	0
1963–64	486,000,000	1,000,000	12,900
1964–65	930,000,000	197,000,000	1,673,800
June 1965	52,000,000	3,000,000	48,300
July 1965	65,000,000	0	0

Had there been no upper basin projects there would have been no secondary energy at Hoover during 1962–63, 1963–64, and 1964–65 but there would have been 400 million kilowatt-hours of secondary energy during 1965–66.

The U.S. Bureau of Reclamation hopes to supply all of the deficiency energy required in the current 1965–66 operating year from generation at Glen Canyon powerplant.

(Item 7 accompanying statement of Northcutt Ely)

Present consumptive use of main Colorado River water and flow to Mexico for calendar year 1963

State and project:	*Acre-feet*
California:	
Metropolitan Water District	1,046,180
Palo Verde Irrigation District	367,180
Imperial Irrigation District	3,062,490
Coachella Valley County Water District	537,640
Yuma project (reservation division)	45,300
Subtotal	5,058,790
Arizona:	
Colorado River Indian Reservation	186,660
Gila gravity main canal	610,520
Yuma project (reservation division)	169,610
Subtotal	966,790
Nevada:	
State of Nevada	24,510
Boulder City	2,730
Subtotal	27,240
Total consumptive use in Lower Colorado River Basin	6,052,820
Mexico:	
Scheduled deliveries	1,500,000
Excess arrivals	503,898
Subtotal	2,003,898
Grand total	8,056,718

52–850—65——39

(Item 8 accompanying statement of Northcutt Ely)

STATEMENT OF DALLAS E. COLE, CHIEF ENGINEER, COLORADO RIVER BOARD OF CALIFORNIA

The Colorado River Board of California favors prompt passage of the pending legislation, because of the urgent need of more water in the great Pacific Southwest and the imperative need to implement quickly the necessary investigations and plans to augment the water supply naturally available in the region. Parts of the region, for example central Arizona, are in dire need of more water now. The region as a whole will need a supplemental water supply of 4 or 5 million acre-feet a year within a few decades, and as much as 15 million acre-feet a year in the long-range future. The search for supplemental water for the Pacific Southwest must begin immediately.

The Colorado River Board is a State agency created by act of the legislature in 1937, and given the statutory responsibility of protecting the interests of California, its agencies and citizens in the waters of the Colorado River system. The board is composed of six members appointed by the Governor, each nominated by and representing one of the public agencies of California having contracts for the use of water or power from the Colorado River. These agencies are: Palo Verde Irrigation District, Imperial Irrigation District, Coachella Valley County Water District, the Metropolitan Water District of Southern California, San Diego County Water Authority, and City of Los Angeles Department of Water and Power.

These six agencies own, in behalf of more than 10 million people, the major water rights in California on the Colorado River. The agencies cover an area of more than 9,800 square miles and contain more than half the population and assessed valuation of the entire State (more than $19 billion).

Southern California homes, farms, and industries rely greatly on the water and power resources of the Colorado River. Eighty percent of the water now used in southern California and 25 percent of all the water now used in the entire State comes from the Colorado River by means of facilities representing a total investment of $800 million—and a replacement value more than twice that much at present-day prices. About 4 billion kilowatt-hours of electrical energy are delivered each year to southern California from hydroelectric plants on the Colorado—small in percentage of total use but large in necessity and value, because most of it is used to meet high peak demands of short duration that could not otherwise be met except by large additional capital investment.

THE REGION OF WATER DEFICIENCY

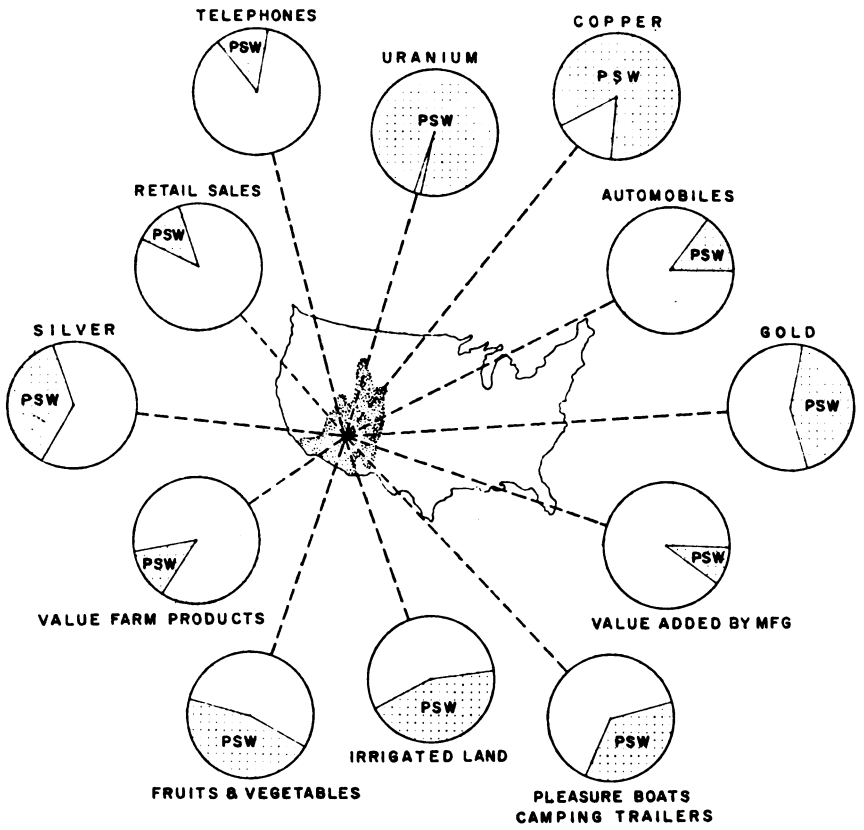
The bill before the committee deals with the water needs of large and important segments of the Nation's population and economy. The region covers the entire Colorado River drainage area plus part of the seven basin States outside the natural basin which are or may be served with Colorado River water, in all some 350,000 square miles or about 11 percent of the area of the 48 contiguous States. It includes such important population and industrial centers as Salt Lake City, Denver, Las Vegas, Phoenix, Tucson, Los Angeles, and San Diego, which are dependent upon the Colorado River system for all or major portions of their water supplies.

More than 80 percent of the Colorado River Basin receives on the average less than 15 inches of rain a year. Thus despite the large area of the basin, the runoff per square mile is relatively small. The Ohio River Basin, the Columbia River Basin, and the Colorado River Basin are almost equal in size but each of the first 2 produces more than 10 times as much water on the average as the Colorado. To achieve full development of all the resources of the Colorado River service area will require more water than can be produced in the basin. Even at the present state of development, water deficiencies are acute in some parts of the region.

The Pacific Southwest is the fastest growing region of the United States. Its population has increased about 85 percent in the 15 years since 1950 and now numbers about 15 million people. There is no sign of any letup in the rate of increase. Accompanying the population growth is a similar growth in the region's economy. According to projections in the report of January 1964, by the Secretary of the Interior on the Pacific Southwest water plan the population of the region may be expected to triple in the next half century.

This is a region rich in resources, except water. The vitality of the area's economy can be gaged by a number of indicators, as in chart 1.

SOME INDICATORS OF THE ECONOMY
OF THE PACIFIC SOUTHWEST



A wide variety of mineral deposits is scattered through the region, including some materials which are surging rapidly into national importance as the atomic and space programs demand. For example, the region accounts for 99 percent of the Nation's domestic uranium production. More than half the Nation's copper production comes from the area, with Arizona leading in this regard. Vast coal deposits are being developed for generation of electricity at large mine-mouth steamplants. Many trillions of barrels of oil in extensive shale deposits in Wyoming, Utah, and Colorado will be exploited as the market for fuels and petrochemicals grow and many of the conventional sources of oil are depleted. Industrial development in the States of the Colorado River Basin has proceeded at a rapid rate since the end of World War II and is expected to continue far into the future. Food processing in connection with the extensive agricultural development was one of the first industries to be established and is still one of the largest in the basin.

Manufacturing has grown continuously and now includes many thousands of items, large and small: shipbuilding, aircraft, electronics, space support equipment, refining of petroleum products, clothing, movies, television production, rubber products, and plastic products. Value added by manufacture in the seven-State area is 10 percent of the national total.

The seven Colorado River Basin States contain about 12 percent of the Nation's population. People in those seven States account for 13 percent of national retail sales, 14 percent of the telephones, 35 percent of the pleasure boats and camping trailers and 15 percent of the motor vehicles. They drive more miles per capita than the national average. Tourism and outdoor recreation attract millions of visitors to the area from all over the world.

Irrigated agriculture and livestock raising are major elements of the area's economy. More than 15 million acres of land are devoted to irrigated agriculture in the Colorado River Basin States, of which more than 4 million acres are irrigated with Colorado River water. The seven States produce more than $5 billion worth of crops and livestock annually, or about one-sixth of the U.S. total. Annual production from areas irrigated by the Colorado River system is $921 million, and would be much greater if water were available to irrigate all suitable lands. Practically all the agriculture in the basin is dependent on irrigation.

Because of warm climate and long growing season, the southern half of the region ships enormous quantities of fresh fruits and vegetables to eastern markets during much of the winter. For example, at the height of the winter lettuce harvest, as many as 2,800 carloads of this perishable crop are sent to market from the Imperial Valley, Calif., each month.

A wide variety of specialty crops is produced in the southern area, including melons, grapes, dates, citrus, green vegetables, and seed and nursery items.

WATER DEFICIENCY

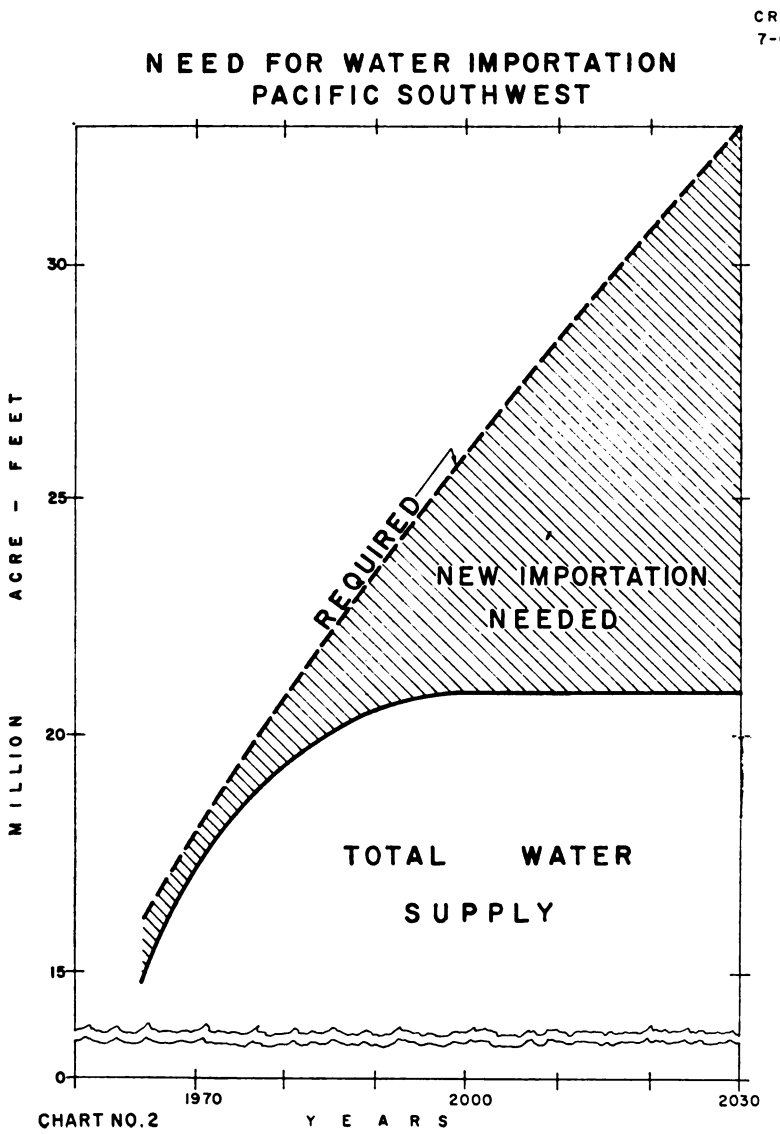
The explosive growth in the population and economy has led to overcommitment of the water supply naturally available in the region as a whole. Sustaining the present level of economic activity depends upon complete utilization of the available surface water supply and the mining of groundwater, principally in southern California and central Arizona.

When water is scarce, conflicts of interest are unavoidable and often lead to controversy as in the Colorado River Basin, where competition among subbasins, States and projects and among different water uses has been prevalent for many years. In recent months, for example, differences have become sharp between those whose primary interest is in preservation and enhancement of the fish, wildlife, and recreation resources along the lower Colorado and those whose primary interest is in maintaining an adequate water supply for the agricultural, municipal, and industrial water users in an area threatened with water shortage. Sincere efforts are being made to compromise such differences, but they cannot be fully resolved as long as the water supply is inadequate for all reasonable demands. Competition will intensify as demands increase.

Taken as a whole the region is presently short a million, five hundred thousand acre-feet of water a year. Chart 2 illustrates the present and anticipated future shortage, considering the needs of existing and identifiable future developments. Eventually the equivalent of another Colorado River will be required to overcome the projected deficiency. The plotting on the chart allows for the transfer of 2½ million acre-feet a year of water from northern to southern California through facilities now under construction as part of the State water plan.

Shortages in some segments of the region are now and will be in the future more severe relatively than may be inferred from the regionwide figures. The central Arizona area must now pump from its wells 2 million acre-feet more water a year than the ground water basins can permanently sustain. Current use of water from ground water basins in southern California aggregates about 2 million acre-feet a year, of which about 500,000 acre-feet represents overdraft.

The decree of the U.S. Supreme Court in *Arizona* v. *California et al.* deals essentially with an assumed basic water supply sufficient for the consumptive use in the United States of 7,500,000 acre-feet a year from the lower main stream of the Colorado River and divides that quantity 2,800,000 to Arizona, 4,400,000



to California and 300,000 to Nevada. The decree provides no guide to the sharing of a supply less than 7,500,000 acre-feet a year, a condition which may prevail fairly soon. Accordingly, Arizona and California congressional representatives have agreed upon language in section 304 of the bills which would provide that diversions for the central Arizona unit be so limited as to assure the availability of enough water to permit 4.4 million acre-feet of consumptive use of main stream water a year in California and certain other uses in Arizona and Nevada, until works are constructed to deliver not less than 2.5 million acre-feet of water a year from outside sources into the Colorado River below Lee Ferry.

Apparently the decree and the agreement in section 304 of the bill have induced the misconception by some persons that the horizon of the proposed regional planning is to be established and limited by the quantities just cited. That is decidedly not the case. The numbers 2.5 million, 7.5 million, etc., are of legal

import only and are by no means to be construed as physical, engineering, or economic limitations. The 2.5 million acre-feet a year is only the legal minimum of the initial phase of an importation program; the practical physical minimum likely would be higher for the initial phase, which would have to be followed by later additions as the real water needs grow.

A total annual supply of 7.5 million acre-feet in the lower main stream is not enough to meet the full needs of the three lower basin States. The supply of the entire Colorado River system, plus an importation no greater than 2.5 million acre-feet a year would not be enough to meet all the requirements of the upper and lower basins.

Arizona needs substantially more than 2.8 million acre-feet a year from the main stream, to provide water for her existing main stream projects, provide for anticipated growth in her population and economy and overcome the present ground-water overdraft in the central part of the State. Nevada says her 300,000 acre-feet will not suffice to the end of the century.

California's Colorado River projects are already using more than 5 million acre-feet a year, and have contracts and designed capacity for at least 5.4 million, including 1,212,000 acre-feet for the metropolitan water district. To supply all the irrigable land within the agricultural projects' service areas in addition to the full metropolitan water district entitlement would require a total considerably in excess of 5.4 million.

The Secretary in his 1964 report estimated that in order to maintain at their present levels the economies of California's agricultural areas dependent on the Colorado River, a net diversion of about 4.2 million acre-feet a year would be needed. Current research and studies of consumptive use and leaching requirements indicate that the total needs may be substantially greater than 4.2 million acre-feet. Similar conclusions would apply to similar areas in the other States.

Even to provide 5.4 million acre-feet a year to California and the corresponding shares of the total supply to Arizona and Nevada would require an average annual flow of about 12 million acre-feet in the river at Lee Ferry, leaving 9.5 million for consumptive use after deducting losses and the required delivery to Mexico. To maintain that much flow in the lower main stream would require an importation of 4.5 million acre-feet a year, or 2 million more than the 2.5 million legal minimum specified in the bill. Still more would be required if the Upper Colorado River Basin States are to share in the benefits of an importation of water.

The water needs of the upper basin States are increasing rapidly and will someday exceed the upper basin's legal share of the supply naturally available. Mexico would like to acquire more Colorado River water than the present treaty provides. Factors like these emphasize the need for long-range plans to add large quantities of water to the supply in the southwest region.

NEED FOR REGIONAL PLAN

The only effective solution to problems such as those mentioned is a comprehensive approach to the water problems of the region as a whole. A regional plan to meet the most urgent needs and to anticipate the long-range needs, as the Secretary of the Interior has proposed, is in the best interest of the Nation. The need to get started is urgent. Even if planning starts at once, years will pass before additional water can be brought to the Colorado.

A plan that will coordinate the augmentation of the water supply of the Colorado River with the growing needs will do much to minimize conflicts of interest and lessen controversies. A region so rich in natural and manmade resources should be provided plenty of water, sufficient for all practical and reasonable purposes.

Considering the West as a whole, the water supply is ample for extensive additional development but the water must be redistributed geographically to achieve maximum use. River basins in the Northwest waste to the sea annually millions of acre-feet of water in excess of foreseeable future needs within those basins. Numerous suggestions that have been made to transport some of this excess to the Colorado River Basin must be examined in detail, to select the best. First, however, the future needs of the areas that have surplus water must be determined in order to assure those areas proper protection and assistance in their own development. Other possibilities such as salt-water conversion must be studied also. All this takes time, money, and cooperation. The regional plan should spread benefits to the maximum practicable, and minimize detriments. When fact and logic displace emotionalism and fear, an effective solution to our water problems will emerge.

The bill before you has widespread support throughout California. Arizona, California, and the other Colorado River Basin States are at last working together toward the same end, the implementation of a regional plan and framework that will take care of the water requirements of all segments of the regional economy as the needs arise.

(Item 9 accompanying statement of Northcutt Ely)

STATE OF CALIFORNIA,
COLORADO RIVER BOARD OF CALIFORNIA,
Los Angeles, August 22, 1965.

MEMORANDUM—WATER REQUIREMENTS, COLORADO RIVER SERVICE AREA IN CALIFORNIA

Statements have been prepared by the Palo Verde Irrigation District, Imperial Irrigation District, Coachella Valley County Water District, and the Metropolitan Water District of Southern California showing their present net Colorado River water requirements and projected future requirements for water from the river and/or unidentified sources. Copies of the statements are attached.

In round numbers the total present requirements including those of the Bard Irrigation District and the Yuma Indian Reservation amount to 5.1 million acre-feet a year. Projected requirements including also the decreed rights in California of the Chemehuevi, Fort Mohave, and Colorado River Indian Reservations amount to 7.9 million acre-feet a year. The quantities are in terms of net diversions; i.e., gross diversions minus returns to the river. Components of the totals are:

	Net annual requirements in millions of acre-feet	
	Present	Projected
Palo Verde	0.4	0.55
Imperial	3.0	4.8
Coachella	0.5	1.2
Bard, Indian reservations, miscellaneous	0.05	0.10
Metropolitan	1.15	1.25
Total	5.10	7.90

The projected agricultural requirements allow for development of all irrigable lands within (1) the present boundaries of the Palo Verde Irrigation District, (2) the area covered by the Imperial Irrigation District's 1932 water supply contract with the Secretary of the Interior, including the East, West, and Pilot Knob Mesa units, (3) the Colorado River service area established by the 1934 water supply contract between the Coachella Valley County Water District and the Secretary, (4) the present boundaries of the Reservation Division of the Yuma project and (5) the decreed rights of the Chemehuevi, Fort Mohave, and Colorado River Indian Reservations in California. The Coachella projection also includes water for future urban development within the service area. The projection for the Metropolitan Water District is for about the turn of the century.

DALLAS E. COLE, *Chief Engineer.*

(Item 9(a) accompanying statement of Northcutt Ely)

STATEMENT OF PALO VERDE IRRIGATION DISTRICT PRESENT AND PROJECTED USE OF COLORADO RIVER WATER

The purpose of this statement is to convey accurate information as to the projected future water requirements of the Palo Verde Irrigation District.

Palo Verde Irrigation District is an agency of the State of California. It is a party to the California Seven Party Water Agreement with water rights under the first, third, and sixth priorities, and is an original contractor with the United States for Colorado River water.

The district serves lands within the political boundaries of the district located in the Palo Verde Valley and Lower Palo Verde Mesa. The district contains approximately 104,500 acres in the valley and 17,500 acres on the Lower Palo Verde Mesa. The lands are adjacent to the Colorado River at Blythe on the eastern boundary of California. The district supplies water only for irrigation. The city of Blythe, which lies entirely within the district, obtains its water from deep wells.

During 1964 the district supplied water from the river to 82,600 acres of farmland in the Palo Verde Valley. Approximately 90,000 acres in the valley within the district are considered capable of cultivation and will require water in the near future.

During 1964 the district supplied river water for 550 acres of farmland on the Lower Palo Verde Mesa. Approximately 300 additional acres on the mesa were cultivated with water from wells. It is anticipated that a total of 16,000 acres of land on the mesa will require Colorado River water within the next few years.

Although the district is adjacent to large areas of undeveloped lands feasible for agriculture with Colorado River water, only those lands now in the district and included in the seven party water agreement and the water delivery contract with the United States, and for which diversion facilities and other facilities have been constructed for many years, have been included in the projections.

Because of its geographic location adjacent to the Colorado River, Palo Verde Irrigation District's drainage water flows back into the Colorado River and is reusable downstream. Accordingly, return flow is a significant factor in determining the consumptive use of water by Palo Verde Irrigation District. The current and projected figures are stated in terms of consumptive use measured by surface diversion, less surface return flow available for use in the United States or in satisfaction of the Mexican Treaty obligation. Diversion alone is not a reliable index of consumptive use by the district nor actual streamflow depletion.

In making these projections the long actual experience of the district has been extrapolated. These projections assume that prevailing cropping patterns and climatic conditions will continue. No allowance has been made for water quality changes on the assumption that within reasonable limits increased diversions will cause a corresponding increase in returns. These qualifications are mentioned because the projected use figures presented below are based on past experience.

CURRENT CONSUMPTIVE USE

	Net cultivated acres	Consumptive use [1]
		Acre-feet
Valley	82,600	396,500
Mesa	550	4,100
Total		400,600

PROJECTED CONSUMPTIVE USE

Valley	[2] 90,000	432,000
Mesa	[2] 16,000	120,000
Total		552,000

[1] Measured as surface diversion from, less surface return to, the Colorado River.
[2] Estimated.

J. E. BLAKEMORE, *Manager.*

(Item 9(b) accompanying statement of Northcutt Ely)

STATEMENT BY R. F. CARTER, GENERAL MANAGER, IMPERIAL IRRIGATION DISTRICT

My name is R. F. Carter. I have been connected with Imperial Irrigation District for the past 16 years, the last 6 years of which I have served as general manager. We are here on behalf of the district to support a program for the further comprehensive development of the water resources of the Lower Colorado River Basin and for the provision of additional and adequate water supply for use in the Upper as well as the Lower Colorado River Basin.

Imperial Irrigation District, a nonprofit public agency operating under the statutes of the State of California, is presently completing its 54th year of service to what is now the fourth most productive agricultural county in the United States. Food and fiber produced in Imperial County totaled over $214 million in 1963, with a slight decrease in agricultural product sales for 1964.

Crops are harvested and planted each month of the year. Principal crops grown in Imperial Valley are alfalfa, cotton, sugarbeets, winter vegetables, flax, melons, barley, various fruits, and select seed. Livestock operations are of vast importance, particularly the feeding of cattle.

The irrigated area within the service area, totaling almost a million acres, represents approximately 434,000 irrigated acres. The unirrigated area is raw desert.

Imperial Irrigation District diverts its sole source of water from the Colorado River at Imperial Dam through the 80-mile long All-American Canal built by the Bureau of Reclamation in the 1930's, to the irrigated acres, all of which lie at or below sea level.

Since the point of diversion on the Colorado River at Imperial Dam is 179 feet above sea level and the land it serves is below sea level, we are fortunate to be able to operate the entire system on a gravity basis.

For your information, the total number of canals and drains which shunt the irrigation water to the lands and remove the quantity of water required to maintain an adequate salt balance within the service area totals over 3,000 miles. Or, to put it another way, if all the canals and drains required to operate the Imperial Irrigation District's system are placed end to end, the facility could transport water from the San Diego Harbor to the New York Harbor.

Most of these facilities are unlined; however, the district is now, and has been in the past, in a concrete lining program whereby the facilities located above the natural surface of the irrigated area are being concrete lined at the rate of 50 miles per year.

Average annual rainfall is slightly less than 3 inches, and during the summer we expect about 100 days of temperatures over 100°.

Imperial Irrigation District entered into a contract with the U.S. Department of Interior, Bureau of Reclamation, on December 1, 1932, for the construction of a diversion dam, main canal and appurtenant structures and for the delivery of water to the district. This contract was amended on March 4, 1952, to permit Imperial Irrigation District to operate the Imperial Dam facilities, the main All-American Canal and develop any power potential on the All-American Canal.

Imperial Irrigation District enjoys a third priority to the water it receives from the Colorado River pursuant to the seven-party agreement, the California Limitation Act, and the Colorado River compact and the Boulder Canyon Project Act. Imperial Irrigation District is presently diverting approximately 2.9 million acre-feet of water per annum, which the district claims to be a present perfected right which dates back prior to about 1900, to irrigate 434,000 acres to which reference has been made herein; but is entitled to place water on an additional 245,000 acres when water is available for development of the Pilot Knob Mesa, and the east and west Mesa units by virtue of article 23 of the All-American Canal contract between the United States and Imperial Irrigation District; which, among other things, goes on to say that "Within a reasonable time to be determined by the Secretary, from the date water is available for and can be delivered to any public lands within the boundaries of the district, such lands shall be opened to entry."

The public lands we refer to are lands defined by the contract, included in the service area, and lands we are permitted to serve providing water is available for them.

Imperial Irrigation District in applying the Blaney-Criddle formula, a universally accepted formula, to the 245,000 acres of land, has determined that the demand required by developing said land will amount to 1,690,000 acre-feet of water per annum.

We fully appreciate the fact that we are restricted by the priorities above referenced, but only to the extent that the quantities diverted by those having senior rights; namely, Palo Verde Irrigation District and the Bard project, coupled with the diversion made by Imperial cannot exceed the agricultural entitlement of 3,850,000 acre-feet.

Imperial Valley has made a large contribution to the economy of the West in its agricultural undertaking and not only has, but is providing food and fiber products to the rapidly growing population of our metropolitan areas and, since the growth rate is expected to almost double within the not too distant future,

it is imperative that additional water be made available to the lands that may be developed to continue to accommodate our ever-increasing population.

If we are to rely on the present annual water yield from the Colorado River, it is needless to expect to ever open and develop public lands in the east and west Mesa and Pilot Knob units. The only way that we can ever hope to develop these public lands is with interbasin assistance.

Imperial Irrigation District will fully support legislation which will place additional water in the area of need because it believes that there is no other solution to the continued success of the West.

(Item 9(c) accompanying statement of Northcutt Ely)

COACHELLA VALLEY COUNTY WATER DISTRICT

COLORADO RIVER WATER REQUIREMENTS FOR COACHELLA VALLEY, BY LOWELL O. WEEKS, GENERAL MANAGER-CHIEF ENGINEER

I. HISTORY OF COACHELLA VALLEY AND THE COACHELLA VALLEY COUNTY WATER DISTRICT

A. Coachella Valley

Coachella Valley is located in eastern Riverside County and lies to the northwest of the Salton Sea. It is the northern extension of a large valley that was originally known as the Colorado Desert. This large valley, for practical reasons, is divided into three distinct areas. The part in Mexico is called Mexicali Valley, the part south of Salton Sea is called Imperial Valley, and the part north of Salton Sea is known as Coachella Valley.

The average rainfall is so slight in the Coachella Valley that it is practically disregarded, and the sole dependence for water in growing crops is placed in irrigation. The source of this supply lies principally in the rainfall and the melting snows on the high mountain peaks at the northwestern end of the valley and, since 1949, in a supply from the Colorado River diverted at Imperial Dam through the All-American Canal to Coachella Valley, a distance of 160 miles, where it is distributed onto the farms.

The development of the valley began in 1888 when a water-bearing sand and gravel strata was found beneath the ground surface. During the first few years of development nearly all the wells had an artesian pressure that produced a sufficient volume for irrigation, but with the increase in the number of wells, the water table soon lowered. With reduced pressure, many of the wells ceased for flow or the flow was so decreased that farmers had to resort to pumping.

It was evident at an early date that additional water must be found and brought to Coachella Valley. If no additional water were to be found, the acreage to be served by the underground supply would have to be limited to approximately 10,000 acres. Studies made by the State of California Department of Water Resources indicates an average annual overdraft of about 100,000 acre-feet from the Coachella Valley ground water basin.

B. Coachella Valley County Water District

As originally formed, the Coachella Valley County Water District was located entirely within the county of Riverside. However, in recent years the boundaries of the district have been extended to include contiguous lands in Imperial County (approximately 54,000 acres) and in San Diego County (approximately 27,500 acres). All of the lands within the district are desert lands and the district now contains approximately 620,000 acres as shown on map No. 1. The elevation of most agricultural lands is below sea level.

This district was formed in the year 1918 under what is now known as the county water district law (Division 12, California Water Code) and has continuously existed and functioned as such since that time as a public agency of the State of California. All of its authorized functions and duties are governmental in nature.

In 1937, by special act of the legislature, the Coachella Valley Storm Water District was merged into the Coachella Valley County Water District, and the water district, in addition to its powers and duties as a county water district, was also vested with all the powers, duties, and functions of a storm water district as provided in the Storm Water District Act of 1909.

A. Contracts with the United States

Since 1918 the district has entered into seven separate and distinct contracts with the United States, all dealing with a supply of water from the Colorado

II. CONTRACTS

River. The early contracts of 1920, 1921, and 1929 were brought into existence after the passage of the Kinkaid Act by the Congress in May 1918 under which the district made contributions to the United States for its early surveys, investigations, and reports, looking forward to the construction of what we now call Hoover Dam and the building of an All-American Canal to deliver water into Coachella and Imperial Valleys.

The district has also entered into four separate repayment contracts with the United States, incurring repayable obligations in the aggregate total of $36 million in round figures.

The first contract is dated October 15, 1934, and is for capacity in the Imperial Dam and the All-American Canal and for the delivery of water into Coachella Valley. The second contract bears the date of December 22, 1947, and is for the construction of a distribution system and appurtenances as a means of delivering water from the All-American Canal (Coachella main canal) to the lands within the Coachella Valley County Water District that were included within the service area. This distribution system has been completed. It is an underground, closed concrete pipe system aggregating more than 500 miles in length. All Colorado River water delivered to the agricultural areas in Coachella Valley through this underground, closed system is metered to each water user. The third contract is dated October 14, 1958, and is for the construction of an irrigation system and drainage works for 10,240 acres of Indian lands within the district. The fourth contract, dated July 30, 1963, is for the rehabilitation and betterment of the works that were constructed under the 1934 and 1947 contracts. Three of these contracts between the United States and the Coachella Valley County Water District have been validated by the court of competent jurisdiction.

B. Contract with the State of California for a water supply

On March 29, 1963, the Coachella Valley County Water District entered into a contract with the State of California for a water supply in the ultimate amount of 23,100 acre-feet per annum. This contract has been validated in the court of competent jurisdiction. The cost of this water supply, so contracted for by the district from the State of California, is not economic for agricultural use, but will be used exclusively for domestic and municipal purposes, such water to become available to the district during the year 1972.

III. IRRIGATION WATER SUPPLY REQUIREMENTS

A. Consumptive use for agriculture

The climate of Coachella Valley is characterized by long, extremely hot summers, with occasional high temperatures throughout the entire year. The mild winters, a low relative humidity, cloudless skies, and an almost negligible rainfall combined with good soils have given Coachella Valley a great advantage in the growing of many specialty crops. This area enjoys a 365-day growing season per year; its field crops are specialty crops; its citrus and table grapes are among the finest produced anywhere. This area is the only place on the North American Continent where dates are grown commercially. In the interest of the region, the State, and the Nation, an adequate supply of water should at all times be available to maintain and support the existing and future growth of the sound economy now prevailing in this singular valley.

The annual consumptive use of crops grown in Coachella Valley are shown in table No. 1. The values shown are derived from the work of Blaney-Criddle in their publication, Technical Bulletin No. 1275, "Determining Consumptive Use and Irrigation Water Requirements," updated by the district as reflected in irrigation practices in planting and growing crops in Coachella Valley.

The methods of irrigation in Coachella Valley are similar to those used in other irrigated regions. In this valley much thought and effort has been given to the most efficient way of handling water. This district's distribution system consists of 500 miles of underground concrete pipelines. The farmers' irrigation system is also one of pipelines. These pipelines have the effect of reducing water losses as well as saving valuable land which otherwise would have been lost due to open canals and ditches.

The Coachella main canal (Coachella Branch-All American Canal) was constructed to serve the Colorado River service area within Riverside County, Calif. This area contains approximately 161,200 acres of land, most of which is irrigable. However, the 1947 contract was for the construction of a distribution

system to provide actual delivery or had capacity designed into its pipelines for 94,600 acres as shown by table No. 2.

The cropping pattern of Coachella Valley for the last 8 years is shown on table No. 3. The consumptive use values as shown on table No. 1, applied to the cropping pattern of Coachella Valley, shows that the average annual water requirement is 4.6 acre-feet per acre.

B. Maintenance of salt balance in agricultural lands (leaching requirement)

Most soils of the arid Western United States contain a large percentage of soluble salts which causes many problems to the industry. Add to those problems the irrigation water from the Colorado River, which contains more than 1 ton of salt in each acre-foot, and the problems of irrigation increase in complexity. Without taking into consideration maintenance of salt balance, irrigation water is removed from the soil by transpiration and evaporation, leaving most of the salt to accumulate in the root zone. Leaching, which dissolves and carries the salts vertically downward, is the only successful method of salt removal which is indispensable to a sustained agriculture. Leaching is accomplished by either ponding the water on the surface of the ground, or by application of irrigation water in excess of the crops' consumptive use requirement. This increased amount of water percolates through the soil carrying the salts below the root zone and is ultimately discharged through the farm tile drainage system.

For the last 8-year period the average duty of water for agriculture within the Coachella Valley County Water District has been 6.6 acre-feet per acre per year as shown on table No. 4. This means that each water user is applying approximately 7 tons of salt to the surface of each acre of his land every year. This amount has to be removed for the soil to remain in crop production.

The percentage of the consumptive use requirements to be added to maintain salt balance in the land is as shown on table No. 5. The 8-year cropping pattern of Coachella Valley requires an average of 1.2 acre-feet per acre of water for leaching purposes as shown on table No. 6.

To maintain salt balance in the land which is imperative to sustain agriculture, the headgate delivery duty of water in Coachella Valley is 6.9 acre-feet per acre per year as shown on table No. 7.

C. Domestic, municipal and industrial requirements

In addition to the 94,600 acres that receive water from works designed and constructed by the 1947 contract, there are 66,600 acres of land which are also located within the Colorado River service area as that area was established by the 1934 water supply contract. Water delivery was to be made available to these lands from the Coachella Canal. Many of these acres are excellent agricultural lands and all can be, and some are now used for urban development. An adequate water supply for this acreage would require 5 acre-feet per acre per year.

IV. COLORADO RIVER WATER REQUIREMENTS

Colorado River water is diverted for the Coachella Valley County Water District at Imperial Dam which is about 18 miles upstream from Yuma, Ariz. The All-American Canal roughly parallels the Colorado River on the California side down to Pilot Knob powerplant and wasteway for a distance of approximately 21 miles. The canal then swings westerly toward Imperial Valley. Drop No. 1 is the turnout for the Coachella main canal (Coachella Branch-All American Canal) and is located 15 miles downstrem from Pilot Knob. The Coachella Canal is 123.45 miles in length and is concrete lined for the last 37 miles. The quantity of water that must be diverted annually from the Colorado River for the Coachella Valley County Water District is 1,205,000 acre-feet. This is shown on table No. 8.

V. SUMMARY

The U.S. District Court, Southern District of California, Central Division, in the case of the *United States* vs. *Coachella Valley County Water District* (III Federal supplement 172 (1953)) said:

"In desert regions he who owns the water or water rights, in reality owns the land, as desert land without water is relatively worthless; whereas such land with an adequate water supply becomes extremely valuable."

A water supply for crop consumptive uses, for maintainance of salt balance and for urban development is imperative to sustain the development of the Coachella Valley.

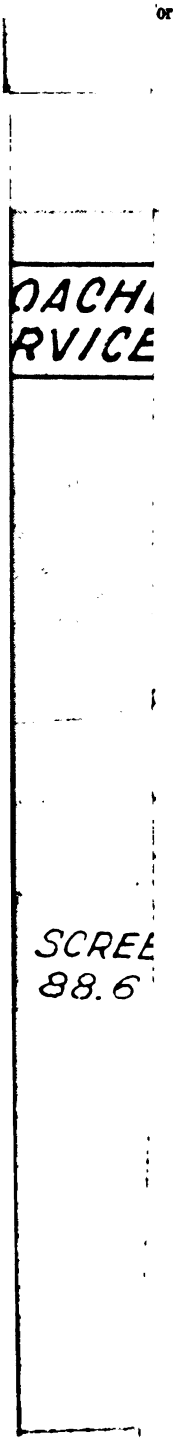


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TABLE No. 1.—*Annual consumptive use for crops in Coachella Valley*

Crop:	Consumptive use requirement [1] (in feet)
Barley	2.89
Alfalfa hay	5.62
Other hay	3.94
Irrigated pasture (alfalfa, etc.)	5.62
Silage or insilage (sorghums, corn)	3.94
Cotton, lint (upland)	3.12
Sugarbeets	3.04
Asparagus	4.45
Beans (fresh market)	1.50
Broccoli	1.94
Cabbage	1.94
Carrots	1.72
Corn (sweet), fresh market	2.21
Cucumbers	2.00
Lettuce	0.87
Cantaloupes, etc	2.41
Honeyball and honeydew, etc	2.41
Watermelons	2.41
Onions (dry)	2.17
Onions (green)	1.48
Peas (green), fresh market	1.47
Peppers (all kinds)	3.12
Squash (table)	2.63
Sweet potatoes	3.08
Tomatoes (fresh market)	3.22
Other vegetables	3.08
Crops not harvested (tree and vine)	4.68
Total nursery	4.68
Soil building (alfalfa, etc.)	5.62
Crops not harvested (other)	4.45
Grapefruit	4.31
Lemons and limes	4.31
Oranges and tangerines	4.31
Dates	7.50
Grapes (table)	4.19
Other fruits	4.32
Pecans	4.04

[1] U=KF. Blaney-Criddle formula from technical bulletin No. 1275 "Determining Consumptive Use and Irrigation Water Requirements," p. 1.
Where U=consumptive use requirement; K=empirical seasonal coefficient; F=sum of the monthly factors (f) for the season (sum of the products of mean monthly temperature (t) in degrees Farenheit and monthly percentage of annual daytime hours (p).

TABLE No. 2.—*Lands to be irrigated by works included in 1947 distribution system contract with U.S. Government*

U.S. Bureau of Reclamation lands	[1] 73,260
Indian lands	[2] 8,300
Patented lands	[3] 13,040
Total	94,600

[1] Meters installed by USBR.
[2] Meters installed or to be installed by CVCWD pursuant to contract with Secretary of Department of the Interior.
[3] Meters installed or to be installed by CVCWD.

TABLE NO. 3.—*Water requirement for crops grown in Coachella Valley*

Crop	Consumptive use requirement [1] (in feet)	1957		1958		1959		1960		1961		1962		1963		1964	
		Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet
Barley	2.89	3,020	8,728	2,170	6,271	1,969	5,690	2,501	7,228	1,614	4,664	1,666	4,815	945	2,731	420	1,214
Alfalfa hay	5.62	7,068	39,722	5,763	32,388	4,691	26,363	5,060	28,437	4,924	27,673	4,500	25,290	2,190	12,308	3,512	19,737
Other hay	3.94			214	843	315	1,241	624	2,459	946	3,727	305	1,202	205	808	330	1,300
Irrigated pasture (alfalfa, etc.)	5.62	1,957	10,998	2,499	14,044	1,566	8,801	929	5,221	1,258	7,070	815	4,580	844	4,743	902	5,069
Silage or insilage (sorghums, corn)	3.94	2,458	9,685	1,496	5,894	1,307	5,150	1,038	4,090	1,348	5,311	785	3,093	492	1,938	1,536	6,052
Cotton, lint (upland)	3.12	6,260	19,531	5,492	17,135	5,564	17,360	6,782	21,160	5,736	17,896	5,667	17,681	5,183	16,171	5,246	16,368
Sugarbeets	3.04			77	234							35	106	2,700	8,208	4,033	12,260
Asparagus	4.45	563	2,505	604	2,688	763	3,395	1,654	7,360	1,647	7,329	1,601	7,124	1,601	7,124	2,860	12,727
Beans (fresh market)	1.50	612	918	170	255	420	630	309	464	207	311	278	417	145	218	149	224
Broccoli	1.94	22	43	8	16	4	8	32	62	18	35	20	39	25	49	40	78
Cabbage	1.94	103	200	33	64					20	39	70	136	80	155	158	307
Carrots	1.72	2,774	4,771	2,105	3,621	2,925	5,031	3,050	5,246	2,185	3,758	3,266	5,618	3,922	6,746	3,920	6,742
Corn (sweet) fresh market	2.21	4,701	10,389	5,547	12,259	5,710	12,619	4,594	10,153	4,914	10,860	5,019	11,092	5,278	11,664	4,157	9,187
Cucumbers	2.00			11	22	8	16			3	6	10	20	3	6		
Lettuce	.87	91	79	182	158	34	30	32	28	49	43	105	91	171	149	194	169
Cantaloupes, etc	2.41	302	728	300	723	236	569	398	959	761	1,834	653	1,574	67	161	38	92
Honeyball and honeydew, etc	2.41	1	2					56	135	115	277	75	181	67	161	34	82
Watermelons	2.41	157	378	740	1,783	1,148	2,767	590	1,422	253	610	510	1,229	56	135		
Onions (dry)	2.17	51	111	186	404	140	304	150	326	176	382	221	480	47	102	105	228

Onions (green)	1.48	183	271	54	80	115	170	75	111	215	318	240	355	205	303	213	315
Peas (green) fresh market	1.47	75	110	55	81	55	81	41	60	47	69	69	101	75	110	72	106
Peppers (all kinds)	3.12	583	1,819	621	1,938	687	2,143	541	1,688	622	1,941	585	1,825	470	1,466	424	1,323
Squash (table)	2.63	747	1,965	549	1,444	547	1,439	594	1,562	496	1,304	397	1,044	269	707	563	1,481
Sweet potatoes	3.08			192	591	161	496	60	185	86	265	40	123	25	77	65	200
Tomatoes (fresh market)	3.22	1,159	3,732	927	2,985	1,098	3,536	913	2,940	767	2,470	741	2,386	644	2,074	592	1,906
Other vegetables	3.08	774	2,384	737	2,270	733	2,258	868	2,673	910	2,803	1,218	3,751	1,025	3,157	1,384	4,263
Crops not harvested (tree and vine)	4.68	1,427	6,678	4,949	23,161	4,213	19,717	3,282	15,360	3,425	16,029	2,825	13,221	6,560	30,701	4,375	20,475
Total nursery	4.68	1,088	4,858	1,064	4,980	945	4,423	724	3,388	726	3,398	805	3,767	754	3,529	784	3,669
Soil building (alfalfa, etc.)	5.62	1,418	7,969	1,443	8,110	843	4,738	499	2,804	775	4,356	491	2,759	314	1,765	283	1,590
Crops not harvested (other)	4.45	195	868	675	3,004	574	2,554	448	1,994	467	2,078	942	4,192	1,330	5,874	1,094	4,868
Grapefruit	4.31	6,891	29,700	7,609	32,795	8,313	35,829	6,988	30,118	7,261	31,295	7,285	31,398	7,595	32,734	7,583	32,683
Lemons and limes	4.31	415	1,789	403	1,737	343	1,478	806	3,474	590	2,543	633	2,728	655	2,823	666	2,870
Oranges and tangerines	4.31	802	3,457	1,406	6,060	1,556	6,706	3,028	13,051	3,656	15,757	4,045	17,434	5,268	22,705	5,354	23,076
Dates	7.50	3,686	27,645	3,766	28,245	3,678	27,585	3,431	25,733	3,493	26,198	3,200	24,000	3,248	24,360	3,776	28,320
Grapes (table)	4.19	11,124	46,610	11,080	46,425	11,592	48,570	11,791	49,404	11,806	49,467	11,724	49,124	11,754	49,249	11,874	49,752
Other fruits	4.32	87	376	30	130	17	73	16	69	25	108	21	91	13	56	65	281
Pecans	4.04	40	162	40	162	40	162	31	125	31	125	31	125	30	121	35	141
Total acres of crops grown		60,784		63,197		62,310		61,935		61,572		60,893		64,245		66,836	
Less double crop		8,455		9,605		6,783		7,602		7,582		7,450		6,472		6,783	
Total acres irrigated		52,329		53,592		55,527		54,333		53,990		53,443		57,773		60,053	
Total water required in acre-feet			249,181		263,000		251,932		249,489		252,349		243,192		255,388		269,155
Irrigated acreage requirement in acre-feet per acre per year[3]			4.76		4.91		4.54		4.59		4.67		4.55		4.42		4.48

[1] See table No. 1.
[2] See districts annual crop reports.
[3] Average (8 years) irrigated acreage requirement in acre-feet per acre per year equals 4.62.

TABLE No. 4.—*Water usage within Coachella Valley*

Year	Acres irrigated	Water delivered			Annual water duty (acre-feet)
		Colorado River (acre-feet)	Deep wells (acre-feet)	Total (acre-feet)	
1957	52,329	276,501.8	23,088	299,589.8	6.3
1958	53,592	310,060.8	38,529	348,589.8	6.5
1959	55,527	320,245.4	38,396	358,641.4	6.5
1960	54,333	328,660.5	40,265	368,925.5	6.8
1961	53,990	325,651.4	40,664	366,315.4	6.8
1962	53,443	346,815.3	43,062	389,877.3	7.3
1963	57,773	331,883.1	38,131	370,014.1	6.4
1964	60,053	324,125.0	35,864	359,989.0	6.0

NOTE.—Average annual duty of water, 6.6 acre-feet per acre.

TABLE No. 5.—*Leaching requirements for crops in Coachella Valley*

Crop	Bottom of root zone salt tolerance $EC \times 10^{3*}$	Leaching requirement n percentage $LR=\frac{ECiw}{ECdw}$ ** irrigating water = 1.5***	Leaching requirement in acre-feet
Barley	13.5	11	0.32
Alfalfa hay	8.0	19	1.07
Other hay	11.0	14	.55
Irrigated pasture (alfalfa, etc.)	8.0	19	1.07
Silage or ensilage (sorghums, corn)	10.0	15	.59
Cotton, lint (upland)	16.0	9	.28
Sugar beets	16.0	9	.27
Asparagus	8.0	19	.85
Beans (fresh market)	3.5	43	.65
Broccoli	8.0	19	.37
Cabbage	7.0	21	.41
Carrots	4.0	38	.65
Corn, sweet (fresh market)	7.0	21	.46
Cucumbers	4.0	38	.76
Lettuce	5.0	30	.26
Cantaloups, etc	4.0	38	.92
Honeyball and honeydew, etc	4.0	38	.92
Watermelons	4.0	38	.92
Onions (dry)	4.0	38	.82
Onions (green)	4.0	38	.56
Peas, green (fresh market)	3.5	43	.63
Peppers (all kinds)	5.0	30	.94
Squash (table)	4.0	38	1.00
Sweet potatoes	6.0	25	.77
Tomatoes (fresh market)	8.0	19	.61
Other vegetables	5.0	30	.92
Crops not harvested (tree and vine)	4.5	33	1.54
Total nursery	3.0	50	2.34
Soil building (alfalfa, etc.)	8.0	19	1.07
Crops not harvested (other)	7.0	21	.93
Grapefruit	4.5	33	1.42
Lemons and limes	3.5	43	1.85
Oranges and tangerines	4.0	38	1.64
Dates	10.0	15	1.13
Grapes (table)	5.0	30	1.26
Other fruits	5.0	30	1.30
Pecans	3.0	50	2.02

*Electrical conductivity (EC) in millimhos per liter are those that are associated with a 50-percent decrease in crop yield and are taken from USDA Handbook No. 60 "Diagnosis and Improvement of Saline and Alkali Soils," February 1954, and unpublished data of U.S. Salinity Laboratory.

**This equation taken from USDA Handbook No. 60, p. 37.

***Assumed salt content of Colorado River Water as: EC of 1.5, p.p.m. of 1,040, tons of salt/acre-foot of .38

TABLE No. 6.—*Leaching requirement for crops grown in Coachella Valley during an 8-year period, July 1965*

[Colorado River water conductivity of electrical conductivity = 1.50 (parts per million = 1,040, tons of salt per acre-foot = 1.38)]

Crop	Leaching requirement [1] (in feet)	1957		1958		1959		1960		1961		1962		1963		1964	
		Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet
Barley	0.32	3,020	966	2,170	694	1,969	630	2,501	800	1,614	516	1,666	533	945	302	420	134
Alfalfa hay	1.07	7,068	7,563	5,763	6,166	4,691	5,019	5,060	5,414	4,924	5,269	4,500	4,815	2,190	2,343	3,512	3,758
Other hay	.55			214	118	315	173	624	343	946	520	305	168	205	113	330	182
Irrigated pasture (alfalfa, etc.)	1.07	1,957	2,094	2,499	2,674	1,566	1,676	929	994	1,258	1,346	815	872	844	903	902	965
Silage or insilage (sorghums-corn)	.59	2,458	1,450	1,496	883	1,307	771	1,038	612	1,348	795	785	463	492	290	1,536	906
Cotton, lint (upland)	.28	6,260	1,753	5,492	1,538	5,564	1,558	6,782	1,899	5,736	1,606	5,667	1,587	5,183	1,451	5,246	1,469
Sugarbeets	.27			77	21							35	9	2,700	729	4,033	1,089
Asparagus	.85	563	479	604	513	763	649	1,654	1,406	1,647	1,400	1,601	1,361	1,601	1,361	2,860	2,431
Beans (fresh market)	.65	612	398	170	111	420	273	309	201	207	135	278	181	145	94	149	97
Broccoli	.37	22	8	8	3	4	1	32	12	18	7	20	7	25	9	40	15
Cabbage	.41	103	42	33	14					20	8	70	29	80	33	158	65
Carrots	.65	2,774	1,803	2,105	1,368	2,925	1,901	3,050	1,983	2,185	1,420	3,266	2,123	3,922	2,549	3,920	2,548
Corn (sweet) fresh market	.46	4,701	2,162	5,547	2,552	5,710	2,627	4,594	2,113	4,914	2,260	5,019	2,309	5,278	2,428	4,157	1,912
Cucumbers	.76			11	8	8	6			3	2	10	8	3	2		
Lettuce	.26	91	24	182	47	34	9	32	8	49	13	105	27	171	44	194	50
Cantaloups, etc.	.92	302	278	300	276	236	217	398	366	761	700	653	601	67	62	38	35
Honeyball and honeydew, etc.	.92	1	1					56	52	115	106	75	69	67	62	34	31
Watermelons	.92	157	144	740	681	1,148	1,056	590	543	253	233	510	469	56	52		
Onions (dry)	.82	51	42	186	153	140	115	150	123	176	144	221	181	47	39	105	86
Onions (green)	.56	183	102	54	30	115	64	75	42	215	120	240	134	205	115	213	119
Peas (green) fresh market	.63	75	47	55	35	55	35	41	26	47	30	69	43	75	47	72	45
Peppers (all kinds)	.94	583	548	621	584	687	646	541	509	622	585	585	550	470	442	424	399
Squash (table)	1.00	747	747	549	549	547	547	594	594	496	496	397	397	269	269	563	563
Sweet potatoes	.77			192	148	161	124	60	46	86	66	40	31	25	19	65	50
Tomatoes (fresh market)	.61	1,159	707	927	565	1,098	670	913	557	767	468	741	452	644	393	592	361
Other vegetables	.92	774	712	737	678	733	674	868	799	910	837	1,218	1,121	1,025	943	1,384	1,273
Crops not harvested (tree and vine)	1.54	1,427	2,198	4,949	7,621	4,213	6,488	3,282	5,054	3,425	5,275	2,825	4,351	6,560	10,102	4,375	6,738
Total nursery	2.34	1,038	2,429	1,064	2,490	945	2,211	724	1,694	726	1,699	805	1,884	754	1,764	784	1,835
Soil building (alfalfa, etc.)	1.07	1,418	1,517	1,443	1,544	843	902	499	534	775	829	491	525	314	336	283	303

Footnotes at end of table.

TABLE NO. 6.—*Leaching requirement for crops grown in Coachella Valley during an 8-year period, July 1965*—Continued

[Colorado River water conductivity of electrical conductivity=1.50 (parts per million=1,040, tons of salt per acre-foot=1.38)]

Crop	Leaching requirement [1] (in feet)	1957		1958		1959		1960		1961		1962		1963		1964	
		Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet	Acres [2]	Acre-feet
Crops not harvested (other)	.93	195	181	675	628	574	534	448	417	467	434	942	876	1,320	1,228	1,094	1,017
Grapefruit	1.42	6,891	9,785	7,609	10,805	8,313	11,804	6,988	9,923	7,261	10,311	7,285	10,345	7,595	10,785	7,583	10,768
Lemons and limes	1.85	415	768	403	746	343	635	806	1,491	590	1,092	633	1,171	655	1,212	666	1,232
Oranges and tangerines	1.64	802	1,315	1,406	2,306	1,556	2,552	3,028	4,963	3,656	5,996	4,045	6,634	5,268	8,640	5,354	8,781
Dates	1.13	3,686	4,165	3,766	4,256	3,678	4,156	3,431	3,877	3,493	3,947	3,200	3,616	3,248	3,670	3,776	4,267
Grapes (table)	1.26	11,124	14,016	11,080	13,961	11,592	14,606	11,791	14,857	11,806	14,876	11,724	14,772	11,754	14,810	11,874	14,961
Other fruit	1.30	87	113	30	39	17	22	16	21	25	33	21	27	13	17	65	85
Pecans	2.02	40	81	40	81	40	81	31	63	31	63	31	63	30	61	35	71
Total acres of crops grown		60,784		63,197		62,310		61,935		61,572		60,893		64,245		66,836	
Less double crop		8,455		9,605		6,783		7,602		7,582		7,450		6,472		6,783	
Total acres irrigated		52,329		53,529		55,527		54,333		53,990		53,443		57,773		60,053	
Total leaching water required in acre-feet			58,638		64,886		63,432		62,339		63,637		62,804		67,719		68,641
Leaching requirement in acre-feet per acre per year [3]			1.12		1.21		1.14		1.15		1.18		1.18		1.17		1.14

[1] See table No. 5.
[2] See districts annual crop reports.
[3] Average (8 years) leaching requirement in acre-feet per acre per year equals 1.16.

TABLE No. 7.—*Irrigation water requirements*

	Annual duty of water in acre-feet
Water requirement: Average consumptive use per acre	4. 9
Harvested acres	4. 6
Planted but not harvested acres	. 3
Salt balance requirement	2. 0
Required as shown on table No. 6	1. 2
Required for minimum nonuniformity [1]	. 8
Delivery duty to the farm	6. 9

[1] Nonuniformity factors:
A. Nonuniformity due to water application.
B. Nonuniform penetration due to soil profile.
C. Variations of Blaney-Criddle coefficients.

TABLE No. 8.—*Disposition of Colorado River water diverted at Imperial Dam*

	Acre-feet
Diverted at Imperial Dam (station 60)	1, 205, 000
Loss Imperial Dam to Pilot Knob wasteway (station 1117)	17, 000
Loss Pilot Knob to Coachella main canal (drop No. 1)	11, 000
Received at Coachella main canal (station 1906+75)	1, 177, 000
Received at check 6–A, Coachella main canal	1, 031, 000
Loss drop No. 1 to check 6–A (station 2602+74)	146, 000
Received at mile post 88.6, Coachella main canal	1, 005, 000
Loss 6–A to mile post 88.6 (station 4675+65)	26, 000
Canal losses mile post 88.6 to mile post 123.45 (station 6517+00)	12, 000
Regulatory losses, within distribution system	7, 000
Available for use within the Coachella service area	986, 000
Delivered to farm headgate for agricultural uses	653, 000
Delivered to urban lands for domestic, municipal, and industrial uses	333, 000

(Item 9(d) accompanying statement of Northcutt Ely)

STATEMENT ON BEHALF OF THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA, BY ROBERT SKINNER, GENERAL MANAGER

The Metropolitan Water District of Southern California (herein referred to as "the district") has endorsed in principle H.R. 4671 and its counterpart bills (said bills being hereinafter collectively referred to as H.R. 4671). A certified copy of resolution 6647 containing this endorsement is attached hereto as appendix 1.

The district is a public and municipal corporation, containing an area of approximately 4,500 square miles, lying on the coastal plain of southern California. The district is comprised of the corporate areas of 26 unit municipalities consisting of 13 incorporated cities, 12 municipal water districts, and 1 county water authority. These agencies are situated in the six southern California counties of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura. The city of Los Angeles is the largest of the 13 unit cities, but a total of 118 cities are included within the district, as the 12 municipal water districts and the San Diego County Water Authority contain within their boundaries many cities as well as large unincorporated areas. The district distributes its water at wholesale to its unit municipalities to supplement their water supplies. The district has a population of about 9,500,000—approximately one-half the population of

the State of California. The climate is semiarid. The annual water supply produced within the boundaries of the district, plus water currently imported by the city of Los Angeles from the Owens Valley and tributary watersheds of the Sierra Nevada, approximates 1,400,000 acre-feet. The total requirements of the area in the district greatly exceed that amount. The city of Los Angeles is commencing work on a second barrel of its aqueduct to bring an additional 150,000 acre-feet of water per year from the Owens Valley.

To provide supplemental water, the district, in 1931, entered into a water delivery contract with the United States under the Boulder Canyon Project Act. When the San Diego County Water Authority was annexed to the district in 1946, a similar contract then held by the city of San Diego was transferred to the district, so that the district now holds contracts for storage at Lake Mead and delivery at Parker Dam, 155 miles below Hoover Dam, of 1,212,000 acre-feet per year from the main stream of the Colorado River. Of this quantity, 550,000 acre-feet, by internal agreement among the California contractors, is within the 4,400,000 acre-feet per year of the water apportioned to California under article II(B)(1) of the decree in *Arizona* v. *California*, if and when sufficient main stream water is available for release to satisfy 7,500,000 acre-feet of annual consumptive use in the States of Arizona, California, and Nevada. The balance of 662,000 acre-feet is dependent on the availability of main stream water for release in excess of such 7,500,000 acre-feet, one-half of which excess is apportioned to California under article II(B)(2) of the decree.

Main stream water consumptively used within California in satisfaction of present perfected rights as defined in article I (G) and (H) of the decree, will be charged to California's apportionment of 4,400,000 acre-feet per year under II(B)(1) of the decree, including diversions of not more than 131,400 acre-feet per year of water for consumptive use for irrigation of Indian lands in California in accordance with article II(D)(1)–(5) of the decree.[1]

The district, under a California Seven-Party Priority Agreement and regulations promulgated by the Secretary of the Interior, is junior to certain earlier agricultural rights in California to the waters of the river for beneficial uses to the aggregate amount of 3,850,000 acre-feet of total contractual allocations of 5,362,000 acre-feet to all California contractors. Present uses of water in California amount to approximately 5,100,000 acre-feet a year, or substantially in excess of the 4,400,000 acre-feet apportioned to California under the decree. Thus, to whatever extent present uses of Colorado River water in California may be curtailed, the district will be the principal loser.

To convey its share of the water from the Colorado River to the coastal plain of southern California, a distance of approximately 250 miles, the district has, at its own expense, constructed the Colorado River aqueduct project, which includes canals, conduits, tunnels, pumping plants, auxiliary works, and an extensive distribution system, at a cost of approximately one-half billion dollars, and a present replacement value of over a billion dollars. To provide a diversion reservoir for the Colorado River aqueduct project, the district bore the cost of Parker Dam (except a relatively small portion, borne by the United States, representing the cost of temporary diversion tunnels) which created Lake Havasu.

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[1] EXPLANATORY NOTE.—The source of the figure of 131,400 acre-feet of diversions is the decree and the master's report in *Arizona* v. *California*, and includes: 11,340 acre-feet to the Chemehuevi Indian Reservation; 51,616 acre-feet to the Yuma Indian Reservation; 54,746 acre-feet to the portion of the Colorado River Indian Reservation land located in California; and 13,698 acre-feet to the portion of the Fort Mohave Indian Reservation land located in California.

Although the decree made a gross award of the consumptive use of Colorado River water to the Colorado River Indian Reservation for use on reservation land located in Arizona and California, the master made a finding of fact that the total amount of irrigable reservation land in California (exclusive of the land contained in a boundary dispute which was not settled by the Court) was 8,213 acres, to which the master awarded for use on this land a maximum annual diversion of Colorado River main stream water in the amount of 54,746 acre-feet.

Although the decree made a gross award to the Fort Mohave Indian Reservation of the consumptive use of Colorado River water for use on reservation land located in both Arizona and California, the master made a finding of fact that the total amount of irrigable reservation land in California was 2,119 acres to which the master awarded for use on this land a maximum annual diversion of Colorado River main stream water in the amount of 13,698 acre-feet.

from which the water for the central Arizona project is proposed by H.R. 4671 to be diverted. This would permit the use of the dam and reservoir at no cost to the central Arizona project.

There is no Federal money in the district's Colorado River aqueduct project. During the depression of the early thirties, the district sold its first construction bonds to the Reconstruction Finance Corporation at an interest rate, after refunding, of approximately 4 percent. As soon as the bond market had been restored to normal, the Reconstruction Finance Corporation sold those bonds to private investors at a profit to the United States of approximately $14 million. All construction and operating funds have been raised by the sale of bonds secured by the taxing power of the district, by taxation of property within the district, and by sale of water.

As mentioned above, the present population within the area served by the district is about 9,500,000, which is approximately one-half that of the State of California. Table 1 and figure 1 which are attached as appendixes 2 and 3, respectively, show the recorded increase in population in the district's service area from 1940 to date, and also show the predicted increase in population to year 2020. By the latter date about 22 million people are expected to be in the service area.

The water demands for domestic, municipal, industrial, and other uses to be supplied by the district are shown on table 2 and figure 2, which are attached as appendices 4 and 5, respectively. These exhibits show the actual deliveries of Colorado River water from 1941 to date within the district's service area, and also show the predicted increase in water demand to be supplied by the district up to year 2020. By that date it is estimated that the total demand to be met by the district will be about 3,600,000 acre-feet annually.

To meet the demands indicated on table 2 and figure 2 (apps. 4 and 5) referred to above, the district has two sources of supply. The first source is water from the Colorado River obtained pursuant to the district's contracts with the United States, hereinabove referred to, for the delivery to the district for consumptive use of 1,212,000 acre-feet annually from the Colorado River. The second source is water from the California State water project obtained pursuant to a contract between the district and the State of California (herein referred to as "State"), which provides for the delivery to the district of a maximum of 2 million acre-feet per year.

The annual amounts to be obtained from the State vary from year to year, building up from an estimated quantity of 250,000 acre-feet in 1971, which is the first year of service from the State water project, to a maximum of 2 million acre-feet by approximately 1990. The amount of water to be obtained annually from the Colorado River is also subject to change from year to year, depending upon the availability of water in the Colorado River to meet requirements for existing and future projects served pursuant to contractual or other commitments. For purposes of planning expansion of its distribution system for delivery of State project water, the district has assumed a certain schedule of availability of water from the Colorado River, as shown on figure 2 (app. 5), and as explained below.

It is considered that, after allowing for evaporation and seepage losses, about 1,180,000 acre-feet of Colorado River water could be delivered within the district's service area out of a total diversion from the Colorado River of 1,212,000 acre-feet annually. It is assumed that utilization of Colorado River water by the district to this extent will continue to prevail up to the time that the central Arizona project shall have become operational, which has been taken to be 1975. Between 1975 and 1990 it has been assumed that the supply of Colorado River water available to the district will be reduced uniformly each year until 1990 and thereafter only 550,000 acre-feet would be available to the district from the river for consumptive use. Of this amount about 525,000 acre-feet annually would be available for delivery within the district's service area, taking into account losses in transport and storage.

The district is currently participating with the Atomic Energy Commission and the Office of Saline Water in a study by Bechtel Corp. to determine the feasibility of constructing a sea water conversion plant capable of producing 150,000 acre-feet annually for blending with the district's Colorado River water. Such quantity would amount only to 6 percent of the quantities of imported water from the State project and the Colorado River assumed to be available to the district in 1990. This study is expected to be completed by the end of this year.

On the basis of the annual quantities of Colorado River and State project water assumed in the planning studies to be available, it is considered that the district can supply all demands within its service area up to about 1990. After 1990 additional water will be required from sources not yet identified. As shown by table 2 (app. 4) and figure 2 (app. 5) the quantities of such additional water needed to meet the demand for water to be supplied by the district are 82,930 acre-feet in 1989–90; 527,400 acre-feet in 1999–2000; 868,100 acre-feet in 2009–10; and 1,106,130 acre-feet in 2019–2020. These amounts are in addition to the water from the State water project (2 million acre-feet annually) and the Colorado River (525,000 acre-feet annually) assumed to be available for delivery by the district in its service area.

RESOLUTION 6647

Whereas there were introduced in the Congress of the United States during the second week of February 1965, bills entitled "Lower Colorado River Basin Project Act," and

Whereas among the authors of these bills are both California Senators, more than 30 California Members of the House and all three Arizona Congressmen, and

Whereas this proposed legislation would authorize construction of the central Arizona project and related works, and

Whereas it would also protect California's uses of Colorado River water up to 4.4 million acre-feet a year until new works were in operation bringing at least 2.5 million acre-feet annually into the main stream of the Colorado from outside the Colorado River Basin, and

Whereas it would also direct the Secretary of the Interior to investigate all sources from which such water could be obtained, and

Whereas this proposed legislation has as its ultimate objective the importation of vast quantities of water beyond the 2.5 million acre-feet a year from sources outside the Colorado River Basin which additional water is needed for their future development not only by California but also by Arizona and other States of the West: Now, therefore, be it

Resolved, That the board of directors of the Metropolitan Water District of Southern California does hereby endorse, in principle, the "Lower Colorado River Basin Project Act."

I hereby certify, that the foregoing is a full, true, and correct copy of a resolution adopted by the board of directors of the Metropolitan Water District of Southern California, at its meeting held Febuary 9, 1965.

NORTON L. NORRIS,
Executive Secretary,
Metropolitan Water District of Southern California.

TABLE 1.—*Record and projection of population of The Metropolitan Water District of Southern California*

Agency	1940	1945	1950	1955	1960	1965	1970
Beverly Hills	26,823	28,000	29,032	30,000	30,817	33,800	36,500
Burbank	34,337	59,500	78,577	86,700	90,155	96,000	102,000
Central Basin Metropolitan Water District				839,900	1,036,021	1,170,000	1,290,000
Compton	16,198	24,800	47,991	63,700	71,812	76,000	79,000
Foothill Metropolitan Water District				61,700	76,938	93,000	106,000
Glendale	82,582	93,000	95,700	114,700	119,442	131,200	145,000
Las Virgenes Metropolitan Water District					3,405	7,000	24,700
Long Beach	164,271	209,000	250,767	313,000	344,168	365,000	386,000
Los Angeles	1,504,277	1,728,000	1,970,358	2,169,900	2,479,015	2,700,000	2,910,000
Pasadena	81,864	90,000	104,577	112,000	116,407	121,000	131,000
Pomona Valley Metropolitan Water District			65,207	95,400	157,327	222,000	290,000
San Marino	8,175	10,200	11,700	12,900	13,658	13,900	14,200
Santa Monica	53,500	62,900	71,595	77,500	83,249	88,000	93,000
Torrance	9,950	11,900	22,241	61,400	100,991	120,000	140,000
Upper San Gabriel Valley Metropolitan Water District						575,000	670,000
West Basin Metropolitan Water District			330,224	446,450	566,100	675,000	762,000
Subtotal for metropolitan water district agencies in Los Angeles County	1,981,977	2,317,300	3,077,969	4,485,250	5,289,505	6,486,900	7,179,400
Anaheim	11,031	11,280	14,556	50,132	104,184	148,000	186,000
Coastal Metropolitan Water District		19,450	31,600	40,890	62,900	91,000	130,000
Fullerton	10,442	10,300	13,958	27,808	56,180	76,000	96,500
Orange County Metropolitan Water District				159,823	379,311	670,000	975,000
Santa Ana	31,921	36,131	45,533	60,232	100,350	140,000	171,000
Subtotal for metropolitan water district agencies in Orange County	53,394	77,161	105,647	338,885	702,925	1,125,000	1,558,500
Eastern Metropolitan Water District				22,020	32,000	52,000	82,000
Western Metropolitan Water District of Riverside County				132,000	172,400	225,000	310,000
Subtotal for metropolitan water district agencies in Riverside County				154,020	204,400	277,000	392,000
Chino Basin County Water District (in San Bernardino County)				79,000	157,120	215,000	285,000
San Diego County Water Authority (in San Diego County)			462,888	702,300	956,400	1,200,000	1,450,000
Calleguas Metropolitan Water District (in Ventura County)						220,000	393,000
Total for the Metropolitan Water District	2,035,371	2,394,461	3,646,504	5,759,455	7,310,350	9,523,900	11,257,900

TABLE 1.—*Record and projection of population of The Metropolitan Water District of Southern California*—Continued

Agency	1975	1980	1985	1990	2000	2010	2020
Beverly Hills	38,400	40,000	41,300	42,500	44,400	45,800	46,500
Burbank	106,500	111,000	114,500	118,000	123,500	128,000	131,000
Central Basin Metropolitan Water District	1,380,000	1,460,000	1,530,000	1,590,000	1,695,000	1,760,000	1,800,000
Compton	81,500	84,000	86,000	88,000	91,000	93,500	95,000
Foothill Metropolitan Water District	116,000	124,000	130,000	135,000	143,000	149,000	152,000
Glendale	153,200	160,000	165,500	170,000	178,000	184,000	188,000
Las Virgenes Metropolitan Water District	59,000	97,000	127,000	149,200	186,000	207,500	218,000
Long Beach	404,000	420,000	433,000	445,000	465,000	480,000	490,000
Los Angeles	3,100,000	3,275,000	3,430,000	3,574,000	3,806,000	3,978,000	4,092,000
Pasadena	137,000	143,000	148,000	153,000	160,500	167,000	172,000
Pomona Valley Metropolitan Water District	354,000	410,000	462,000	510,000	595,000	655,000	700,000
San Marino	14,500	14,800	15,100	15,500	16,300	17,100	18,000
Santa Monica	97,000	101,000	104,500	107,000	111,000	114,000	116,000
Torrance	151,000	160,000	167,000	173,000	183,000	190,000	195,000
Upper San Gabriel Valley Metropolitan Water District	745,000	800,000	842,000	883,000	940,000	977,000	1,000,000
West Basin Metropolitan Water District	845,000	911,000	970,000	1,021,000	1,098,000	1,149,000	1,181,000
Subtotal for metropolitan water district agencies in Los Angeles County	7,782,100	8,310,800	8,765,900	9,174,200	9,835,700	10,294,900	10,594,500
Anaheim	215,000	238,000	256,000	270,000	288,000	297,000	301,000
Coastal Metropolitan Water District	170,000	210,000	248,000	280,000	331,000	366,000	385,000
Fullerton	116,000	133,000	149,000	163,000	187,000	202,000	210,000
Orange County Metropolitan Water District	1,240,000	1,475,000	1,680,000	1,860,000	2,150,000	2,350,000	2,475,000
Santa Ana	195,000	214,000	228,000	241,000	256,000	264,000	267,000
Subtotal for metropolitan water district agencies in Orange County	1,936,000	2,270,000	2,561,000	2,814,000	3,212,000	3,479,000	3,638,000
Eastern Metropolitan Water District	134,000	195,000	270,000	350,000	500,000	621,000	700,000
Western Metropolitan Water District of Riverside County	412,000	520,000	640,000	750,000	960,000	1,130,000	1,250,000
Subtotal for metropolitan water district agencies in Riverside County	546,000	715,000	910,000	1,100,000	1,460,000	1,751,000	1,950,000
Chino Basin Metropolitan Water District (in San Bernardino County)	365,000	455,000	545,000	640,000	800,000	925,000	1,010,000
San Diego County Water Authority (in San Diego County)	1,680,000	1,900,000	2,110,000	2,300,000	2,650,000	2,950,000	3,175,000
Calleguas Metropolitan Water District (in Ventura County)	570,000	737,000	900,000	1,053,000	1,320,000	1,505,000	1,610,000
Total for the Metropolitan Water District	12,879,100	14,387,800	15,791,900	17,081,200	19,277,700	20,904,900	21,977,500

Notes:

1. Historical population figures are shown for agencies only after agency annexed to Metropolitan.

2. Projected population figures include population of areas on southern California coastal plain not within any agency having a contract for service from the State Water Project, and which are expected to annex to Metropolitan in the future.

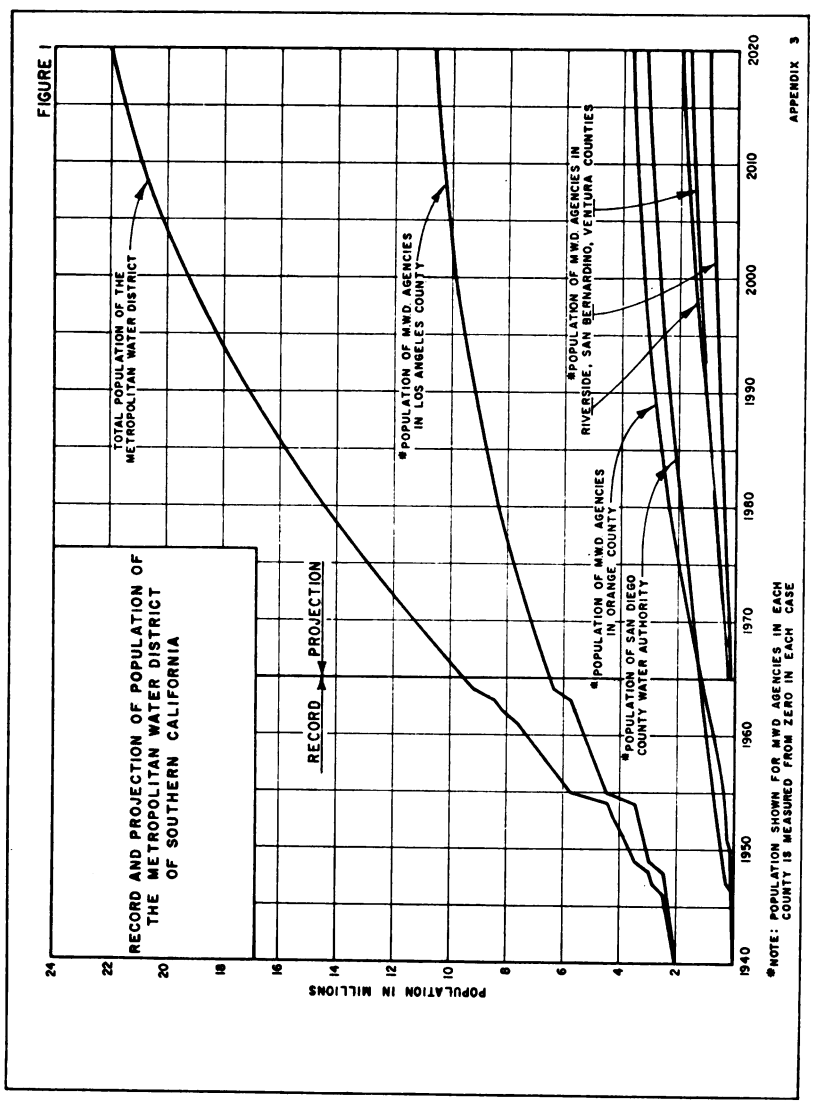


TABLE 2.—*Record and projection of demand for water to be supplied by The Metropolitan Water District of Southern California*[1]

[In acre-feet]

Agency	1941–42	1944–45	1949–50	1954–55	1959–60	1964–65	1969–70
Beverly Hills	1,669	2,582	514	1,517	3,344	6,382	6,700
Burbank	181	747	371	2,174	4,634	7,107	9,600
Central Basin Metropolitan Water District				465	8,821	50,352	84,000
Compton	762	330	18	22	496	2,770	3,640
Foothill Metropolitan Water District				1,838	8,875	9,625	13,100
Glendale	0	0	33	1,488	1,343	2,354	5,100
Las Virgenes Metropolitan Water District						1,621	4,800
Long Beach	0	4,943	14,170	15,311	22,209	32,368	34,900
Los Angeles	0	319	12,648	22,679	88,475	80,187	43,600
Pasadena	0	4,427	18,496	19,426	19,590	19,121	26,000
Pomona Valley Metropolitan Water District				5,693	6,918	13,336	37,000
San Marino	0	0	0	0	0	2	300
Santa Monica	6,221	8,807	10,465	11,325	11,506	10,504	13,050
Torrance	0	36	1,722	7,583	13,291	16,449	9,300
Upper San Gabriel Valley Metropolitan Water District						0	11,000
West Basin Metropolitan Water District			1,558	23,609	66,893	95,453	77,500
Subtotal for metropolitan water district agencies in Los Angeles County exclusive of groundwater recharge	8,833	22,191	59,995	113,130	256,395	347,031	379,590
Groundwater recharge:							
Central Basin Metropolitan Water District				54,796	72,469	148,492	120,000
Upper San Gabriel Valley Metropolitan Water District						10,000	33,000
West Basin Metropolitan Water District			0	2,990	3,715	25,652	80,000
Subtotal for metropolitan water district agencies in Los Angeles County inclusive of groundwater recharge	8,833	22,191	59,995	170,916	332,579	531,175	612,590
Anaheim	0	1,905	2,853	4,552	4,593	13,260	14,400
Coastal Metropolitan Water District	0	1,203	3,302	6,237	12,168	22,940	29,300

Fullerton	540	489	1,551	3,542	7,935	10,592	11,100
Orange County Metropolitan Water District				2,389	15,958	72,609	87,500
Santa Ana	0	4,896	5,236	6,951	7,396	7,104	13,400
Subtotal for metropolitan water district agencies in Orange County exclusive of groundwater recharge	540	8,403	12,942	23,651	48,050	126,505	155,700
Groundwater recharge: Orange County Metropolitan Water District				67,789	165,935	132,271	200,000
Subtotal for metropolitan water district agencies in Orange County inclusive of groundwater recharge	540	8,403	12,942	91,440	213,985	264,651	355,700
Eastern Metropolitan Water District				11,938	29,198	[2] 33,141	43,000
Western Metropolitan Water District of Riverside County					7,920	20,996	37,300
Subtotal for metropolitan water district agencies in Riverside County				11,938	37,118	54,137	80,300
Chino Basin Metropolitan Water District (in San Bernardino County)				4,821	3,568	[3] 18,993	28,100
San Diego County Water Authority (in San Diego County)			69,308	103,151	142,645	241,624	282,000
Calleguas Metropolitan Water District (in Ventura County)						11,887	62,000
Subtotal for metropolitan water district agencies exclusive of groundwater recharge	9,373	30,594	142,245	256,691	487,776	796,608	987,690
Groundwater recharge				125,575	242,119	319,984	433,000
Miscellaneous sales and deliveries	71	2,014	23,565	3,080	5,022	5,256	5,000
Total for metropolitan water district inclusive of groundwater recharge	9,444	32,310	165,810	385,946	734,917	1,121,848	1,425,690

[1] Historical water demand figures, including zeros, are shown for agencies only after agency annexed to Metropolitan.

Projected water demand figures include demand of areas on southern California coastal plain not within any agency having a contract for service from the State water project, and which are expected to annex to Metropolitan in the future.

[2] The entry for Eastern Metropolitan Water District in fiscal year 1964-65 includes 567 acre-feet of water used for groundwater recharge.

[3] The entry for Chino in fiscal year 1964-65 includes 3,002 acre-feet of water used for groundwater recharge.

TABLE 2.—*Record and projection of demand for water to be supplied by The Metropolitan Water District of Southern California*—Continued

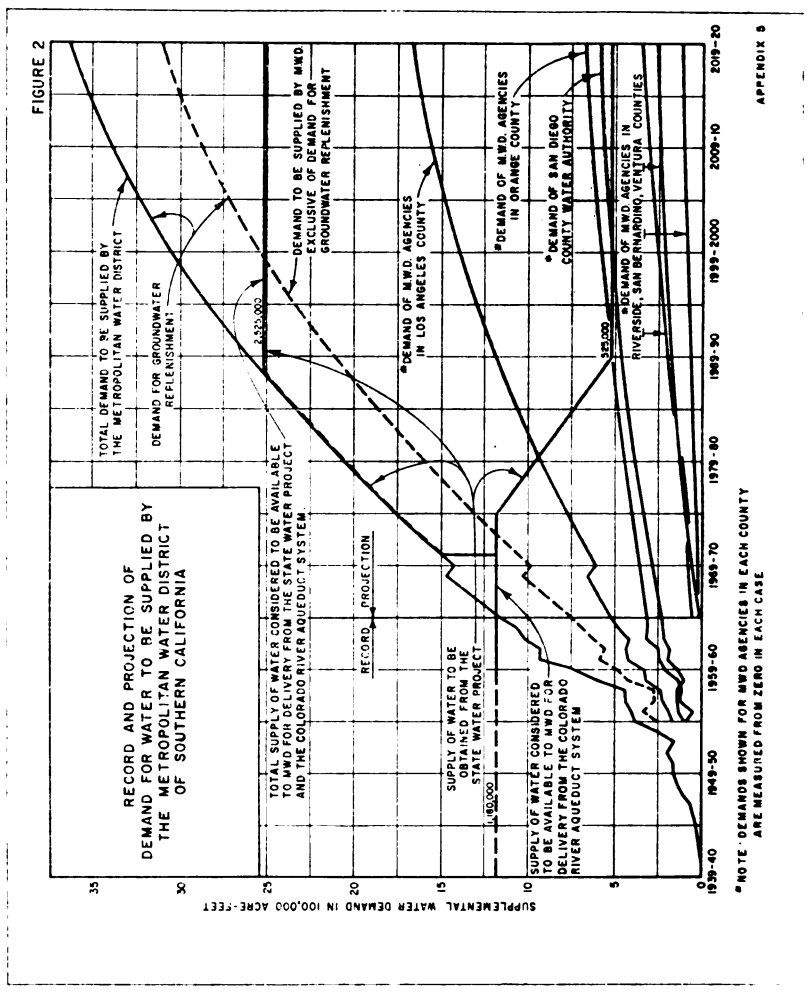
[In acre-feet]

Agency	1974–75	1979–80	1984–85	1989–90	1999–2000	2009–10	2019–20
Beverly Hills	8,100	9,300	10,200	11,050	12,400	13,400	14,000
Burbank	11,800	13,800	15,600	17,200	19,500	21,400	22,500
Central Basin Metropolitan Water District	110,000	135,000	157,000	176,000	207,000	228,000	242,000
Compton	4,400	5,100	5,650	6,140	6,920	7,460	7,780
Foothill Metropolitan Water District	15,300	17,300	19,300	20,850	23,400	25,400	26,700
Glendale	6,550	8,000	9,500	10,800	13,200	15,100	16,600
Las Virgenes Metropolitan Water District	13,100	20,800	27,700	33,900	44,000	50,900	54,900
Long Beach	39,000	43,000	46,500	49,700	54,500	58,300	60,700
Los Angeles	94,000	136,800	180,000	221,800	288,900	339,000	372,400
Pasadena	29,100	32,000	34,300	36,700	40,300	42,800	44,500
Pomona Valley Metropolitan Water District	55,000	73,400	92,000	110,000	144,500	178,500	211,000
San Marino	620	910	1,200	1,470	2,000	2,470	2,950
Santa Monica	14,250	15,300	16,250	16,950	18,130	19,070	19,700
Torrance	11,700	13,800	15,550	17,100	19,600	21,300	22,500
Upper San Gabriel Valley Metropolitan Water District	15,625	20,250	24,500	28,125	33,750	37,500	40,000
West Basin Metropolitan Water District	99,000	117,560	132,500	146,870	168,150	182,900	191,100
Subtotal for metropolitan water district agencies in Los Angeles County exclusive of groundwater recharge	527,545	662,320	787,750	904,655	1,096,250	1,243,500	1,349,330
Ground water recharge:							
Central Basin Metropolitan Water District	120,000	120,000	120,000	120,000	120,000	120,000	120,000
Upper San Gabriel Valley Metropolitan Water District	46,875	60,750	73,500	84,375	101,250	112,500	120,000
West Basin Metropolitan Water District	80,000	80,000	80,000	80,000	80,000	80,000	80,000
Subtotal for metropolitan water district agencies in Los Angeles County inclusive of groundwater recharge	774,420	923,070	1,061,250	1,189,030	1,397,500	1,556,000	1,669,330
Anaheim	17,800	20,800	23,400	25,500	28,600	30,900	32,400
Coastal Metropolitan Water District	39,500	49,800	59,000	67,900	82,300	94,000	102,000

TABLE 2.—*Record and projection of demand for water to be supplied by The Metropolitan Water District of Southern California*—Con.

[In acre-feet]

Agency	1974–75	1979–80	1984–85	1989–90	1999–2000	2009–10	2019–20
Fullerton	13,500	15,900	18,300	20,400	24,100	26,300	27,800
Orange County Metropolitan Water District	114,000	136,000	160,000	181,100	221,000	259,700	288,000
Santa Ana	15,600	17,500	19,000	20,500	22,500	24,000	25,000
Subtotal for metropolitan water district agencies in Orange County exclusive of groundwater recharge	200,400	240,000	279,700	315,400	378,500	434,900	475,200
Groundwater recharge: Orange County Metropolitan Water District	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Subtotal for metropolitan water district agencies in Orange County inclusive of groundwater recharge	400,400	440,000	479,700	515,400	578,500	634,900	675,200
Eastern Metropolitan Water District	48,000	57,950	72,200	86,900	109,400	125,300	133,600
Western Metropolitan Water District of Riverside County	54,500	71,900	89,500	107,100	141,500	170,000	194,500
Subtotal for metropolitan water district agencies in Riverside County	102,500	129,850	161,700	194,000	250,900	295,300	328,100
Chino Basin Metropolitan Water District (in San Bernardino County)	38,000	47,100	59,000	69,500	88,500	102,900	113,500
San Diego County Water Authority (in San Diego County)	335,000	381,000	425,000	461,000	519,000	560,000	586,000
Calleguas Metropolitan Water District (in Ventura County)	108,000	132,000	152,000	174,000	213,000	239,000	254,000
Subtotal for metropolitan water district agencies exclusive of groundwater recharge	1,311,445	1,592,270	1,865,150	2,118,555	2,546,150	2,875,600	3,106,130
Groundwater recharge	446,875	460,750	473,500	484,375	501,250	512,500	520,000
Miscellaneous sales and deliveries	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Total for the metropolitan water district inclusive of groundwater recharge	1,763,320	2,058,020	2,343,650	2,607,930	3,052,400	3,393,100	3,631,130



Mr. ROGERS. Let's have order in the committee room because we are limited on time.

Our next witness is Mr. Hennen Forman, executive vice president of the Arizona Public Service Co., representing both the public and private utilities.

Under the unanimous-consent request, Mr. Forman is recognized for 17 minutes.

STATEMENT BY A. H. FORMAN, EXECUTIVE VICE PRESIDENT, ARIZONA PUBLIC SERVICE CO.

Mr. FORMAN. Mr. Chairman, my name is A. H. Forman. I have been in the utility business since 1927, with experience in the West since 1949. I am executive vice president and a member of the board of directors of Arizona Public Service Co. Arizona Public Service Co. is an investor-owned utility with more than 40,000 stockholders scattered throughout the United States. We distribute electricity and/or natural gas to some 425,000 customers in 11 of Arizona's 14 counties. Like other citizens of the State of Arizona, I am interested in the authorization of the Lower Colorado River Basin project and am privileged to appear before your committee to discuss the ability of western electric utility markets to absorb additional quantities of peaking power which could be created by the installation of additional hydroelectric facilities on the Colorado River. My estimates are aimed at the ability to absorb 1,845,000 kilowatts of salable power from Bridge and Marble Canyon Dams at approximately 35 percent load factor. The planned for installed capacity at these plants of 1,500,000 kilowatts at Bridge and 600,000 kilowatts at Marble has been reduced by 255,000 kilowatts, which will be used for central Arizona project pumping, in order to arrive at the salable power. These quantities have been furnished me by the U.S. Bureau of Reclamation and my estimates indicate that the available market can easily absorb these quantities by the time the dams are constructed.

To support this statement, I would refer you first to table A "Estimated Loads, Reserves, and Scheduled Installed Capacities" for the years 1966 through 1975, for the Federal Power Commission's market areas Nos. 47 and 48. Area 47 covers most of southern California and parts of Nevada. Area 48 covers the State of Arizona plus a small area in the east part of southern California, southeast Nevada and an extremely small part of New Mexico. These two areas, along with area 46, which covers most of northern California and the northwest part of Nevada, comprise Federal Power Commission's power supply region VIII. To arrive at the estimates of loads with reserves shown in the first column, I have taken the published figures of the Federal Power Commission in "Electric Power Statistics" for the year 1964. These were summarized by months to obtain the maximum kilowatts for each month and the maximum for the year. From this base, the loads for subsequent years were increased by the annual percentage of growth shown in the Federal Power Commission's national power survey for region VIII, except that the growth percentages were adjusted upward slightly due to the fact that supply areas 47 and 48 have historically had a somewhat larger growth rate than area 46. The loads for each year were then reduced by 5 percent as an allowance for within-month diversity.

To this estimate of loads has been added an allowance of 15 percent for required reserves. This percentage is that estimated in the Federal Power Commission's 1964 national power survey as a reasonable amount for systems fully coordinated over wide areas.

In the second column of table A, are estimates for future installed capacities, by years, for market areas 47 and 48. For this purpose I have used the existing and contemplated additions of capacity as shown in Federal Power Commission's statistics plus certain other scheduled additions. In this latter category there is included 240 megawatts of Colorado River storage project power to be imported into the area, 1,500 megawatts to be installed by six members of West associates in the Arizona Public Service Co.'s Four Corners powerplant and 1,500 megatts to be installed by Southern California Edison Co., perhaps with some partners in its projected Mohave plant in Nevada. In addition, the capacity figures take into account the capacity which may be brought into the area by the projected Pacific Northwest-Southwest interties.

The third column of table A shows that in addition to the presently scheduled capacity installations, there will be needed by 1975, 4½ million additional kilowatts.

So far, these estimates are aimed only at total additional capacity requirements. If you will refer to table A–1, "Estimated Capacity Requirements in Megawatts" you will see in columns 1, 2, and 3 the same estimate of future capacity, but itemized as to steam and hydro installations. In column 4 there is shown the same forecast of loads as in table A, but in this instance without a reserve allowance. Columns 5 and 6 itemize these forecasted loads as to baseload and peaking load. Baseload is taken as 65 percent of total load with peaking being the remaining 35 percent. To arrive at these percentages we have constructed, on a conservative basis, an estimated load duration curve for the combined areas, taking into account maximum and minimum loads and the load factor of the region. From this curve, it is estimated that 45 percent of the load may be carried by peaking sources with 31 percent load factor. Similarly, 40 percent of the load could be carried with 28 percent load factor peaking, 35 percent with 25 percent load factor peaking, and 30 percent with 21 percent load factor peaking. In view of the estimated load factors from Bridge Canyon and Marble Canyon Dams, it is felt that an assumption of 35 percent for peaking is conservatively low.

Referring, again, to table A–1, columns 7, 8, and 9 show the differences between columns 1, 2, and 3, and columns 4, 5, and 6. Looking at the last entries on these columns you will note that for the year 1975, there is an indicated deficiency of 880 megawatts total, that the steam sources exceed the baseload requirements by 2¼ million kilowatts and that the hydro installations fall short of meeting the peaking requirements by over 3,100,000 kilowatts. In each instance the requirement for reserves is ignored. This requirement totaling over 3,600,000 kilowatts in 1975 is shown column 10.

From these figures, I conclude that by 1975 the area could absorb over 3 million kilowatts of peaking and probably, in view of the need for reserves, could absorb as hydropower something like one-third of the indicated reserve requirements or a total of about 4,300,000 hydro peaking kilowatts.

The information shown on table A–1, is also shown graphically on chart 1 for the year 1975. In this, you will note the relationship between the peaking requirements of 8.5 million kilowatts as shown in the first stack and combined peaking sources of 5.3 million kilowatts without Bridge and Marble Canyon dams as shown in the second stack. The third stack shows that, if Bridge Canyon and Marble Canyon and Marble Canyon dams are included in capacity additions in the amount of 1.8 million kilowatts, there is still a peaking deficiency of 1.4 million kilowatts.

The foregoing indicates that there would be a potential market for peaking power from Bridge Canyon and Marble Canyon dams, provided there are no restrictive marketing arrangements which would preclude the private utilities from purchasing such peaking power on long-term contracts. In addition, that by these figures it should be pointed out loads will continue to grow, thus making the requirements for peaking progressively larger in future years.

The estimates given so far go only to the matter of the ability the utility loads in areas 47 and 48 to absorb peaking power. This leaves open the matter of the economics of supplying such power. The U.S. Bureau of Reclamation has given me an estimate of the cost of supplying peaking power from Bridge and Marble Canyon dams. This estimate is $10 per kilowatt-year plus 3 mills per kilowatt-hour. Naturally, I cannot speak for all of the distributing agencies in this area. Each, of course, would arrange for the most economical way of supplying its own peak requirements. However, I have made an estimate of the cost of supplying peaking capacity by use of the moderate large size unit built especially for this purpose. Two such estimates have been made, one being an addition to the existing plant and the other for a separate location. In each instance, it is indicated that the estimated rate for peaking power from these dams would be competitive and, therefore, it seems that the estimated price would not be a barrier to marketing such power.

Consequently, assuming no market restrictions, I believe that the peaking power contemplated for Bridge Canyon Dam and Marble Canyon Dam can be marketed at the price presently estimated.

(The attachments referred to, table A, table A–1, and chart 1, follow:)

52–850—65——41

TABLE A.—*Estimated loads, reserves, and scheduled installed capacities*

[FPC base data, market areas 47 and 48 (megawatts)]

	Peakloads [1] (with reserves) [2]	Installed capacities [3]	Additional requirements
1966	13,981	16,905	
1967	15,197	18,135	
1968	16,519	19,485	
1969	17,955	20,085	
1970	19,518	22,560	
1971	20,950	22,560	
1972	22,488	23,260	
1973	24,139	23,260	879
1974	25,911	23,260	2,651
1975	27,813	23,305	4,508

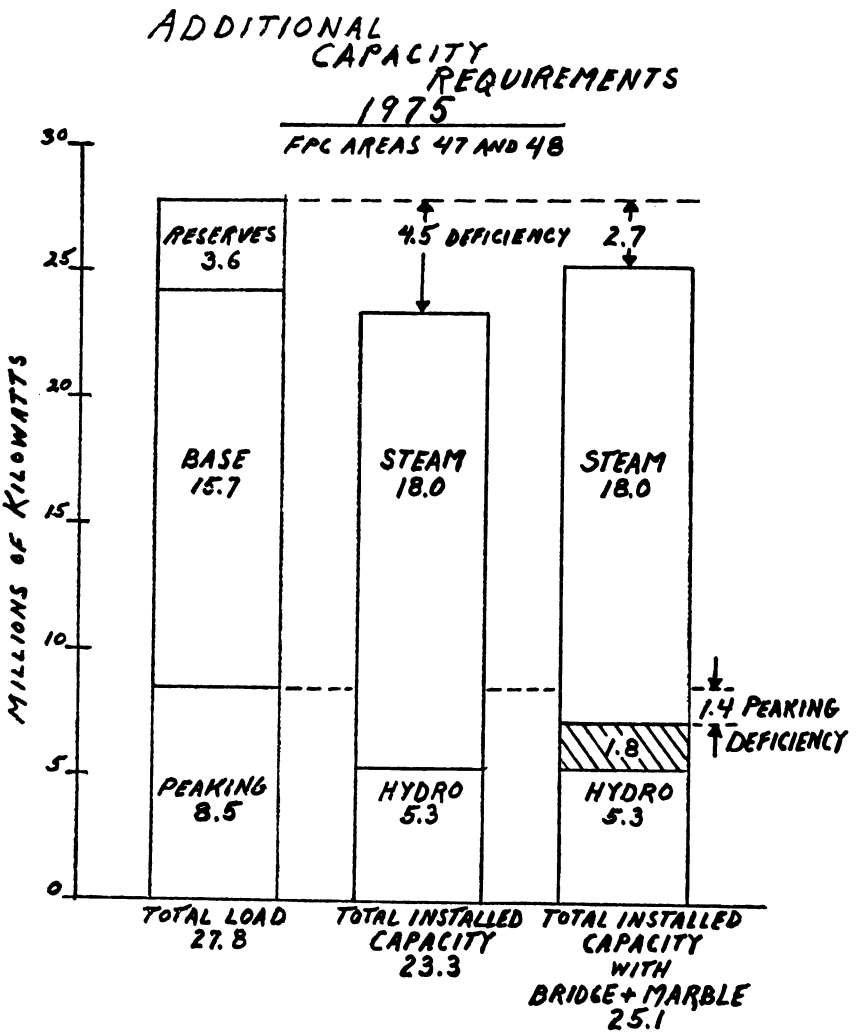
[1] With 5 percent diversity reduction to account for noncoincident peak summation and time zone differentials.
[2] Reserves of 15 percent included.
[3] Includes planned capacity additions through 1968 as indicated in FPC reports.

TABLE A–1.—*FPC market areas 47 and 48*

[Estimated capacity requirements in megawatts]

Year	Capacity installed plus scheduled additions			Load			Deficiencies ignoring reserves			Reserves	Deficient capacity
	Total	Steam	Hydro	Total	Base	Peaking	Total	Base	Peaking		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1966	16,905	13,843	3,062	12,157	7,902	4,255	(4,748)	(5,941)	1,193	1,824	(2,924)
1967	18,135	15,073	3,062	13,215	8,590	4,625	(4,920)	(6,483)	1,563	1,982	(2,938)
1968	19,485	15,073	4,412	14,364	9,337	5,027	(5,121)	(5,736)	615	2,155	(2,966)
1969	20,085	15,673	4,412	15,613	10,148	5,465	(4,472)	(5,525)	1,053	2,342	(2,130)
1970	22,560	17,773	4,787	16,972	11,032	5,940	(5,588)	(6,741)	1,153	2,546	(3,042)
1971	22,560	17,773	4,787	18,217	11,841	6,376	(4,343)	(5,932)	1,589	2,733	(1,610)
1972	23,260	17,973	5,287	19,555	12,711	6,844	(3,705)	(5,262)	1,557	2,933	(772)
1973	23,260	17,973	5,287	20,990	13,644	7,346	(2,270)	(4,329)	2,059	3,149	879
1974	23,260	17,973	5,287	22,531	14,645	7,886	(729)	(3,328)	2,599	3,380	2,651
1975	23,305	17,973	5,332	24,185	15,720	8,465	880	(2,253)	3,133	3,628	4,508

Col. (5). 65 percent of load.
Col. (6). 35 percent of load.
Col. (7). Col. (4) minus col. (1).
Col. (8). Col. (5) minus col. (2).
Col. (9). Col. (6) minus col. (3).
Col. (10). 15 percent of load.
Col. (11). Col. (7) plus col. (10.)
( ) Denotes negative number.



Mr. ROGERS. Thank you, Mr. Forman.

Each member will be recognized for approximately 1 minute.

Mr. ASPINALL. I have no questions.

Mr. ROGERS. Mr. Hosmer?

Mr. HOSMER. I have no questions.

Mr. ROGERS. Mr. Udall?

Mr. UDALL. Thank you, Mr. Chairman.

I have two unanimous-consent requests. A recent speech of June 29 by Commissioner Dominy dealing with this same subject given to the Rocky Mountain Coal Mining Institute indicates the important effects of this project on the coal mining industry development in the area. I ask unanimous consent.

Mr. ASPINALL. Reserving the right to object—is it written with the idea of supporting the project or written with the idea of opposing, they are—what is the purpose of this?

Mr. UDALL. I do not know the purpose for which it was given. I offer it for the purpose of supporting the testimony and showing the coal people have a stake in support of the project and can support it without being damaged by it.

Mr. ASPINALL. Mr. Chairman, I will accept it for what it is worth.

Mr. ROGERS. Is there objection? If not, the document will be received.

(The document referred to follows:)

[U.S. Department of the Interior News Release]

TALK BY COMMISSIONER OF RECLAMATION FLOYD E. DOMINY, U.S. DEPARTMENT OF THE INTERIOR, BEFORE THE ROCKY MOUNTAIN COAL MINING INSTITUTE AT ESTES PARK, COLO., TUESDAY, JUNE 29, 1965

FUTURE POWER REQUIREMENTS OF WESTERN STATES, BUREAU OF RECLAMATION CONCEPT

It was my honor, less than 2 months ago, to address the 10th annual minerals symposium of the American Institute of Mining, Metallurgical & Petroleum Engineers, at which I discussed hydropower's contribution to our energy resources.

I am equally honored today to participate in this symposium on future power requirements. I want to utilize the occasion to get down to some of the specifics of a developing pattern of hydrothermal compatibility which will have a far-reaching and beneficial effect on use of the vast coal deposits of the Rocky Mountain States in which you have a particular interest.

The problems that we both face are wrapped up in the growth and expansion of these Western States and the contribution of this growth to the Nation's prosperity and that of its individuals. My interest, quite frankly—my concern, really—is how best to make reclamation's future contribute to this western growth—and ultimately to the Nation's.

Your interest? Frankly and honestly it should be how you can best contribute to—and become a part of—western expansion, toward the laudable goal of mining and selling more coal.

At the risk of oversimplification, I would say this: From your standpoint, it seems to me your future reduces to one inescapable problem.

The Rocky Mountain States have a population density of less than 10 people per square mile. This figure is about equivalent to the average density of the entire United States 100 years ago. As a matter of interest, we might compare this with a present national average density of over 50 people per square mile, a New England and eastern seaboard average of over 350, and my own home base—the District of Columbia—a major metropolitan area, a crushing 12,500 people per square mile.

The question then is, What do you do with better than half a trillion tons of bituminous and subbituminous coal, a potential producer of energy which underlies an area with so few people? Where are your markets? What major expansion of use?

Defining a problem is one thing; solving it is something else. But there is an answer, I believe.

More customers and more uses, plus more use per customer, make the curve for the consumption of electrical energy in the West steeper than that for population growth. Where are your markets? The Federal Power Commission survey points out that the 11 Western States will have a thermal generation requirement in 1970 of 1,400 trillion B.t.u.'s of energy; and in 1980, 3,400 trillion B.t.u.'s. In dollars of business opportunities created at, say, 15 cents per million B.t.u., this amounts to better than $200 million in 1970 (only 5 years from now) and over $500 million a year by 1980.

I needn't tell you what this kind of sales growth would mean to the Rocky Mountain coal industry. Now where does the Federal Government, and particularly the Bureau of Reclamation, with millions of kilowatts of hydro capacity in our multipurpose dams in the Rocky Mountain States, fit into the picture?

Prophecy is a hazardous business but some aspects of the future role of hydroelectric power seem reasonably certain. First, it seems quite likely that the declining role of hydroelectric power in meeting base load requirements for power and energy supplied by electric systems in the United States will continue.

Thirty years ago, hydroelectric plants provided about 30 percent of the generating capacity and 40 percent of the energy supplied by electric systems in the United States. At present, hydroelectric plants provide only 19 percent of the capacity. The Federal Power Commission forecasts that by 1980, conventional hydroelectric projects will supply about 15 percent of the capacity and 13 percent of the energy. This figure excludes pump storage plants which I do not describe as conventional because they are constructed specifically to provide peaking capacity.

On this demand for hydroelectric peaking capacity and the skyrocketing power needs of the West hangs a rather confident prediction on my part that the immense coalfields of the Rocky Mountain States will be utilized in the future as never before.

The fact that public utilities the country over are turning more and more to hydropower for peaking capacity and to thermal generation for load factor power indicates to me that the traditional competition between thermal and hydropower is at an end. From being competitors, as in past decades, they are now becoming complementary to each other. This shift is particularly true in the West where there has heretofore been a plentiful supply of hydropower to carry firm loads.

The supply of water and the availability of hydroelectric sites for future development is limited. The demand for power and the continuing pressure for reduction of cost is unlimited.

The only reasonable and foreseeable answer to demand is increased thermal capacity using fossil fuels of which coal is certainly the most plentiful and readily available here in the Rocky Mountain States. The only answer to reduced kilowatt-hour costs is greater efficiency which can be achieved by larger generating units at mine mouth plants operating at close to 100-percent load factor as practicable.

But such high load factor operations are possible only when there is peaking capacity readily available to handle the demand when coffeepots go on in the morning and television sets are warmed up at night. And that, I anticipate, will be the principal future role of the Bureau of Reclamation in power operations in the Western States in years to come.

Developments are already heading in this direction. You can point with justifiable pride to your part in the Hayden station here in Colorado, and the substantial enhancement which this thermal plant contributes to the Colorado River storage project. Likewise, the existence of the Colorado River storage project makes the moving of Hayden power to its markets a reality, and supplies peaking capacity for that plant as well.

Of course, it is not as simple as it sounds. Our fundamental and primary responsibility is to meet the consumptive water needs of the West for urban, industrial and agricultural purposes. Thus, the effects of hydro peaking operations, with the accompanying withholding and high discharges of water for short periods of time, must be carefully studied to be certain that they are consistent with the overall objectives of multipurpose river development.

I call this to your attention to emphasize that only plant capacity surplus to meeting project needs for pumping purposes is available and then only under circumstances where preference is given to cooperatives and to municipal and Federal utilities and purposes.

This means that the flow of water for power generation in varying degree for specific plants is controlled by the need to supply municipal and industrial needs for water pumping and for flood control and navigation.

An exception to this statement might occur in the event that thermal power becomes cheaper than hydro for firm loads as it gives promise of becoming in some areas. In such instances, the preference customers might well turn to sources of thermal supply in which case such capacity would be available for peaking purposes.

Another possibility is that which we have worked out with the Pacific Gas & Electric Co. in California. Here the company in essence supplies load factor power to meet the demands for preference customers in exchange for peaking power from our hydroelectric plants in the Central Valley of California. It has been a mutually advantageous arrangement for the Pacific Gas & Electric Co.

for the Government and for the preference customers. I see no reason why more arrangements of this kind cannot be worked out in other areas including here in the Rocky Mountain States.

From our standpoint the gradual shift from base to peak load operations and market is advocated principally for the following reasons:

First, the financial integrity of existing plants may be in jeopardy in future years because of the competitive inroads of thermal power.

Second, against this competition new hydroelectric projects, which inevitably will be more costly, may not be financially feasible unless power and energy are sold primarily for peaking purposes.

Third, as time passes, fewer and fewer of our hydroelectric installations will have sufficient water for total load factor operations to supply current and future needs. This, of course, will result from increased upstream consumptive water usage and is taken into consideration in our payout schedules but it does not help in fulfilling the power needs of the West.

The first of these reasons has particular applicability to the Rocky Mountain region. Electric power and energy from thermal sources is becoming available in ever-greater quantities in the range of 5 to 7 mills at the comparable load factor to which we are pricing firm power from the upper Colorado River system at 6 mills.

I have no doubt that the thermal rate will be reduced somewhat more in the future if, and this is a very big if, peaking capacity can be found in large quantities. As I understand it, utilities and coal companies now have on the planning boards proposals for thermal generation plants with a total of around 10 million kilowatts of capacity.

These are plants with tremendous generators, some of them 750,000 kilowatts or more capacity. Those in the Colorado Basin contemplate coal firing. These generators may be able to bring the cost of energy down to 3 or 4 mills or less if they can achieve a high load factor operation. This is possible only if they have peaking capacity which can most logically come from hydropower operations.

There is another factor which is vital to these operations. This is the availability of high-capacity, long-distance transmission networks which are readily available as common carriers to serve the needs of all systems. Your mine mouth plants will be necessarily located in relatively isolated areas far from the load centers which, incidentally, will reduce the air pollution problem. Some of them will be fairly close to the hydroplants they will rely on for peaking purposes although this is not important if efficient high-capacity transmission systems are available.

The Federal Government has the nucleus of such a network in the several systems of the Bureau of Reclamation and that of the Bonneville Power Administration in the Pacific Northwest. Soon most of these systems will be tied together through the Pacific Northwest-Pacific Southwest intertie which has been authorized for joint Federal-utility construction and on which work is now getting underway.

This intertie will include two direct-current 750-kilovolt systems, one connecting the Columbia River system with Los Angeles and the other, in turn, connecting the Columbia River system with the Hoover-Parker-Davis system at Hoover Dam. This system, in turn, connects with the upper Colorado River system, which connects with the Missouri River Basin system. I expect that there will soon be a heavy-duty direct connection between the Columbia River system and the Missouri River Basin system.

Thus, while heavy reliance will undoubtedly be placed on Colorado River hydroplants for peaking capacity for the existing and proposed thermal plants in the Rocky Mountain States, additional capacity will be available from the Pacific Northwest and the Missouri River Basin plants.

The joining together of a wide spectrum of power agencies under the sponsorship of WEST to construct large coal plants should contribute another step toward the happy marriage of steam and hydro. During the announcement of the enlarged WEST membership at a meeting in Phoenix recently, which I was privileged to attend with Secretary of the Interior Udall, the Secretary voiced fervent hopes that coal and hydro would be integrated to the benefit of all.

The construction of coal units at Four-Corners by Arizona Public Service Co., the proposed additional large units there and at Bullhead City by Southern California Edison, and the proposed major installation at Utah's Kaiparowits coalfield close by the waters of Lake Powell * * * all represent substantial

contributions to the thermal side of this combined picture. The opportunity is now upon you to achieve the available efficiency of use by blending these great power sources with appropriate peaking hydro installations, existing and proposed.

As Secretary Udall told the meeting, if we plan and work together on a regional basis, we can achieve for consumers the economics of modern, large-scale technology without sacrificing the independence and integrity of the many electric utility systems, public and private, which serve the region.

You too are interested because many of these utilities are the principal customers for Rocky Mountain coal. This expansion and prosperity means your expansion and prosperity.

It is important to us too because we rely heavily on revenues from our hydropower operations to finance the essential work of water resource development. Without such expansion of the usable water supply, the West would soon be bumping up against a hard and fast ceiling on its economic growth.

And we all are interested in proceeding in a voluntary and mutually advantageous manner because the independence and integrity of which we speak are basic to our democratic form of government and American way of life.

Thus, once again, we come to a common objective for the common good which can be reached only by understanding each other's needs and capabilities and working cooperatively to a common end.

Mr. UDALL. Mr. Chairman, I want to thank Mr. Forman for the very excellent demonstration and also point out that he has two of the highest priced and most capable propmen that ever appeared before this committee.

The gentleman on the left—and this illustrates the unity in Arizona—the gentleman on the left is Roger Ernst who was Under Secretary of Interior in the Eisenhower administration and now an official of Arizona Public Service Company and the other is Les Alexander, assistant general manager of the Salt River project. These men have been of great help to me in preparing for these hearings.

Mr. ASPINALL. Once again, you have pirated your people from the upper basin.

Mr. UDALL. I hope the chairman will forgive me and forgive Arizona.

Mr. ROGERS. Are you through, Mr. Udall?

Mr. UDALL. Yes.

Mr. ROGERS. Mr. Wyatt?

Mr. WYATT. Mr. Forman, I would like to thank you for an excellent statement, clear and precise. Having known him previously, I would like to welcome Mr. Ernst here and thank you.

Mr. ROGERS. Mr. Hansen?

Mr. HANSEN. Thank you, Mr. Chairman. I would also like to say this is very informative and since we are recognizing people, I would like to present a former Congressman from Idaho who used to sit on this committee, Mr. John Sanborn.

Mr. ROGERS. Mr. Sanborn, glad to have you here. Mr. Reinecke?

Mr. REINECKE. I am concerned about the future of peaking power. It is apparent that both Bridge and Marble, if constructed will not supply the deficit which is anticipated. Where will we get our peaking power after there are no more dams to be built?

Mr. FORMAN. That is something that worries me as an operator a great deal. I say that because the program that we had embarked upon so far recently has been the installation of remote baseload plants and those to be economical should be operated at extremely high load factor, which brings into focus the problem you mention.

There are a number of things that can be done. There are some pump storage projects perhaps, in the area. There are a variety of fuel-burning plants that can be built.

There are fairly large sized gas or other fuel-fired plants built expressly for peaking. There is some sentiment for the use of diesel. There is some sentiment for the use of airplane engines—gas turbines.

Mr. REINECKE. How much difference is there between the hydro-peaking power and these other units that you are contemplating investigating at the present time?

Mr. FORMAN. The estimate that I referred to—they are compared to the quoted rate of $10 plus 3 mills. I found in one estimate about $9.47 plus almost 4 mills which would be higher at an extremely low loading factor.

Mr. REINECKE. That was the steamplant or diesel?

Mr. FORMAN. Steam. That is 300-megawatt steamplant built for peaking.

The second estimate is a little higher than that, $10.36 plus almost 4 mills.

Mr. ROGERS. The time of the gentleman has expired. We want to thank you, Mr. Forman, for a very excellent presentation.

Mr. FORMAN. Thank you, Mr. Chairman.

Mr. ROGERS. The next witness is Dr. Hiram Davis, an economist from Arizona. Dr. Davis? You are recognized for 17 minutes.

STATEMENT OF DR. HIRAM DAVIS, ECONOMIST, STATE OF ARIZONA

Dr. DAVIS. Thank you, Mr. Chairman, gentlemen of the committee. I have a short statement. I will endeavor to insure that it is really short by reading it if I may have your permission.

Mr. ROGERS. Fine.

Mr. DAVIS. Otherwise I might ad lib at too great length.

My name is Hiram S. Davis. I am director of economic research for Western Management Consultants, a firm of management and economic consultants with headquarters in Arizona and offices in southern California. By birth, I am a midwesterner who has had the opportunity of living in Colorado and Pennsylvania as well as in Arizona. From 1945 to 1953 I was director of the industrial research department at the Wharton School of Finance and Commerce of the University of Pennsylvania. Since coming to Arizona in 1956, I have directed a great many projects dealing with the economy of various sections of the State as well as conducting marketing studies of national scope. In May of this year our firm published a comprehensive study of the growth outlook for Maricopa County which was made possible by a group of public and private sponsors, including the board of supervisors of Maricopa County and the Council of the Salt River Pima-Maricopa Tribe. I am here today as a consultant to the Arizona Interstate Stream Commission.

There is economic justification for constructing the central Arizona unit as soon as possible. This justification rests on the following considerations:

1. The unit must eventually be constructed, if water supplies which originate outside Arizona are to be made available for consumptive purposes within major urban areas of the State.

2. Arizona, in common with other States in the Pacific Southwest, must have more water than can be produced by runoff from its own watershed and a safe rate of pumping from the underground if water scarcity is not to put an early ceiling on long-run economic development. It is the recognition of this region-wide need that has brought about the Lower Colorado River Basin project.

3. In many sections of Arizona, a "safe rate" of pumping from the underground has already been exceeded for a number of years, as indicated by the continual decline in water table. The consequent rise in water costs has already had an adverse effect on agriculture. Over 200,000 acres are estimated to have been withdrawn from crop use in Arizona (primarily in the area between Phoenix and Tucson—western Pinal County) because of lack of water, pumping costs, or water become too saline for farming purposes.

4. The main stem of the Colorado River provides an immediate source from which water can be drawn for distribution by the central Arizona unit as soon as the unit is constructed.

5. There may come a time when the total flow of the main stem of the Colorado River is insufficient to meet the consumptive uses to which the lower basin States are entitled under the decree of the Supreme Court. Though varying predictions have been made as to the time when this eventuality will occur, most current estimates indicate that a significant "deficit" should not be expected until sometime between 1990 and 2000. In other words, measuring from 1975, there is at least a 15- to 25-year period in which Arizona can reasonably expect to receive all of the water from the flow of the main stem of the Colorado to which it is entitled under the Court decree, including a share in "surplus" flows, providing the central Arizona system were sized large enough to handle an "economic" portion of such surpluses.

6. The economic benefits that would be generated during the first 20 years of the unit's use are sufficiently in excess of total costs to warrant authorization of the central Arizona unit, even though there could be subsequent periods in which the system was not fully utilized. (But such periods of underutilization would only occur, if the importation of water from outside the Pacific Southwest were delayed beyond 20 years and present predictions about the demand for Colorado River water exceeding supply in the vicinity of the year 2000 or before were actually realized.)

(*a*) The present value of the benefits to be created during the first 20 years of the unit's use (beginning say in 1975) is estimated to total $1.23 billion for the entire period. This estimate is based upon an average diversion of 1.2 million acre-feet per year from the Colorado River and the production of 50,000 acre-feet in the Twin Buttes and Charleston subprojects. The economic value of $1.23 billion is equivalent to more than $75 per acre-foot at canal side. (These estimates have been developed from the Pacific Southwest water plan, Supplemental Information Report on Central Arizona Project, Arizona, January 1964, U.S. Department of Interior, Bureau of Reclamation, ch. V. "Economic Analysis," pp. 34–43.)

(*b*) The cost of constructing the unit, including cost of interim financing, has been estimated by the Bureau of Reclamation to be

approximately $560 million. But note the present value of the total benefits for the 20-year period. They are on the order of $1.23 billion or approximately 2.2 times the initial cost of the entire central Arizona unit.

(*c*) Moreover, total benefits exceed costs, even if one:

(1) assumes a shorter period in which the supply of water from the Colorado River would permit full utilization of the central Arizona system, and (2) operating, maintenance, and replacement costs are included at their present worth. As indicated by the accompanying chart, total benefits, even by 1989 would exceed total costs by more than $275 million—a 14-year period, assuming the unit began operation in 1975.

On this chart behind me we have displayed the present worth of the project benefits in hundreds of millions of dollars from 1989 to the year 2009. This is the range of the shortage, particularly referred to in the Tipton report. You will note that the top line there, we have an estimate of the present worth of the projects benefits running from around 9 upward to $1 billion, nearly $1,800 million.

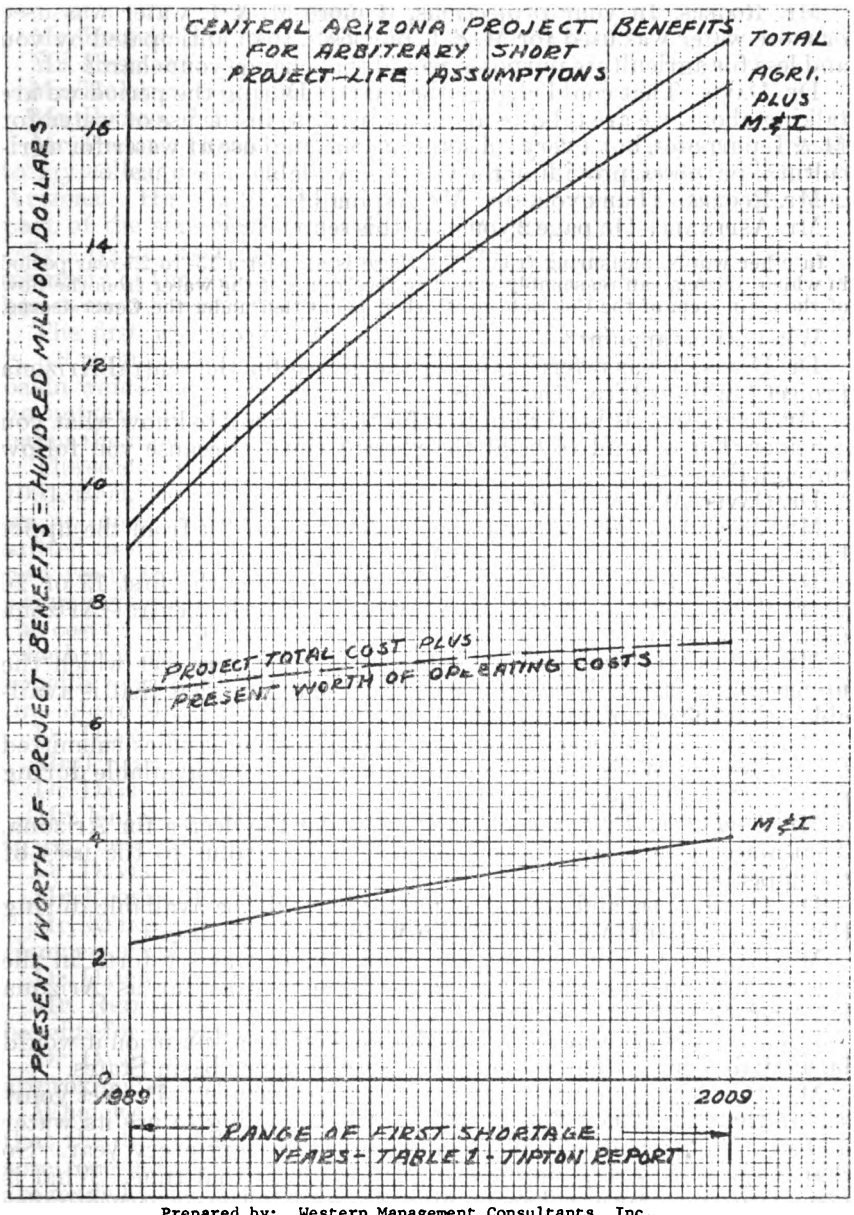
You will note the second line under that closely following that, the total for agriculture plus municipal and industrial, the economic benefits to be generated by the use for such purposes. The difference is primarily recreation, development that will ensue from the construction and so on. The important thing is to compare that with the line more or less in the center of the chart labeled "Project," total cost plus present worth of operating costs.

You will note that throughout the course of this period, even at the beginning, the total project cost plus present worth of operating costs is substantially less or, as I pointed out in the statement, that even by 1989 the total benefits, economic benefits generated are expected to exceed total cost by more than $275 million. This is a 14-year period assuming the operation—the unit began operation in 1975.

The last line, the bottom line on the chart is simply to indicate the amount of economic benefit created by M. & I. use, and of course the difference between that and the second line from the top, agriculture plus M. & I. indicates the great contribution that the use of this water for agriculture would create during this period.

Sooner or later the central Arizona unit must be constructed to serve the major urban centers and farming areas of Arizona. It is neither economic nor prudent to delay construction until some additional source besides the Colorado River is available. The delay would be "uneconomical" because it would waste water into the Gulf of California which could otherwise be put to immediate use to provide economic benefits of substantial dimensions—benefits that would in fact exceed total costs by a substantial margin even during the first 20 years of use. It would not be prudent to delay construction because it would risk exhaustion of underground reserves to a critical level.

(The chart referred to follows:)



Prepared by: Western Management Consultants, Inc.
Phoenix, Arizona August 23, 1965

Mr. ROGERS. Thank you Dr. Davis.

Do I understand that on the chart the bottom line is just M. & I. while the next is agriculture plus M. & I.?

Dr. DAVIS. Yes, we have in the line labeled agriculture plus M. & I.

Mr. ROGERS. In your projections, if more M. & I. water was used or more water was used for M. & I. purposes, than anticipated by you and less for agriculture purposes, would that change your chart?

Dr. DAVIS. That could change the chart. During the period we are talking about, we are talking about an increase in the use of water for M. & I. purposes, but a very substantial continual use of water for agricultural purposes, providing the water is available.

Mr. ROGERS. Thank you, sir. Mr. Aspinall?

Mr. ASPINALL. On page 2 you have this sentence:

In other words, measuring from 1975, there is at least a 15- to 25-year period in which Arizona can reasonably expect to receive all of the water from the flow of the main stem of the Colorado to which it is entitled under the Court decree.

What is that amount?

Dr. DAVIS. I was referring under the decree for the central Arizona project 1 million 2 from the river.

Mr. ASPINALL. It is all right to refer to it. I want to know what you consider that amount to be at the present time. Because you follow through then——

Dr. DAVIS. We are using a million 2.

Mr. ASPINALL. The water comes down supposedly from the upper basin.

Dr. DAVIS. I am assuming for this purpose for the first 15 or 20 years there would be 1 million 2 available for the central Arizona unit.

Mr. ASPINALL. But not out of the 7.5 million acre-feet which the upper basin must deliver. Our record doesn't show that that is available—that the water is available.

Dr. DAVIS. These were based on the engineering studies submitted this morning. We have used the 1 million 2 as being available during the first 15 to 20 years.

Mr. ASPINALL. From the entitlement under the decree for Arizona. That water is available purely because it is surplus to the uses of the upper basin.

Dr. DAVIS. Yes, and we are assuming it would be available during this period because the upper basin would not be using it.

Mr. ASPINALL. But you say the amount that was set forth in the decree, and the amount in the decree is empty as far as Arizona is concerned, is that not right?

Dr. DAVIS. We must say—we used the 1.2 on the assumption it would be available from what was not used by the upper basin States.

Mr. ASPINALL. You are labeled here as an economist. Project yourself to the year 1995. The upper basin is beginning to use its water and the water which will be surplus is depreciating every year. So that the project is receiving less and less water at that time. What is your position as far as the economics of the project is concerned under those circumstances?

Dr. DAVIS. Under those circumstances as we have indicated here, the economic benefits to be created will be during the first 15 to 20 years and will be substantially in excess of the cost. The indications

are, for example, the Bureau of Reclamation studies, that even with an average availability over the entire 50-year period of approximately 900,000 acre-feet, a decline from the 1.2 to something around 600,000 acre-feet over the 50-year period, that there will be—the project could pay out in that 50-year period.

Mr. ROGERS. The time of the gentleman has expired.

Mr. Hosmer?

Mr. HOSMER. No questions.

Mr. ROGERS. Mr. Udall?

Mr. UDALL. Thank you for being with us, Dr. Davis, and I will say to my colleagues he is a very eminent and distinguished resident of Arizona. His qualifications are amply indicated in the beginning part of the statement which he did not read.

Dr. Davis, as I get your presentation and its significance to the members of the committee, the real hard question we in Arizona have had to answer comes really in two parts.

The first was covered by Commissioner Dominy and the question is, all right, assume after 1995 or 1990 or whenever the year, the upper basin wants the water back and we give it back to them and there are no imports, do you still have a project that would return to the taxpayer the moneys invested in it, and he gave the answer, yes, it would.

The second part of it is what you covered. Assuming that by 1989, 1991, 2009, or whatever it is, depending on whose figure you take, that we no longer have water which has been—which we have been permitted to use by our friends in the upper basin because they are not now ready to use it, the question is, would the project confer benefits, assuming no imports by that time, that confer benefits in excess of the cost? The answer is, as I understand it, whatever year you pick, whether it be 1989, 1995 or any other year, the excess of economic benefits over total project costs is the difference between that dotted line where Mr. Alexander now has his pointer and the upper one.

Dr. DAVIS. It is. The top one.

Mr. UDALL. This is based on your expertise in economic matters.

Dr. DAVIS. Yes.

Mr. UDALL. To the extent we get more rainfall or additional water to use, the picture would be even brighter?

Dr. DAVIS. Yes.

Mr. ROGERS. The time of the gentleman has expired.

Mr. REINECKE. Do you understand that revenues are not necessarily commensurate with benefits?

Dr. DAVIS. I am talking about economic benefits; right.

Mr. REINECKE. Can you give us an idea on how you calculate the benefits for irrigated or nonirrigated lands?

Dr. DAVIS. Yes; the benefits as I have indicated on an acre-foot basis, approximately $73 an acre-foot.

What we have used in terms of agriculture and M. & I. works out that the direct benefits, that is for irrigation purposes, about $36 an acre-foot indirect as a result of the expenditures and so forth that are made by the farmers and so forth. Out of that we anticipate that there will be at least an equal amount, additional amount created.

As a matter of fact, we thought around $40. So the agriculture we estimate, each acre-foot used in agriculture will on the average create economic benefits on the upward of $78 to $80.

Mr. REINECKE. Is this profit or gross value? Is this gross economic value because it is now under irrigation?

Dr. DAVIS. In the case of direct benefits, this is the net benefit after the farmer's costs are taken out.

Mr. ROGERS. Mr. Burton?

Mr. BURTON of California. I yield the balance of my time to the chairman of the subcommittee.

Mr. ROGERS. The chairman of the subcommittee yields it back.

Thank you very much.

Mr. Foley?

Mr. FOLEY. Dr. Davis, I think you made a helpful statement. The gist of your testimony as I understand it is that the central Arizona project can be considered by this committee and examined by this committee without reference to any importations of water and the decision can be made without any references to importations of water in the Colorado River Basin. Judged in that way it is a feasible project and should be supported and authorized by this committee; is that right?

Dr. DAVIS. It is a feasible project from an economic point of view in which to immediately begin construction.

As I have interpreted all the evidence that has been presented, both here and what I looked into prior to coming here, there seems to be general agreement that given the supply of water for the system, regardless of where it would come from, that the central Arizona unit would be economically feasible and should be constructed.

The question has been over the supply of water. On the analysis that I have made I contend that there will be sufficient supply of water over the next 15 to 20 years, even granting the deficiencies that are expected toward the end of this period on an economic basis to justify immediate construction, keeping in mind that following even the period of deficit—if there is no further imported waters—it is varied—the times vary—but the indications are that they will not have a dry aqueduct, but we will have one that we might be handling in poor years, runoff perhaps 600,000 acre-feet but obviously there would be other years based on the history of the river where the runoff would be greater and the production—delivery by the canal would be substantially greater.

Mr. ROGERS. The time of the gentleman has expired. All time has expired and thank you for your statement.

Dr. DAVIS. Thank you for the opportunity.

Mr. ROGERS. The next witness is Mr. Jack Jackson, president, Arizona Game Protective Association, representing Arizona State Wide Wildlife Conservation & Recreation Organization. Mr. Jackson.

STATEMENT OF JACK J. JACKSON, PRESIDENT OF THE ARIZONA GAME PROTECTIVE ASSOCIATION

Mr. JACKSON. Mr. Chairman and members of the committee, my name is Jack Jackson. I am president of the Arizona Game Protective Association, an organization of conservation-minded sportsmen, composed of 29 clubs throughout the State.

We are keenly interested in the conservation of all our Nation's natural resources. Hunting and fishing are sports that are very

largely dependent upon wise management of fish and wildlife habitat and populations. There is also much more to hunting and fishing than the pursuit of fish and game. We regard these activities in the out of doors as a restorative for the mind and spirit of man; an essential part of living a full life under the hurried and complex conditions of modern society.

In the southwestern desert country artificial lakes created by the damming of streams and rivers provide most of the opportunity available for water oriented recreation. It is perhaps a little difficult for those not familiar with the desert country to visualize the rare beauty and appeal of an artificial lake in the colorful canyons of Arizona. We treasure them as one of the things that gives both residents and visitors to our State a rewarding experience.

The existing artificial lakes in Arizona, primarily those on the Salt and Verde Rivers in central Arizona, and Lakes Mead and Powell on the Colorado River, attract hundreds of thousands of people annually. The lakes on the Salt and Verde are so heavily used at times that competition for space among different kinds of uses interferes with the pleasure. In my opinion, there must be few places in the world that can compare with Lake Mead or the now-forming Lake Powell for scenic beauty. Fishing in such splendid surroundings is a soul-satisfying experience—even when the fish aren't biting.

The members of the Arizona Game Protective Association are fully aware of the need to preserve the natural wonders of the Grand Canyon. We are conscious of our stewardship responsibilities toward future generations. Weighing our responsibility to preserve, against our equal responsibility to use wisely, we wish to go on record as favoring and recommending construction of the dams at the Bridge and Marble Canyon sites on the Colorado River in Arizona. We urge, of course, that these dams be operated in such a way as to maximize to the fullest extent practical, their unique potential for recreational uses.

We do not believe that the relatively small degree by which Bridge and Marble Canyon Dams will reduce the miles of river available for whitewater boating is great enough to justify withholding from the people of the Nation the many other esthetic, recreation, and economic values they will create.

On the positive side, the canyon lake behind Bridge Dam would provide for the general public an opportunity to enjoy the Grand Canyon in a way now limited to the few who have the time, energy and money to make the rigorous run down the river rapids or the pack trip to the floor of the canyon. Our national parks are, and should be, for all of the people, not a special few—for the elderly, as well as the young and strong; for the meek as well as the bold adventurer. Surely 13 miles of the river along the boundary of the park is not too much to open to all of the people, while nearly 100 miles of the river remains wild in the park.

Mr. Chairman, I would like to present a resolution adopted by the Arizona Game Protective Association which affirms the position I have stated in the matter.

Thank you.

(The resolution referred to follows:)

RESOLUTION NO. 6—RELATIVE TO THE CONSTRUCTION OF MARBLE AND BRIDGE CANYON DAMS ON THE COLORADO RIVER

Submitted by the Tucson Wildlife Unlimited, December 22, 1964, for consideration to the 42d Annual Arizona Game Protective Association Convention, February 5, 6, 7, 1965, Tucson, Ariz.

Whereas the building of these two dams will provide a water highway through the spectacular inner canyon gorge; and

Whereas the far-reaching regional and economic advantages from the projects outweights the impact on the natural scenic grandeur of that part of the canyon affected which is outside of the Grand Canyon National Park; and

Whereas this area presently is almost totally inaccessable and lost as far as recreational use is concerned; and

Whereas section 7 of the act of February 26, 1919 (40 Stat. 1176), authorizing Grand Canyon National Park states "that whenever consistent with the primary purposes of said park, the Secretary of the Interior is authorized to permit the utilization of acres therein which may be necessary for the development and maintenance of a Government reclamation project; and

Whereas the fringe benefits of additional reservoirs for water storage which will encourage wildlife habitat and recreation in central and southern Arizona is certainly beneficial to the people and economy of the State: Now, therefore, be it

Resolved, That the Arizona Game Protective Association go on record as favoring the construction of these two dams; be it further

Resolved, That copies of this resolution be sent to Arizona's congressional legislatures.

Mr. ROGERS. Mr. Aspinall?

Mr. ASPINALL. I have no questions. He succinctly stated the position.

Mr. ROGERS. Mr. Hosmer?

Mr. HOSMER. Mr. Jackson, do you know how many people go up and down this stretch of the river every year?

Mr. JACKSON. I believe last year—and I say I believe—460 people.

Mr. HOSMER. They take these boats and shoot rapids?

Mr. JACKSON. That is right.

Mr. HOSMER. How many were killed?

Mr. JACKSON. I don't have any idea.

Mr. HOSMER. 460 people. Tell me this. I just have an impossible job understanding these people who say that you have to hold this stretch of the river for 460 people a year, as against 46,000 or 460,000 people like myself who have sense enough to stay out of the rubber boats who could otherwise go up and down and enjoy this stretch of nature. It seems to me to be the height of exclusion in trying to keep the people out of that place and save it for themselves. What is behind all this?

Mr. JACKSON. I think you will find what is behind it right now is a group called the Sierra Club.

Mr. HOSMER. Is it greed or avarice, or what?

Mr. JACKSON. I don't know what. I see no reason why this cannot be set up the way I stated it.

Mr. HOSMER. I do not know why they want to keep my family out of there and the vast majority of the American people. I think it is selfish. I will yield to the gentleman.

Mr. REINECKE. Among those people you cannot understand, this happens to be the form of recreation that many people like and seek just as you perhaps seek golfing or anything else.

I might also say that it is not as though these are the only two lakes available. There are two much larger lakes better equipped, better stocked, very, very close to the location of these two lakes.

Mr. HOSMER. They are not the only rapids available, either.

I might add in addition to that for all these people that want to shoot rapids and see wild nature at its rawest, they have jet airplanes that are worldwide now, and they can go worldwide. They have infinitely greater amount of wild territory to get into.

Mr. BURTON of California. I yield.

Mr. ROGERS. Mr. Udall?

Mr. UDALL. I just want to thank the witness and his fine organization and tell him we are proud of him and certainly support the statement that he has made.

I have been told and I guess we will get some accurate figures later on that, rather than 450 people last year, the fact is that only 900 in all history—there have only been 900 people who have boated down this section of the river. So that Mr. Hosmer, instead of preserving this for 450 people a year, if my figures are correct, we are discussing preserving it for the benefit of 900 people over the last 90 years which runs about 10 a year.

Mr. HOSMER. That is a real exclusive key club.

Mr. UDALL. I was going to inquire—how many cabdrivers, carpenters, and bricklayers, and ordinary God-fearing taxpaying citizens are members of the Sierra Club? I do not know that.

Mr. JACKSON. I do not know.

Mr. ROGERS. Mr. Reinecke?

Mr. REINECKE. It might also be thought in the context that it is the general consensus and very much agreed to that while these are not the only rapids in the world they are the best and you would therefore take away from these people the best of their sport.

Mr. ASPINALL. Now, if my colleague will yield. Have you ever gone down the Dolores River in southwestern Colorado?

Mr. REINECKE. No, sir.

Mr. ASPINALL. Then you would not make a statement like that if you had done so.

Mr. REINECKE. Has my colleague gone down the Colorado?

Mr. ASPINALL. I have friends who have gone down both of them.

Mr. HOSMER. This is a perfect example of all the people who are not experts in the matter and have never seen the place who are the most excited about it.

Mr. REINECKE. One question I do have. In your paper you indicate that only 13 miles I believe of the river are flooded out in the park. It is true that the dam floods out 94 miles of the river? Part of that—part of the national monument and part in the park?

Mr. JACKSON. I believe that is true. You still have 100 miles of river that is running wild.

Mr. REINECKE. Thank you.

Mr. ROGERS. Mr. Burton?

Mr. BURTON of California. Do you represent the Arizona Game Protective Association before the State legislature or is your group represented?

Mr. JACKSON. We have a legislative chairman.

Mr. BURTON of California. Does your group find itself in agreement or disagreement with the Sierra group on matters pending before that body?

Mr. JACKSON. We haven't run into anything, at least this last year that I can think of with the Sierra Club.

Mr. BURTON of California. Is it a normal state of affairs that you find yourselves in disagreement?

Mr. JACKSON. The Arizona Game Protective Association believes——

Mr. BURTON of California. Please respond to my question. Do you normally find yourselves in disagreement?

Mr. JACKSON. We would be in disagreement normally.

Mr. BURTON of California. I yield back the balance of my time.

Mr. JACKSON. Not on everything.

Mr. ROGERS. Mr. Foley?

Mr. FOLEY. No questions.

Mr. ROGERS. Mr. Jackson, do you gage the number of people who do not get through?

Mr. JACKSON. You might.

Mr. ROGERS. Our next witness is George Rocha, chairman, tribal council, Hualapai Indian Tribe of Arizona, and Royal D. Marks, representing the tribe.

Mr. UDALL. Mr. Chairman, could I make a few remarks by way of presentation?

Mr. Rocha is chairman of the tribal council, Hualapai Indian Tribe of Arizona, and its reservation is one of the most rugged and most beautiful and includes the south bank of the site where Bridge Canyon will be constructed some time in the near future. Mr. Marks is one of our leading attorneys in Arizona; he specializes in Indian affairs and has been before this committee on other occasions.

I would also like to identify and ask them to stand, three other members of the Hualapai Indian Tribal Council, Mr. Douglas Mapatis, Mr. Willie Walker, and Mr. Delbert Havatone.

Mr. ROGERS. We are glad to have them all.

Mr. Rocha and Mr. Marks, you may proceed.

STATEMENT OF GEORGE ROCHA, CHAIRMAN, HUALAPAI TRIBE OF ARIZONA; ACCOMPANIED BY ROYAL D. MARKS, COUNSEL, HUALAPAI TRIBE OF INDIANS, ARIZONA

Mr. ROCHA. Before I begin my statement I would like to take this opportunity to thank the chairman and the subcommittee for inviting Hualapai representation to appear before you and we consider it a privilege and an honor.

Mr name is George Rocha. I am chairman of the Hualapai Tribe, Peach Springs, Ariz., and have been requested by the Hualapai Tribal Council to appear before this committee to insure that the rights and interests of the Hualapai Tribe in the site of the proposed Bridge Canyon Dam, and related facilities, are fully recognized and protected under any legislation authorizing either the central Arizona project or the more comprehensive Lower Colorado River Basin project.

According to my information, up to this year the hearings, reports, and testimony before Congress concerning the central Arizona project

or other plans to develop the Colorado River all have been based upon the assumption that electric power revenues from a high dam at Bridge Canyon are essential to the economic feasibility of the proposed development. The bills under consideration by this subcommittee today still include that feature. As far as I am aware, however, the financial data submitted to Congress never has taken into account the payment of fair compensation to the Hualapai Tribe for the use of its property in connection with the construction, operation, and maintenance of the Bridge Canyon project.

The rights and interests of the Hualapai Tribe in the site of the proposed Bridge Canyon Dam, and related facilities, are clear and undisputed. In a supplemental information report dated January 1964, on the Bridge Canyon project, Arizona, as part of the Pacific Southwest water plan, Commissioner Floyd E. Dominy, of the Bureau of Reclamation, advised the Secretary of the Interior:

> All the features required for the construction of the project except the dam and a portion of the reservoir area will be located within the boundaries of the Hualapai Indian Reservation. It is estimated that approximately 20,132 acres of Hualapai Indian Reservation land would be required for rights-of-way.
>
> * * * * * * *
>
> The Indian lands required for rights-of-way for Bridge Canyon Dam and Reservoir are tribal lands held in trust for the benefit of all members of the tribe, and these lands constitute, to all intents and purposes, the only source of their livelihood.

In recognition of the foregoing facts and the special relationship of the United States to Indian tribes generally, Commissioner Dominy suggested to the Secretary that—

> wherever Indian lands are to be acquired in connection with implementation of the initial plan, you should submit recommendations to the Congress for appropriate payments to the Indians in addition to amounts paid as just compensation for lands acquired.

H.R. 4671 and the other bills here under consideration to authorize construction of the Lower Colorado River Basin project are silent on the subject of Hualapai rights at Bridge Canyon. In this regard, I would like to point out to the members of this subcommittee that, independent of the proposed Bureau of Reclamation development, the Arizona Power Authority still has pending before the Federal Power Commission an application for a license to build a dam and power project at Bridge Canyon on the Colorado River. I feel sure that the members of this subcommittee will commend my tribe for its initiative and resourcefulness in reaching advance agreement with the power authority for the use of our lands when and if the license is granted. Under this contract, which was executed on August 30, 1960, the Arizona Power Authority promised to pay the Hualapai Tribe before completion of the project:

(*a*) One hundred fifty thousand dollars upon execution of the agreement;

(*b*) Two thousand dollars per month beginning July 1, 1963; and

(*c*) Rentals and advance payments, after issuance of the license, in a minimum amount of $1,054,000 and an estimated maximum amount of $1,377,000.

Upon completion of the Bridge Canyon project, the Arizona Power Authority also promised to pay the Hualapai Tribe rentals and

royalties ranging in amount from an estimated $402,500 annually for an adverse year during the first stage of development up to an estimated $794,000 annually for an average year during the third stage of development. As additional consideration, the contract further provides that the Hualapai Tribe shall have exclusive control over the shore of the reservoir within the reservation for recreational purposes, which translated into dollars would mean approximately $1 million annually for the tribe, and that the tribe shall have an option to purchase a substantial block of power from the authority at the lowest rate established for the sale of firm power from the Bridge Canyon Dam.

In summary, when the Federal Power Commission had a possible development at Bridge Canyon under active consideration, my tribe was able to negotiate a firm contract with the Arizona Power Authority for the use of Hualapai lands which would have made my people economically self-sufficient in future years. If a dam at Bridge Canyon is to be built by the Bureau of Reclamation as part of the Lower Colorado River Basin project, we think the Hualapai Tribe should receive similar treatment from the Congress. In other words, recognizing the special relationship of the United States to Indians, the Government certainly should be able to give the Hualapais in connection with a Federal development consideration at least equal to what a private organization has offered.

Second, 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 after, the 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. In acting upon the Lower Colorado River Basin project, therefore, this committee, at the very outset, should consider all relevant facts, including the total compensation due the Hualapais for the losses we will suffer, and, in the authorizing legislation, should finally dispose of the matter of compensation. If a dam is to be built at Bridge Canyon, I respectfully urge that the pending bills be amended to provide for the Hualapai Tribe not the hope of possible future benefits, but rather a binding and enforcible commitment as to actual payments and rights.

In concluding my testimony, I wish to comment upon the fact that the Bureau of the Budget, in its report on the bills before this subcommittee, has stated that authorization for both Bridge Canyon and Marble Canyon Dams at this time is not necessary. The Budget Bureau goes on to report its belief that the Bridge Canyon Dam should be deferred for later consideration, especially in view of the President's emphasis, on many occasions, on the importance of preserving and enhancing the natural beauty of this Nation. We have also noted that the Secretary of the Interior has gone on record as concurring in the recommendation of the Bureau of the Budget that the construction of Bridge Canyon Dam should be deferred pending a reevaluation and has further stated:

> **Deferral of the Bridge Canyon project will affect only the magnitude of surplus revenues in the development fund, and will not adversely affect the financial feasibility of the other units of the Colorado River project authorized at this time. Meanwhile, a moratorium should be imposed on the issuance of a license to any non-Federal entity for the construction of a dam at this site.**

In response to the recommendation that construction of Bridge Canyon Dam be deferred for at least 5 years, the Hualapai Council on July 10, 1965, passed Resolution No. 21–65, a copy of which I now hand to you for inclusion as part of my testimony. For further remarks on the harmful effect the proposed moratorium would have on the Hualapais, I would like to introduce our tribal attorney, Royal D. Marks, from Phoenix, Ariz.

Mr. ROGERS. Without objection, your resolution will be received and recorded in the record as part of your testimony.

(The resolution referred to follows:)

RESOLUTION NO. 21–65 OF THE GOVERNING BODY OF THE HUALAPAI TRIBE OF THE HUALAPAI RESERVATION (A FEDERALLY CHARTERED INDIAN CORPORATION), PEACH SPRINGS, ARIZ.

Whereas there has been pending in the Congress of the United States for over 2 years legislation to consider Federal construction of Bridge Canyon Dam and to date the project has not been authorized; and

Whereas in recent months the Bureau of the Budget and others have proclaimed that Bridge Canyon project is not necessary to the ecoonmic feasibility of the Lower Colorado River Basin project; and

Whereas the Hualapai Tribe has at all times been ready to cooperate with the State of Arizona in connection with the construction of said Bridge Canyon project; and

Whereas the Department of the Interior has accepted the recommendation that Bridge Canyon Dam be deferred; and

Whereas there have been pending before the Federal Power Commission applications by the Arizona Power Authority and the city of Los Angeles for authority to construct Bridge Canyon Dam as a power dam; and

Whereas a Federal Power Commission licensed dam at Bridge Canyon will not invade either the Grand Canyon Park or the Grand Canyon National Monument; and

Whereas the development of the "low" dam at Bridge Canyon under a license through the Federal Power Commission would make the Hualapai Tribe economically independent and self-sufficient; and

Whereas in the event neither of the present applicants for a Federal Power Commission license should proceed to construct the Bridge Canyon project, it is the opinion of the Hualapai Tribal Council that it could process an application before the Federal Power Commission and through revenue bonds could construct and operate the Bridge Canyon project for the benefit of the Hualapai Indians; and

Whereas studies prepared by Harza Engineering Co. for the Arizona Power Authority show that the power and energy from a low Bridge Canyon project can be marketed in California and Arizona at prices sufficient to amortize the necessary $318 million bond issue and still produce annual net revenues of approximately $8 million;

Whereas the Hualapai Tribe has been denied the benefits from this major resource on its reservation for the past 20 years due to the fact it had been reserved by the State of Arizona and the United States as being a necessary part of the central Arizona project; and

Whereas there is a threatened moratorium on the Colorado River which would forestall the possible building of Bridge Canyon Dam for many years to come; and

Whereas the Hualapai Tribal Council believes it is for the best interest of the Hualapai Tribe to resist such a moratorium so that it may proceed with an application before the Federal Power Commission for the building of said dam; Now, therefore, be it

Resolved by the Hualapai Tribal Council in meeting assembled this 10th day of July 1965, That it respectfully requests the Congress of the United States to restore the jurisdiction of the Federal Power Commission at the Bridge Canyon damsite so that the tribe's major asset may be developed for the benefit of the Hualapai Indians and for the benefit of the State of Arizona and the adjoining States for the purpose of supplying power; and be it further

Resolved, That the tribal attorneys, Royal D. Marks of Phoenix, Ariz., and Arthur Lazarus, Jr. of Washington, D.C., are authorized and instructed to appear before congressional committees that may be hearing Senate bills 75 and 1019 pending in the 89th Congress, for the purpose of protesting a moratorium at the Bridge Canyon damsite and presenting the views of the Hualapai Tribe regarding its construction of the Bridge Canyon Dam; be it further

Resolved, That copies of this resolution be forwarded to the Arizona congressional delegation as well as all other Members of Congress who are interested or involved in the pending legislation, S. 75 and S. 1019.

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 members of whom six constituting a quorum were present at a regular meeting thereof this 10th day of July 1965; and that the foregoing resolution was duly adopted by the affirmative vote of eight 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.*

Mr. ROGERS. Without objection the other resolution will be received as part of your testimony.

(The resolution referred to follows:)

RESOLUTION

Whereas several of the Indian tribes in Arizona are vitally interested in and will be affected by bills now pending in the 89th Congress in connection with the Lower Colorado River Basin project and the central Arizona project; and

Whereas testimony is to be given at hearings to be held August 23, 24, 26, and 27, 1965, in Washington, D.C.; and

Whereas George Rocha, representing the Hualapai Tribe is to present testimony at said hearings; and

Whereas it is evident to the members of the Intertribal Council of Arizona that the building of Bridge Canyon Dam is important not only to the Hualapai Tribe but to other tribes who are members of the Intertribal Council of Arizona; and

Whereas George Rocha, chairman of the Hualapai Tribal Council, has discussed with the members of the intertribal council the testimony he is to give at the hearings being held in Washington, D.C., as hereinabove set forth: Now, therefore, be it

Resolved by the Intertribal Council of Arizona at its meeting regularly called this 14th day of August 1965, That it endorses the testimony of George Rocha, chairman of the Hualapai Tribe, in connection with the building of Bridge Canyon Dam and especially in connection with the request that the moratorium on the Colorado River, with respect to the building of additional structures, be lifted so that the building of a dam at the Bridge Canyon site may be possible in the near future.

CERTIFICATION

I, the undersigned as secretary of the Intertribal Council of Arizona, hereby certify that at a duly convened meeting of the Intertribal Council of Arizona held at the Salt River Pima-Maricopa Reservation on August 14, 1965, the foregoing resolution was duly adopted by unanimous vote of the members present.

EDMUND JACKSON,
Chairman, Intertribal Council of Arizona.
EVA NORTHRUP,
Secretary, Intertribal Council of Arizona.

Mr. ROGERS. Mr. Marks?

Mr. MARKS. Mr. Chairman, I, too, would like to join Mr. Rocha in thanking you for giving us this opportunity to appear before you.

My name is Royal D. Marks. I am a member of the firm of Marks & Marks, Phoenix, Ariz., which serves, together with Arthur Lazarus,

Jr., of Washington, D.C., as counsel to the Hualapai Tribe of Indians on all matters relating to the planning and construction of a dam and power project at Bridge Canyon on the Colorado River within the exterior boundaries of the Hualapai Reservation. I appear before this committee today at the request of the Hualapai Tribe to present to you some further thoughts on possible power development at Bridge Canyon that have been discussed by the Hualapai Tribal Council and those of us who are trying to assist the Hualapai Tribe in becoming economically independent.

This should be called when it is constructed, Hualapai Dam.

Over the years Congress has considered, but never has approved, a number of bills which would have authorized construction of a dam at Bridge Canyon as part of the central Arizona propect or other development projects on the Colorado River. As was pointed out by Mr. Rocha in his testimony, the Bureau of the Budget has examined the bills pending before this subcommittee relating to the Lower Colorado River Basin project, and has recommended authorization of all of the proposed elements of the plan with the exception of the Bridge Canyon Dam. The Department of the Interior has accepted the recommendation of the Bureau of the Budget that Bridge Canyon Dam be deferred, and the clear implication of such action is that, in the event Bridge Canyon should never be constructed by the United States, its absence would not render the lower basin project infeasible.

As Chairman Rocha also indicated in his testimony, on the other hand, the development of Bridge Canyon for power purposes and related facilities is the only way the Hualapai Tribe can hope to make its reservation economically self-sufficient. Indeed, a significant portion of the tribe's current income—amounting to $2,000 per month—already is derived from an agreement with the Arizona Power Authority looking toward eventual authorization of the Bridge Canyon Dam. If the Federal Government is not going to construct this project, therefore, we feel that Congress should not cut off a valuable source of present and potential revenue to the Hualapais, but rather should leave the tribe free to develop its own lands under direct license from the Federal Power Commission or in conjunction with another licensee. Briefly stated, I urge on behalf of the Hualapai Tribe that Congress not approve the suggested 5-year moratorium on consideration of a power project at Bridge Canyon and, furthermore, that this committee endorse the repeal of the act of August 27, 1964 (78 Stat. 607), which prohibits the FPC from licensing such a project before December 31, 1966.

One of the main objections to the construction of Bridge Canyon Dam by the Federal Government as a high dam (1,866 feet) seems to be that the water backed up by the dam would invade Grand Canyon Park and Grand Canyon National Monument. I would point out to this committee that, as originally planned and now contemplated, an FPC-licensed Bridge Canyon project would not invade either the Grand Canyon Park or the Grand Canyon National Monument. The Bridge Canyon project, as proposed by the Hualapai Tribe, would back water to an elevation of 1,610 feet. At this elevation the dam and reservoir would be bounded entirely on its left bank by the Hualapai Reservation and over its right bank by the Lake Mead recreational area.

At the present time there are two pending applicants for a Federal Power Commission license; namely, the Arizona Power Authority and the city of Los Angeles. In the event neither of the present applicants for a Federal Power Commission license wishes to proceed with the construction of the Bridge Canyon project, the Hualapai Tribe takes the position that it would apply for a Federal Power Commission license and, through revenue bond financing, would construct and operate the Bridge Canyon power project for its own benefit as well as for the benefit of the State of Arizona and adjoining States. Studies prepared by Harza Engineering Co. for the Arizona Power Authority, for example, show that the power and energy from a low Bridge Canyon Dam can be marketed in California and Arizona at prices sufficient to amortize the necessary $318 million bond issue and still produce annual net revenues of approximately $8 million.

The Hualapai Tribe has approximately 600 members with an average annual income of approximately $85,000. Its present revenue is derived primarily from the raising of cattle. As previously noted, the tribe's one single resource of any consequence is the hydroelectric potential of the Bridge Canyon development. The Hualapai Tribe has been denied the benefits from this resource for the past 20 years because it had been reserved by the State of Arizona and the United States as being a necessary adjunct to the central Arizona project. As shown by the reports of the Bureau of the Budget, concurred in by the Secretary of the Interior, this is no longer the case. The central Arizona project is now a part of the lower Colorado River Basin project, and the Department of the Interior and the Bureau of the Budget have found that the small amount of subsidy needed for the latter project can easily be furnished from the basin fund which will be created from the revenues of Marble Canyon, Hoover, Parker, and Davis.

In view of the findings of the Bureau of the Budget with respect to the economics of the Lower Colorado River Basin project, I urge that the Congress restore Federal Power Commission jurisdiction over the Bridge Canyon portion of the river. By law, a Federal Power Commission licensed project cannot invade the Grand Canyon Park or Monument. Moreover, once Bridge Canyon has been constructed by a licensee of the Federal Power Commission and the reservoir elevation has been established at 1,610 feet, there will no longer be the specter of future invasion of the Grand Canyon Park and Monument by the Bureau of Reclamation.

It is true that a licensee of the Federal Power Commission might not apply the revenues of the Bridge Canyon project to the benefit of the large municipalities of southern California and Arizona, but rather would apply these benefits to the Hualapai Tribe; however, since the Congress of the United States proposes to appropriate billions of dollars for the relief of the underprivileged industrial and municipal water users of the Pacific Southwest, it does not seem unreasonable to request this same Congress to restore jurisdiction of the Bridge Canyon site to the Federal Power Commission so the tribe can do for itself what the Lower Colorado River Basin States are requesting Congress to do for them.

The Hualapai Tribe is appearing before this committee not to request Federal money or Federal concessions. The tribe simply requests this committee to recommend to the Congress that the jurisdiction of the Federal Power Commission be restored at Bridge Canyon so that the tribe's one single major asset may be developed for the benefit of not only the Hualapai Indians but for the benefit of the State of Arizona and the adjoining States for the purpose of supplying badly needed power.

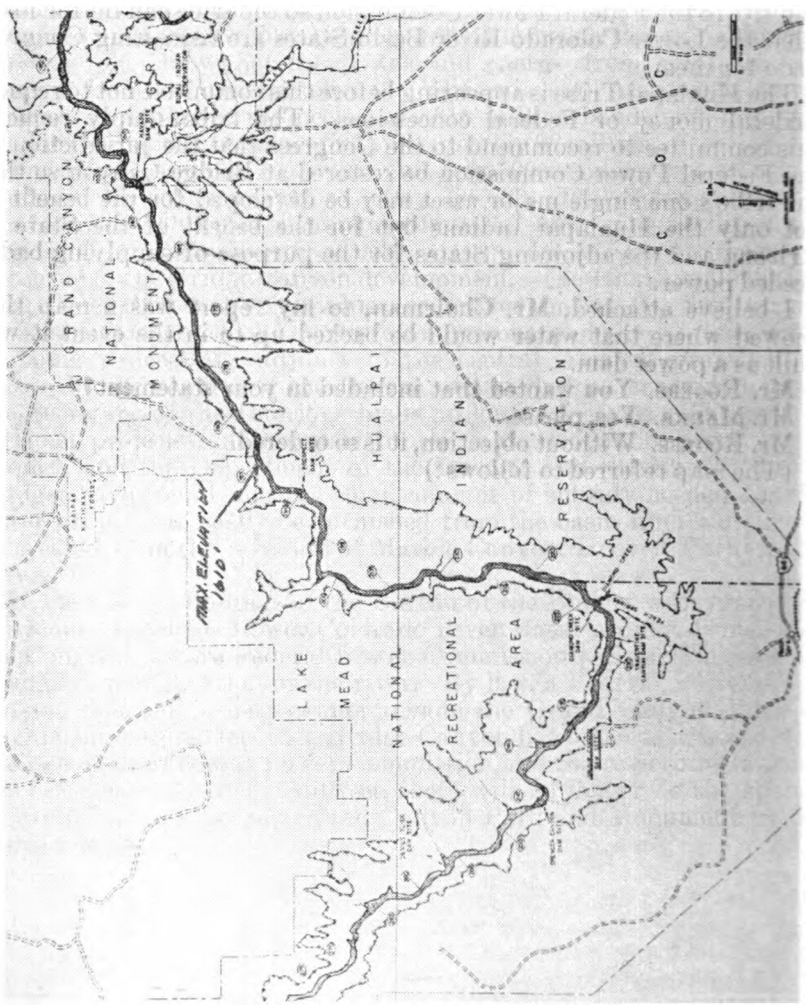
I believe attached, Mr. Chairman, to my report was a map that showed where that water would be backed up to in the event it was built as a power dam.

Mr. ROGERS. You wanted that included in your statement?

Mr. MARKS. Yes, please.

Mr. ROGERS. Without objection, it is so ordered.

(The map referred to follows:)



Mr. ROGERS. We have 2 minutes left. Are there any questions?

Mr. UDALL. Mr. Marks, in the statement Mr. Rocha indicated that the dam would flood about 20,000 acres of Hualapai rights?

Mr. MARKS. Not flooded, be taken for the rights-of-way.

Mr. UDALL. What is the extent of the whole reservation, do you know?

Mr. MARKS. 990,000 acres.

Mr. UDALL. Are there any acres that would be needed for rights-of-way which are occupied by homes, buildings, improvements, or any commercial activities?

Mr. MARKS. I don't believe so at this time.

Mr. UDALL. This moratorium against construction under FPC license expires New Years Eve, next year, about 15 months from now, is this correct?

Mr. MARKS. Yes.

Mr. UDALL. That is all I have.

Mr. ROGERS. Mr. Burton?

Mr. BURTON of California. When was this reservation set aside for the tribe?

Mr. MARKS. 1883.

Mr. BURTON of California. Was there a reservation at that time for this damsite?

Mr. MARKS. Not to my knowledge.

Mr. BURTON of California. Is the Bridge Canyon Dam site within the geography of that which was set aside for the tribe at the time the reservation was established?

Mr. MARKS. Yes.

Mr. BURTON of California. At this time, may I ask that the staff provide me, if not every other member of the committee with confirmation of this fact. I believe that under any and all circumstances—to whatever extent property interests of the tribe are affected—the tribe should be compensated by appropriate language and amount in this legislation. I do not think there can be any quarrel on that count.

If we were to accede in your request and the Federal Power Commission were granted authority to grant a license, do you anticipate you would be working with one of the private power agencies in your area to establish this site?

Mr. MARKS. They could do it independently and by itself.

Mr. BURTON of California. I did not ask you whether they could. I asked what the plans were.

Mr. MARKS. There are no plans. We want to see the dam built so these major assets can be developed. If the other people aren't going to build it, we want to build it.

Mr. BURTON of California. Will you provide this committee with a copy of the analysis that this engineering firm made—that led this engineering firm to the conclusion that you could issue revenue bonds and receive net income of $8 million annually?

Mr. MARKS. We will furnish that to you.

Mr. UDALL. Will the gentleman yield?

Just for the record, was this tribal reservation set aside by Executive order or an act of Congress?

Mr. MARKS. Executive order.

Mr. BURTON of California. Will the staff send to me—or to all of us, if the Chair so rules—what the facts in terms of whether this land area encompassing the Bridge Canyon Dam was included in the reservation of the tribe at the time the reservation was set up?

Mr. ROGERS. Do you have that information, Mr. Marks?

Mr. MARKS. We can get it. I believe it is available. It certainly is available.

Mr. HOSMER. The reservation has never been enlarged.

Mr. MARKS. No.

Mr. BURTON of California. The gentleman has asserted that this Bridge Canyon Dam site area is within the reservation of the tribe and I assume in the absence of challenge by the Department, we can assume his assertion is correct.

Mr. MARKS. May I answer? It is well within the exterior boundaries of the reservation as established on the map that is attached to the report.

Mr. BURTON of California. At what point in time was there imposed a limitation on the tribe's power to develop whatever they chose to on their property, to wit, a damsite at this Bridge Canyon Dam area? One of the statements said within the last 20 years.

Mr. MARKS. We said for 20 years we have been standing by while either the State of Arizona or other individuals or the Government has been waiting to develop this area.

Mr. BURTON of California. When this action took place, was the tribe in any way given payment at that time for having this property right of theirs suspended?

Mr. MARKS. Senate bill 502 was introduced by Senator Hayden and was passed which placed the moratorium.

Mr. ROGERS. The Chair must cut off the discussion and would suggest to the gentleman from California that he can read the hearings on the bill referred to by Mr. Marks which was passed to prevent the Federal Power Commission from granting these. These are available in their entirety in the Interstate and Foreign Commerce Committee.

Thank you very much, gentlemen, for your presentation.

Our next witness is Mr. Harry Horton, special counsel, Imperial Irrigation District.

Mr. UDALL. May I have unanimous consent?

At the hearing Tuesday a question was raised about the central Arizona project, the effect on the Arizona tribes. I prepared a letter to you on this date and would ask this be made a part of the record at this point.

Mr. ROGERS. Is there objection? Hearing none, the letter will be made a part of the record.

(The letter referred to follows:)

CONGRESS OF THE UNITED STATES,
HOUSE OF REPRESENTATIVES,
Washington, D.C., August 27, 1965.

HON. WALTER ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation,
House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: On August 23, there was a reference in the hearings on H.R. 4671 concerning benefits to the Indians of various reservations resulting from construction of this project. I wish to submit this letter as an outline of such benefits and indicate the beneficial impact of the Lower Colorado Basin development on the Indian tribes of the area.

(1) The Indians most heavily affected by the project are those residing on the Gila River Indian Reservation in Pinal County. The San Carlos project contains a total of approximately 100,000 acres of irrigable land, of which approximately 50,000 acres are located within the Gila River Indian Reservation and is the property of the Pima-Maricopa Indians. The water needs of this project are 400,000 acre-feet annually delivered to the farm headgate, but only half of this delivery has been maintained, and that mainly by withdrawing large quantities of ground water—water in excess of the safe annual yield of the ground water basins. The San Carlos project is in serious financial trouble because of low water supply, and it would benefit materially through receipt of a share of the water from the central Arizona unit. Mr. Dominy has testified that included in the costs of the central Arizona unit are $19,970,000 for the construction of concrete-lined distribution systems on the various reservations in Arizona, with a major part to be used on the San Carlos Reservation.

(2) A small part of the money which would be appropriated for construction of the central Arizona unit would be used to line distribution systems on the Chuichui portion of the Papago Reservation, the Ak Chin, and San Xavier Reservations, which are located near Tucson.

(3) Recreational benefits will accrue to Arizona Indians in the form of recreational benefits which will result from construction of Marble Canyon Dam, partly on the Navajo Reservation, and Bridge Canyon Dam, partly on the Hualapai Reservation.

(4) The bill presently provides for the construction of Orme Dam on the Salt River and McDowell Reservations near the confluence of the Salt and Verde Rivers. The testimony already shows a possibility of relocating this dam off the reservations, but, if built, it would be of tremendous benefit to these tribes.

(5) The water exchange features of the bill would eventually provide both irrigation and recreational water for the Whiteriver Apache and the San Carlos Apache Reservations in eastern Arizona.

(6) An additional benefit accruing the Navajo Indians is employment during construction in connection with construction of Marble Canyon Dam and related facilities—and also to the Hualapai Tribe when Bridge Canyon Dam is constructed. It is estimated by the Bureau of Reclamation that 25 million man-hours of work will be required in the construction of this dam and powerplant over a period of several years.

(7) In addition to providing employment for Indians, Bridge Canyon Dam, being on the Hualapai Reservation, would be of tremendous and permanent benefit to that underdeveloped Indian area. It would provide one of the finest recreational and fishing lakes in the world. The Indians feel that they should not be deprived of the having of this facility with its accompanying benefits and accompanying revenues.

Very truly yours,

MORRIS K. UDALL.

(Pursuant to permission granted, see p. 943, the material relating to the Hualapai Indian Reservation and the rights of the United States with respect to the damsites follows:)

DEPARTMENT OF THE INTERIOR,
Washington, D.C., August 31, 1965.

Hon. MORRIS K. UDALL,
House of Representatives,
Washington, D.C.

DEAR MR. UDALL: Pursuant to your request that the Secretary of the Interior provide the basic documents relative to the rights of the United States in and to the Bridge Canyon and Marble Canyon sites, I am transmitting certain materials as outlined below:

BRIDGE CANYON DAM

The proposed Bridge Canyon Dam site is located on the Colorado River at lower Gneiss site, river mile 237.5, in the lower Granite Gorge about 20 miles from the nearest paved highway and railroad near Peach Springs, Ariz. The lands for the Bridge Canyon unit, exclusive of transmission lines, are situated in the Hualapai Indian Reservation, the Grand Canyon National Monument, the Kaibab National Forest, the Grand Canyon National Park, on lands withdrawn for reclamation purposes, and, in a few instances, on lands still in private ownership. Five power site reserves and two waterpower designations, covering the

damsite and part of the reservoir area, were made during the period 1914–41, as follows:

(1) Power site reserve No. 446 (made by Executive order dated September 5, 1914 (copy attached), covering all lands within one-fourth mile of the Colorado River in part of the Boulder Canyon project and in stretches of the Bridge Canyon Basin);

(2) Power site reserve No. 447 (made by departmental order dated July 16, 1914 (copy attached), covering all lands in the Hualapai and Navajo Indian Reservations within one-fourth mile of the Colorado River);

(3) Power site reserve No. 490 (made by Executive order of May 11, 1915 (copy attached), covering all the lands within one-fourth mile of the Colorado River in several locations along the north side of the river);

(4) Power site reserve No. 605 (made by Executive order of April 28, 1917 (copy attached), covering lands within one-fourth mile of the Colorado River, and all lands within one-fourth mile of Kanab Creek for a distance of 5 miles from the river in the areas of the Grand Canyon National Monument and Kaibab National Forest);

(5) Power site reserve No. 763 (made by departmental order dated November 27, 1941 (copy attached), including lands in the Hualapai Reservation to elevation 1,800, not previously covered by power site reserves);

(6) Waterpower designations Nos. 5 and 7 (made by departmental order dated February 9, 1917 (copy attached), under the authority of sec. 28 of the act of June 20, 1910 (36 Stat. 574, 575) covering all lands within one-fourth mile of the Colorado River within the Grand Canyon National Monument, in Grand Canyon National Park, and in other places).

On April 19, 1920, the site for the Bridge Canyon Dam was included in a first-form reclamation withdrawal under sec. 3 of the Reclamation Act of June 17, 1902 (32 Stat. 388), covering all lands lying within 2 miles of the Colorado River 1 mile below the north side of Diamond Creek on the south line of T. 32 N., R. 15 W., G. & S. RM.

On March 3, 1933, additional lands were withdrawn which include that section of the river for about 70 miles upstream from Bridge Canyon Dam site, overlapping the earlier withdrawal. This latter withdrawal constitutes the upper limits of the Lake Mead National Recreation Area which is administered by the National Park Service under agreement with the Bureau of Reclamation, approved by the Secretary of the Interior, October 13, 1936. The lands under reclamation withdrawal are on the north side of the river in the Arizona strip and extend from the Grand Canyon National Monument at river mile 183.8 downstream to well below the damsite.

The withdrawal of March 3, 1933, provides the necessary rights-of-way on the north side of the river from the damsite to the western boundary of the Grand Canyon National Monument.

The Bridge Canyon Dam site is also the subject of five project applications pending before the Federal Power Commission and the lands included in such project applications are withdrawn under the Federal Power Act.

MARBLE CANYON DAM

The Marble Canyon Dam site is located 12½ miles above the upstream boundary of Grand Canyon National Park, and is outside of the national park and monument.

The lands for the proposed Marble Canyon Dam and Reservoir are subject to the following withdrawals and reservations under the laws of the United States:

(1) Reserved for power development by waterpower designation No. 7, approved February 9, 1917 (copy attached), pursuant to section 28, of the act of June 20, 1910 (36 Stat. 557, 575).

(2) Reserved for power development by power site reserve No. 447, July 16, 1914 (copy attached), pursuant to the act of June 25, 1910 (36 Stat. 855, 858).

(3) Reserved for power development by power site reserve No. 446 of September 5, 1914 (copy attached), pursuant to the act of June 25, 1910 (36 Stat. 843) as amended by the act of August 24, 1912 (37 Stat. 497).

(4) Reserved for power development by power site reserve No. 743 of May 7, 1920 (copy attached), pursuant to the act of June 25, 1910 (36 Stat. 847) as amended by the act of August 24, 1912 (37 Stat. 497).

(5) Reserved for reclamation purposes by first form reclamation withdrawal of March 14, 1957, 22 F.R. 5857, pursuant to the act of June 17, 1902 32 Stat. 388, 43 U.S.C., 391).

(6) Reserved for reclamation purposes by first-form reclamation withdrawal; public land orders No. 1909, July 17, 1959, 24 F.R. 5904, pursuant to the act of June 17, 1902 (32 Stat. 388, 43 U.S.C., 391).

(7) Reserved for power purposes on July 15, 1958, under section 24 of the act of June 10, 1920, as amended, c. 285 (41 Stat. 1075, 16 U.S.C., 818), in connection with project No. 2248.

Copies of the first-form reclamation withdrawals mentioned herein are not available at this time but will be forwarded to the subcommittee as soon as this material can be obtained from the Bureau's field files.

Since the effective dates of the withdrawals or reservations of lands hereinbefore mentioned, some of the townships involved have been surveyed. Subsequent to survey, the boundaries of some of the withdrawals or reservations have been slightly modified by powersite interpretations to conform the reservations or withdrawals to the survey. These modifications will not appreciably affect the land area involved in the projects.

I have requested that the Bureau of Reclamation provide me with maps showing the land status and classification in the areas affected by the proposed projects. Upon receipt of such maps, I will transmit them to you for use by the subcommittee.

Sincerely yours,

FRANK J. BARRY, *Solicitor.*

LAND CLASSIFICATION BOARD,
June 30, 1914.

The Honorable the SECRETARY OF THE INTERIOR.

SIR: In accordance with your general instructions, I recommend the withdrawal for waterpower sites of the following areas, involving approximately 40,000 acres.

Respectfully,

GEO. OTIS SMITH, *Director.*

Respectfully referred to the President with favorable recommendation.

ORDER OF WITHDRAWAL

POWER SITE RESERVE NO. 446

Colorado River, Ariz. and Nev.

Under and pursuant to the provisions of the act of Congress approved June 25, 1910 (36 Stat., 847), entitled "An act to authorize the President of the United States to make withdrawals of public lands in certain cases," as amended by act of Congress approved August 24, 1912 (37 Stat., 497), it is hereby ordered that the following described lands be, and the same are hereby, withdrawn from settlement, location, sale, or entry and reserved for waterpower sites:

Gila and Salt River Meridian, Arizona

All lands within a quarter of a mile of Colorado River within the following unsurveyed townships:

T. 33 N., R. 5 W.
T. 34 N., R. 5 W.
T. 32 N., R. 16 W.
T. 33 N., R. 16 W.
T. 30 N., R. 17 W.
T. 31 N., R. 17 W.
T. 32 N., R. 17 W.
T. 30 N., R. 18 W.
T. 31 N., R. 18 W.
T. 31 N., R. 19 W.
T. 32 N., R. 19 W.

All lands located on the north or west bank of Colorado River within a quarter of a mile thereof, in the following unsurveyed townships and portions of townships:

T. 36 N., R. 5 E., N½ of township.
T. 37 N., R. 5 E.
T. 37 N., R. 6 E.
T. 38 N., R. 6 E.
T. 39 N., R. 6 E.
T. 39 N., R. 7 E.
T. 40 N., R. 7 E.
T. 40 N., R. 8 E.
T. 41 N., R. 8 E.
T. 41 N., R. 9 E.
T. 42 N., R. 9 E.
T. 33 N., R. 6 W.
T. 32 N., R. 7 W.
T. 33 N., R. 7 W.
T. 32 N., R. 8 W., S½ of township.
T. 31 N., R. 9 W.
T. 32 N., R. 9 W.
T. 31 N., R. 10 W.
T. 31 N., R. 15 W.
T. 32 N., R. 15 W.

All lands on the south or east bank of Colorado River within a quarter of a mile thereof and not within the Hualpai Indian Reservation, within the following unsurveyed townships:

T. 32 N., R. 6 W.
T. 33 N., R. 6 W.
T. 31 N., R. 15 W.
T. 32 N., R. 15 W.

Mount Diablo Meridian, Nevada

T. 21 S., R. 68 E.,
Sec. 2, lots 5 to 8, inclusive;
Sec. 3, lots 5, 6, and 7, SE¼ of NW¼;
Sec. 4, lots 1 and 2;
Sec. 11, lot 1;
Sec. 12, lots 1 to 4, inclusive,
NW¼ of NW¼.

All lands within a quarter of a mile of Colorado River in the following unsurveyed townships:

T. 21 S., R. 69 E.
T. 22 S., R. 69 E.
T. 21 S., R. 70 E.
T. 22 S., R. 70 E.
T. 20 S., R. 71 E.
T. 21 S., R. 71 E.
T. 22 S., R. 71 E.

WOODROW WILSON, *President.*

LAND CLASSIFICATION BOARD,
June 30, 1914.

The Honorable the SECRETARY OF THE INTERIOR
(Through the Commissioner of Indian Affairs.)

SIR: In accordance with your general instructions, I recommend the withdrawal for waterpower sites of the following areas, involving approximately 38,000 acres in the Hualpai and Navajo Indian Reservations.

Respectfully,

GEO. OTIS SMITH, *Director.*

I concur in the foregoing recommendation.

_____,
Commissioner of Indian Affairs.

ORDER OF WITHDRAWAL

POWER SITE RESERVE NO. 447

Colorado River, Ariz.

It is hereby ordered that the following described lands, valuable for powersites, be, and the same are hereby, reserved from location, sale, entry, allotment, or other appropriation in accordance with the provisions of sections 13 and 14 of the act approved June 25, 1910 (36 Stat. 855, 858), and that no trust or fee simple patent be issued as regards the lands until further orders:

Gila and Salt River Meridian

All lands in the Hualpai and Navajo Indian Reservations within a quarter of a mile of Colorado River and within the following unsurveyed townships:

T. 36 N., R. 5 E.
T. 37 N., R. 5 E.
T. 37 N., R. 6 E.
T. 38 N., R. 6 E.
T. 38 N., R. 7 E.
T. 39 N., R. 6 E.
T. 39 N., R. 7 E.
T. 40 N., R. 7 E.
T. 40 N., R. 8 E.
T. 41 N., R. 8 E.
T. 41 N., R. 9 E.
T. 42 N., R. 9 E.
T. 33 N., R. 6 W.
T. 32 N., R. 7 W.
T. 33 N., R. 7 W.
T. 32 N., R. 8 W.
T. 30 N., R. 9 W.
T. 31 N., R. 9 W.
T. 32 N., R. 9 W.
T. 27 N., R. 10 W.
T. 28 N., R. 10 W.
T. 29 N., R. 10 W.
T. 30 N., R. 10 W.
T. 31 N., R. 10 W.
T. 27 N., R. 11 W.
T. 28 N., R. 11 W.
T. 27 N., R. 12 W.
T. 28 N., R. 12 W.
T. 28 N., R. 13 W.
T. 29 N., R. 13 W.
T. 29 N., R. 14 W.
T. 30 N., R. 14 W.
T. 31 N., R. 14 W.
T. 31 N., R. 15 W.
T. 32 N., R. 15 W.

Referred to the Commissioner of the General Land Office for appropriate action.

A. A. JONES,
First Assistant Secretary.

LAND CLASSIFICATION BOARD,
July 15, 1914.

The Honorable the SECRETARY OF THE INTERIOR.

SIR: In accordance with your general instructions, I recommend the withdrawal for waterpower sites of the following areas, involving approximately 4,240 acres.

Respectfully,

GEO. OTIS SMITH, *Director.*

AUGUST 12, 1914.

Respectfully referred to the President with favorable recommendation.

FRANKLIN K. LANE.

ORDER OF WITHDRAWAL

POWER SITE RESERVE NO. 448

Owens River Tributaries, California

Under and pursuant to the provisions of the act of Congress approved June 25, 1910 (36 Stat., 847), entitled "An act to authorize the President of the United States to make withdrawals of public lands in certain cases," as amended by act of Congress approved August 24, 1912 (37 Stat., 497), it is hereby ordered that the following described lands be, and the same are hereby, withdrawn from settlement, location, sale, or entry and reserved for water power sites:

Mount Diablo Meridian

T. 15 S., R. 35 E., sec. 6, NW¼ of NE¼, NW¼; all lands in unsurveyed secs. 25, 26, 27, 28, 33, 34, 35, and 36 within one-quarter mile of Lone Pine Creek.

T. 16 S., R. 35 E. (unsurveyed); all lands in secs. 1, 2, and 12 within one-quarter mile of Tuttle Creek.

T. 15 S., R. 36 E., all lands in unsurveyed secs. 29, 30, 31, and 32 within one-quarter mile of Lone Pine Creek.

T. 17 S., R. 36 E., sec 23, NW¼ of NE¼, N½ of NW¼, SE¼ of NW¼.

T. 19 S., R. 36 E., sec. 13, SW¼ of SW¼; sec. 24, N½ of NE¼, N½ of NW¼ SE¼ of NW¼.

T. 19 S., R. 37 E., sec. 19, NW¼ of NW¼.

WOODROW WILSON, *President.*

LAND CLASSIFICATION BOARD,
April 30, 1915.

The Honorable the SECRETARY OF THE INTERIOR.

SIR: In accordance with your general instructions I recommend the withdrawal for waterpower sites of the following areas, involving approximately 12,000 acres, which have been recommended by the Secretary of Agriculture for elimination from the Dixie National Forest, Ariz.

Respectfully,

GEO. OTIS SMITH, *Director.*

Respectfully referred to the President with favorable recommendation.

FRANKLIN K. LANE.

ORDER OF WITHDRAWAL

POWER SITE RESERVE NO. 490

Colorado River, Ariz.

Under and pursuant to the provisions of the act of Congress approved June 25, 1910 (36 Stat. 847), entitled "An act to authorize the President of the United States to make withdrawals of public lands in certain cases," as amended by act of Congress approved August 24, 1912 (37 Stat. 497), it is hereby ordered that the following described lands be, and the same are hereby, withdrawn from settlement, location, sale, or entry, and reserved for waterpower sites:

Gila and Salt River Meridian

All lands located on the north or west bank and the north or east bank of Colorado River within one-quarter of a mile thereof, in the following unsurveyed townships:

T. 32 N., R. 8 W.
T. 33 N., R. 8 W.
T. 29 N., R. 9 W.
T. 30 N., R. 9 W.
T. 28 N., R. 10 W.
T. 29 N., R. 10 W.
T. 30 N., R. 10 W.
T. 27 N., R. 11 W.
T. 28 N., R. 11 W.
T. 27 N., R. 12 W.
T. 28 N., R. 12 W.
T. 29 N., R. 12 W.
T. 28 N., R. 13 W.
T. 29 N., R. 13 W.
T. 29 N., R. 14 W.
T. 30 N., R. 14 W.
T. 31 N., R. 14 W.

WOODROW WILSON, *President.*

MARCH 15, 1917.

The Honorable the SECRETARY OF THE INTERIOR.

SIR: In accordance with your general instructions, I recommend the withdrawal for waterpower sites of the following areas, involving approximately 7,440 acres.

Respectfully,

GEO. OTIS SMITH, *Director.*

Respectfully referred to the President with favorable recommendation.

FRANKLIN K. LANE.

ORDER OF WITHDRAWAL

POWERSITE RESERVE NO. 605

Colorado River and Small Tributaries, Arizona

Under and pursuant to the provisions of the act of Congress approved June 25, 1910 (36 Stat., 847), entitled "An act to authorize the President of the United States to make withdrawals of public lands in certain cases," as amended by act of Congress approved August 24, 1912 (37 Stat. 497), it is hereby ordered that the following described lands be, and the same are hereby, withdrawn from settlement, location, sale, or entry, and reserved for waterpower sites:

Gila and Salt River Meridian

T. 36 N., R. 6E. (unsurveyed), all unsurveyed lands lying within a quarter of a mile of Colorado River on the north and west side, and outside the Tusayan and Kaibab National forests.

All unsurveyed lands in the following townships lying within a quarter of a mile of Colorado River on the north and west side:

T. 38 N., R. 5 E.
T. 40 N., R. 6 E.
T. 37 N., R. 7 E.
T. 41 N., R. 7E.
T. 39 N., R. 8 E.
T. 42 N., R. 8 E.
T. 40 N., R. 9 E.
T. 41 N., R. 10 E.
T. 42 N., R. 10 E.
T. 42 N., R. 11 E.

T. 34 N., R. 4 W. (unsurveyed), all unsurveyed lands lying within a quarter of a mile of Colorado River on the north and west side and outside the Kaibab National Forest.

All unsurveyed lands in the following townships lying within a quarter of a mile of Colorado River on the north and west side or north and east side:

T. 35 N., R. 4 W.
T. 32 N., R. 5 W.
T. 32 N., R. 6 W.
T. 31 N., R. 8 W.
T. 33 N., R. 9 W.
T. 27 N., R. 10 W.
T. 32 N., R. 10 W.
T. 29 N., R. 11 W.
T. 30 N., R. 13 W.
T. 28 N., R. 14 W.
T. 30 N., R. 15 W.
T. 33 N., R. 15 W.
T. 31 N., R. 16 W.

All unsurveyed lands in the following townships lying within a quarter of a mile of Kanab Creek on the north and west side, for a distance of 5 miles from Colorado River: T. 35 N., R. 3 W., T. 35 N., R. 4 W.

All unsurveyed lands in the following townships lying within a quarter of a mile of Paria River, for a distance of 5 miles from Colorado River: T. 40 N., R. 7 E., T. 40 N., R. 8 E.

WOODROW WILSON, *President.*

APRIL 22, 1920.

The Honorable the SECRETARY OF THE INTERIOR.

SIR: In accordance with your general instructions, I recommend the withdrawal for powersite reserve of the following areas involving approximately 6,360 acres in Arizona.

Respectfully,

GEO. OTIS SMITH, *Director.*

MAY 6, 1920.

Respectfully referred to the President with favorable recommendation.

PAYNE.

ORDER OF WITHDRAWAL

POWERSITE RESERVE NO. 743—

Colorado River, Ariz.

Under and pursuant to the provisions of the act of Congress approved June 25, 1910 (36 Stat. 847), entitled "An Act to authorize the President of the United States to make withdrawals of public lands in certain cases," as amended by Act of Congress approved August 24, 1912 (37 Stat., 497), it is hereby ordered that the following described lands be, and the same are hereby, withdrawn from settlement, location, sale, or entry, and reserved for waterpower sites:

Gila and Salt River Meridian

T. 34 N., R. 5 E., all land of the United States, which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter mile of Colorado River on the east side.

T. 35 N., F. 5 E., all land of the United States, which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter mile of Colorodo River on the east side.

T. 36 N., R. 5 E., all land of the United States, which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter mile of Colorado River on the east side and not withdrawn in Powersite Reserve No. 447.

T. 34 N., R. 6 E., all land of the United States, which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter mile of Colorado River on the east side.

T. 35 N., R. 6 E., all land of the United States, which, when surveyed, will be included within legal subdivision situated in whole or in part within a quarter mile of Colorado River.

T. 36 N., R. 6 E., all land of the United States, which, when surveyed, will be included within legal subdivisions, situated in whole or in part within a quarter mile of Colorado River on the east side, and not in Navajo Indian Reservation.

WOODROW WILSON, *President.*

U.S. DEPARTMENT OF THE INTERIOR,
GEOLOGICAL SURVEY,
Washington, November 27, 1941.

The Honorable the SECRETARY OF THE INTERIOR.

SIR: The accompanying proposed order of powersite reserve embraces lands in the Hualpai Indian Reservation adjacent to Colorado River which would be affected by backwater from a moderately high dam at either the Bridge Canyon

or the Travertine Canyon damsite. I recommend the approval of this order (powersite reserve No. 763, Colorado River, Ariz.) involving an estimated area of 400 acres. The lands are all shown to be tribal lands by search of status made by an employee of the Geological Survey, October 17, 1941.

Respectfully,

W. C. MENDENHALL, *Director.*

I concur, July 15, 1942.

FRED W. JOHNSON,
Commissioner, General Land Office.

I concur, June 29, 1942.

WILLIAM ZIMMERMAN, Jr.,
Assistant Commissioner, Office of Indian Affairs.

ORDER OF WITHDRAWAL

POWERSITE RESERVE NO. 763

Colorado River, Ariz.

By virtue of and pursuant to the provisions of section 13 of the act of June 25, 1910, 36 Stat. 858; 43 U.S.C. 148, it is hereby ordered that the following described lands, be, and the same are hereby, withdrawn from location, entry, sale allotment or other appropriation and reserved for powersite purposes including any of said lands in any trust patent issued to any Indian allottee and now or hereafter canceled pursuant to section 14 of the act of June 25, 1910, 36 Stat. 858; 25 U.S.C. 352:

Gila and Salt River Meridian, Arizona

Every smallest legal subdivision on the left or east bank of the Colorado River in the following townships, not previously withdrawn for power purposes, which, when surveyed, will lie in whole or in part below an altitude of 1,800 feet as shown on sheet G of a map of the Colorado River entitled "Plan and Profile of Colorado River from Lees Ferry, Ariz., to Black Canyon, Ariz.–Nev., and Virgin River, Nev." and published in 21 sheets by the U.S. Geological Survey: T. 28 N., R. 10 W.; T. 30 N., R. 10 W.

OSCAR L. CHAPMAN,
Assistant Secretary.

LAND CLASSIFICATION BOARD,
January 31, 1917.

The Honorable the SECRETARY OF THE INTERIOR.

SIR: In accordance with your instructions of November 15, 1910, I recommend the issuance of the following order of designation (waterpower designation No. 5, Arizona No. 2), affecting approximately 124,760 acres of land in Arizona which have been ascertained to be valuable for the development of waterpower.

Respectfully,

GEO. OTIS SMITH, *Director.*

WATERPOWER DESIGNATION NO. 5

Arizona No. 2

Under and pursuant to the provisions of section 28 of the act of Congress approved June 20, 1910 (36 Stat., 557, 575), entitled "An act * * * to enable the people of Arizona to form a constitution and State government and be admitted into the Union on an equal footing with the original States," the following described lands are hereby designated as actually or prospectively valuable for the development of waterpowers or power for hydroelectric use or transmission, and notice is hereby given that under the terms of said act said lands are reserved to the United States and exempted from the operation of any and all grants made or confirmed thereby to the State of Arizona:

Gila and Salt River Meridian

Oak Creek

T. 15 N., R. 4 E.,
Sec. 2, E½, SE¼ of SW¼;
Sec. 10, SE¼ of NE¼, NE¼ of SE¼;
Sec. 11, N½ of NE¼, SW¼ of NE¼, NE¼ of NW¼, S½ of NW¼, N½ of SW¼.
T. 16 N., R. 4 E.,
Sec. 14, SW¼ of NE¼, SE¼ of NW¼, SW¼, NW¼ of SE¼;
Sec. 23, NW¼ of NE¼, S½ of NE¼, NW¼ of NW¼, E½ of W½, ES¼;
Sec. 25, SW¼ of NW¼, W½ of SW¼;
Sec. 26, NE¼, E½ of NW¼, N½ of SE¼, SE¼ of SE¼;
Sec. 35, E½ of NE¼, SE¼;
Sec. 36, W½ of NW¼, NW¼ of SW¼.
T. 17 N., R. 5 E.,
Sec. 13, SE¼ of SE¼;
Sec. 23, SE¼ of SE¼;
Sec. 24, NE¼, SE¼ of NW¼, S½;
Sec. 25, NE¼ of NE¼, W½ of NE¼, NW¼, NW¼ of SW¼;
Sec. 26 NE¼, NE¼ of NW¼, S½ of NW¼, S½.
T. 17 N., R. 6 E.,
Sec. 4, W½ of NE¼, NW¼, N½ of SW¼, SW¼ of SW¼;
Sec. 5, S½ of NE¼, NE¼ of SW¼, S½ of SW¼, SE¼;
Sec. 7, SE¼ of NE¼, SE¼;
Sec. 8, NE¼ of NE¼, W½ of NE½, W½, NW¼ of SE¼;
Sec. 17, W½ of W½;
Sec. 18, NE¼, E½ of NW¼, S½;
Sec. 19, N½, SW¼, NW¼ of SE¼;
Sec. 20, NW¼ of NW¼.
T. 18 N., R. 6 E.,
Sec. 27, S½ of SW¼;
Sec. 33, SE¼ of NE¼, E½ of SE¼;
Sec. 34, NW¼, N½ of SW¼, SW¼ of SW¼.

Verde River

T. 17 N., R. 2E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within 3 miles of Verde River in the east half of the township.

T. 18 N., R. 2 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within 3 miles of Verde River in the east half of the township.

T. 16 N., R. 3 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within half a mile of Verde River.

T. 17 N., R. 3 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within 3 miles of Verde River.

T. 18 N., R. 3 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within 3 miles of Verde River.

T. 12 N., R. 5 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within 1 mile of Verde River.

T. 9 N., R. 6 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within half a mile of Verde River.

T. 10 N., R. 6 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within half a mile of Verde River.

T. 11 N., R. 6 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within half a mile of Verde River.

T. 11½ N., R. 6 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within 1 mile of Verde River.

T. 12 N., R. 6 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within 1 mile of Verde River.

T. 9 N., R. 7 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within half a mile of Verde River.

T. 10 N., R. 7 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within half a mile of Verde River.

T. 11 N., R. 7 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within half a mile of Verde River.

T. 11½ N., R. 7 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within half a mile of Verde River.

Bright Angel Creek

T. 31 N., R. 3 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within half a mile of Bright Angel Creek.

T. 32 N., R. 3 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within half a mile of Bright Angel Creek.

T. 33 N., R. 3 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within half a mile of Bright Angel Creek.

Aravaipa Creek

T. 6 S., R. 17 E., all land of the United States in the E½, secs. 13 and 24 which, when surveyed will be included within legal subdivisions situated in whole or in part within a quarter of a mile of Aravaipa Creek.

T. 6 S., R. 18 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter of a mile of Aravaipa Creek.

T. 6 S., R. 19 E., all land of the United States in the unsurveyed portion of sec. 19 which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter of a mile of Aravaipa Creek. Sec. 19, NE¼.

Tanque Verde Creek

T. 13 S., R. 16 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter of a mile of Tanque Verde Creek.

T. 14 S., R. 16 E., all land of the United States in secs. 1 and 2 which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter of a mile of Tanque Verde Creek.

T. 13 S., R. 17 E., all land of the United States west of sec. 26 which, when surveyed, will be included within legal subdivisions situated in whole or in part within half a mile of Tanque Verde Creek.

T. 14 S., R. 17 E., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter of a mile of Tanque Verde Creek.

Cataract Creek

T. 33 N., R. 3 W., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter of a mile of Cataract Creek.

T. 33 N., R. 4 W., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter of a mile of Cataract Creek.

T. 34 N., R. 4 W., all land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter of a mile of Cataract Creek.

FRANKLIN K. LANE, *Secretary.*

The Honorable the SECRETARY OF THE INTERIOR.

SIR: In accordance with your instructions of November 15, 1910, I recommend the issuance of the following order of designation (waterpower designation No. 7, Arizona No. 4), affecting approximately 178,240 acres of land in Arizona which have been ascertained to be valuable for the development of waterpower.

Respectfully,

GEO. OTIS SMITH, *Director.*

WATERPOWER DESIGNATION NO. 7

Arizona No. 4

Under and pursuant to the provisions of section 28 of the act of Congress approved June 20, 1910 (36 Stat., 557, 575), entitled "An act * * * to enable the people of Arizona to form a constitution and State government and be admitted into the Union on an equal footing with the original States," the following described lands are hereby designated as actually or prospectively valuable for the development of waterpowers or power for hydroelectric use or transmission, and notice is hereby given that under the terms of said act said lands are reserved to the United States and exempted from the operation of any and all grants made or confirmed thereby to the State of Arizona:

Gila and Salt River Meridian

All land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter of a mile of Colorado River and within the following townships:

T. 31 N., R. 1 E.	T. 38 N., R. 5 E.
T. 33 N., R. 1 E.	T. 31 N., R. 6 E.
T. 31 N., R. 2 E.	T. 32 N., R. 6 E.
T. 32 N., R. 2 E.	T. 33 N., R. 6 E.
T. 32 N., R. 3 E.	T. 34 N., R. 6 E.
T. 30 N., R. 4 E.	T. 35 N., R. 6 E.
T. 31 N., R. 4 E.	T. 36 N., R. 6 E.
T. 30 N., R. 5 E.	T. 37 N., R. 6 E.
T. 31 N., R. 5 E.	T. 38 N., R. 6 E.
T. 32 N., R. 5 E.	T. 39 N., R. 6 E.
T. 33 N., R. 5 E.	T. 40 N., R. 6 E.
T. 34 N., R. 5 E.	T. 37 N., R. 7 E.
T. 35 N., R. 5 E.	T. 38 N., R. 7 E.
T. 36 N., R. 5 E.	T. 39 N., R. 7 E.
T. 37 N., R. 5 E.	T. 41 N., R. 7 E.

All land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter of a mile of Kanab Creek for a distance of 5 miles from Colorado River, and within the following townships: T. 35 N., R. 3 W., T. 35 N., R. 4 W.

All land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter of a mile of Clear Creek for a distance of 1 mile from Colorado River, and within the following township: T. 31 N., R. 3 E.

All land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter of a mile of Crystal Creek for a distance of 1 mile from Colorado River, and within the following township: T. 32 N., R. 1 E.

All land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter of a mile of Paria River for a distance of 5 miles from Colorado River, and within the following townships: T. 40 N., R. 7 E., T. 40 N., R. 6 E.

All land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter of a mile of Navajo Creek for a distance of 5 miles from Colorado River, and within the following townships: T. 41 N., R. 9 E., T. 41 N., R. 10 E.

All land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter of a mile of Shinumo Creek for a distance of 1 mile from Colorado River, and within the following township: T. 33 N., R. 1 W.

All land of the United States which, when surveyed, will be included within legal subdivisions situated in whole or in part within a quarter of a mile of Tapeats Creek for a distance of 1 mile from Colorado River, and within the following township: T. 35 N., R. 2 W.

FRANKLIN K. LANE.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SOLICITOR,
Washington, D.C., September 8, 1965.

Hon. MORRIS K. UDALL,
House of Representatives,
Washington, D.C.

DEAR MR. UDALL: In my letter of August 31, 1965, regarding the land status of areas included in the proposed Marble Canyon and Bridge Canyon Dam and Reservoir projects, I mentioned that copies of the first-form reclamation withdrawals mentioned therein were then not available but would be forwarded to the subcommittee as soon as this material could be obtained from the Bureau's field files. The Bureau has provided me with copies of the following documents, which I forward herewith in response to your request.

First form withdrawal, dated April 19, 1920.
First form withdrawal, dated March 3, 1933.
First form withdrawal, dated September 10, 1953.
First form withdrawal, dated March 26, and April 25, 1956.
First form withdrawal, dated March 14, 1957.
First form withdrawal, dated July 17, 1959.
Base map, reclamation withdrawn, land No. X–300–397.
Base map, reclamation withdrawn, land No. X–300–438.

Sincerely yours,

——— ———. *Solicitor.*

FIRST FORM WITHDRAWAL

COLORADO RIVER STORAGE PROJECT, ARIZONA

SECRETARY ORDER DATED APRIL 19, 1920

DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
Washington, April 19, 1920.

The Honorable the SECRETARY OF THE INTERIOR.

SIR: I have the honor to recommend that the following described lands, excepting any tract the title to which has passed out of the United States, be withdrawn from public entry, under the first form of withdrawal, as provided in section 3, act of June 17, 1902 (32 Stat., 388).

COLORADO RIVER STORAGE PROJECT

Boulder Canyon Reservoir, Ariz.

Gila and Salt River Base and Meridian

T. 31 N., R. 22 W., all secs. 1 to 6 inclusive (unsurveyed).
T. 32 N., R. 22 W., all township (unsurveyed).
T. 31 N., R. 23 W., all secs 1 to 12 inclusive (unsurveyed).

All lands lying within 2 miles of the Colorado River from a point on the Colorado River 1 mile below the mouth of Diamond Creek to the south line of T. 32 N.. R. 15 W.

NEVADA

Mount Diablo Meridian

T. 20 S., R. 65 E., all secs. 35 and 36 (unsurveyed).
T. 21 S., R. 65 E., all township (unsurveyed).
T. 20 S., R. 66 E., all secs 26 to 35 inclusive (unsurveyed).
T. 21 S., R. 66 E., all township (unsurveyed).

As the above-described lands are unsurveyed, it is requested that notation be made on the records so as to withdraw the lands after survey is made as well as prior thereto.

Respectfully submitted.

A. P. DAVIS, *Director.*

DEPARTMENT OF THE INTERIOR,
April 19, 1920.

The lands described are hereby reserved as recommended and the Commissioner of the General Land Office will cause the records of his office and of the local land office to be noted accordingly.

JOHN BARTON PAYNE.

FIRST FORM WITHDRAWAL

COLORADO RIVER STORAGE PROJECT, ARIZONA

SECRETARY ORDER DATED MARCH 3, 1933

U.S. DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
Washington, March 3, 1933.

The SECRETARY OF THE INTERIOR.

SIR: It is recommended that the following described lands (excepting any tract the title to which has passed out of the United States) be withdrawn from public entry, under the first form of withdrawal, as provided in section 3, Act of June 17, 1902 (32 Stat. 388).

COLORADO RIVER STORAGE PROJECT

Gila and Salt River Base and Meridian, Arizona

T. 31 N., R. 8 W.
Secs. 4 to 9 inclusive, 16, 17 and 18.
T. 32 N., R. 8 W.
W½ of township.
T. 33 N., R. 8 W.
Secs. 19, 30, 31, 32 and 33, and those portions of secs. 20 and 29 lying west of the west boundary of the Grand Canyon National Monument.
T. 29 N., R. 9 W.
Secs. 4 to 9 inclusive, 16, 17, 18.
T. 30 N., R. 9 W.
Secs. 4 to 9 inclusive, 16 to 21 inclusive, 28 to 33 inclusive.
T. 31 N., R. 9 W., all.
T. 32 N., R. 9 W., all.
T. 33 N., R. 9 W.
Secs. 19 to 36 inclusive.
T. 27 N., R. 10 W.
Secs. 1 to 19 inclusive.
T. 28 N., R. 10 W., all.
T. 29 N., R. 10 W., all.
T. 30 N., R. 10 W., all.
T. 31 N., R. 10 W., all.
T. 32 N., R. 10 W., all.
T. 33 N., R. 10 W.
Secs. 19 to 36 inclusive.
T. 27 N., R. 11 W.
Secs. 1 to 18 inclusive.
T. 28 N., R. 11 W., all.
T. 29 N., R. 11 W., all.
T. 30 N., R. 11 W., all.
T. 31 N., R. 11 W., all.
T. 32 N., R. 11 W.
Secs. 25 to 36 inclusive.
T. 27 N., R. 12 W.
Secs. 1 to 18 inclusive.
T. 28 N., R. 12 W., all.
T. 29 N., R. 13 W., all.
T. 30 N., R. 12 W., all.
T. 31 N., R. 12 W.
Secs. 29 to 36 inclusive.
T. 29 N., R. 13 W., all.
T. 30 N., R. 13 W., all.
T. 31 N., R. 13 W.
Secs. 19, 20, 21, 28 to 33 inclusive.
T. 30 N., R. 14 W.. all.
T. 31 N., R. 16 W., all.
T. 31 N., R. 15 W., all.
T. 30 N., R. 16 W.
Secs. 5, 6, 7, 8 and 18.
T. 31 N., R. 16 W., all.
T. 31 N., R. 21 W.
Secs. 19 to 36 inclusive.
T. 31 N., R. 22 W.
Secs. 23, 24, 25, 26, 35, 36.

Mount Diablo Meridian, Nevada

T. 20 S., R. 63 E.
Sec. 36.
T. 20 S., R. 64 E.
Secs. 31, 32, 33.
T. 20 S., R. 65 E.
Secs. 19 to 36 inclusive.
T. 17 S., R. 67 E.
Secs. 24 and 25.
T. 18 S., R. 67 E.
Secs. 13, 24 and 36.
T. 19 S., R. 67 E.
Secs. 13, 24, 25, and 36.
T. 20 S., R. 67 E.
Secs. 1, 11, 14 and 23.
T. 15 S., R. 68 E.
Secs. 26 and 35.
T. 17 S., R. 68 E.
Secs. 8, 17, 18, 19, 20, 21, 22, 28, 29, 30.
T. 18 S., R. 68 E.
Secs. 5, 7, 18, 25 and 36.
T. 19 S., R. 68 E.
Secs. 18, 19, 30.
T. 15 S., R. 69 E.
Secs. 29 and 32.
T. 16 S., R. 69 E.
Sec. 32.
T. 17 S., R. 69 E.
Secs. 4, 9, 10, 15, 16, 21 and 28.
T. 20 S., R. 69 E.
Secs. 34, 35, and 36.
T. 21 S., R. 69 E.
Secs. 1, 2, 11, 12, 13.
T. 20 S., R. 70 E.
Secs. 23, 26, 31, 32, 33.
T. 21 S., R. 71 E.
Secs. 4, 5, 6, 7, 8, 9, 17, 18, 19, 30.

Respectfully,

EDWARD MEAD, *Commissioner.*

DEPARTMENT OF THE INTERIOR.

The lands described are hereby reserved as recommended and the Commissioner of the General Land Office will cause the records of his office and of the local land office to be noted accordingly.

JOS. M. DIXON,
First Assistant Secretary.

U.S. DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
Washington, March 21, 1933.

The SECRETARY OF THE INTERIOR.

SIR: By departmental order of March 3, 1933, certain lands described therein, excepting any tract the title to which has passed out of the United States, were withdrawn from public entry under first form of withdrawal, as provided in section 3, act of June 17, 1902 (32 Stat., 388) in connection with the Colorado River storage project.

A part of the land included in the said withdrawal was inadvertently described as being in townships 20 and 21 north, range 69 east, Mount Diablo Meridian, Nevada, and it is therefore recommended that the said order be amended to take effect as of March 3, 1933, to the extent of describing the lands in question as being in townships 20 and 21 south, range 69 east, Mount Diablo Meridian, Nevada.

Respectfully,

ELWOOD MEAD, *Commissioner.*

Recommendation approved: March 22, 1933.

JOS. M. DIXON,
First Assistant Secretary.

FIRST FORM WITHDRAWAL

GLEN CANYON PROJECT, ARIZONA AND UTAH

COMMISSIONER ORDER DATED SEPTEMBER 10, 1953

FIRST FORM RECLAMATION WITHDRAWAL

COLORADO RIVER STORAGE PROJECT, ARIZONA-UTAH

Pursuant to the authority delegated by Departmental Order No. 2515 of April 7, 1949, I hereby withdraw the following described lands from public entry, under the first form of withdrawal, as provided by section 3 of the act of June 17, 1902 (32 Stat. 388):

Gila and Salt River Meridian, Arizona

T. 40 N., R. 7 E.,
Sec. 1, lots 1 to 4, inclusive, S½N½ and S½, all;
Sec. 2, lots 1 to 4, inclusive, S½N½ and S½, all;
Sec. 3, lots 1 to 4, inclusive, S½N½ and S½, all;
Secs. 10, 11, and 12, all;
Sec. 13, lots 1 to 4, inclusive, E½NE¼, W½NW¼ and NW¼SW¼;
Secs. 14, 15, and 22, all;
Sec. 23, lots 1 to 4, inclusive, NE¼NE¼, W½NE¼, NW¼ and NW¼SW¼;
Sec. 24, lot 3;
Sec. 26, lots 2, 3, 6, and 7;
Sec. 27, lot 1, N½, SW¼, N½SE¼ and SW¼SE¼;
Sec. 34, lots 1, 2, 5, and 6, NW¼ and N½SW¼;
T. 42 N., R. 7 E., sec. 36, unsurveyed;
T. 40 N., R. 8 E.,
Secs. 2 and 3, those portions lying northwest of the Colorado River unsurveyed;
Secs. 4 to 7, inclusive, all;
Sec. 8, N½ and that unsurveyed portion of S½ lying northwest of Colorado River;
Sec. 9, N½ and that unsurveyed portion of S½ lying northwest of Colorado River;
Sec. 10, that portion lying northwest of Colorado River, unsurveyed;
Sec. 17, that portion lying northwest of Colorado River, unsurveyed;
Sec. 18, lots 1, 2, and 3, N½ and E½SE¼;
Sec. 19, that portion lying northwest of Colorado River, unsurveyed;
Sec. 20, that portion lying northwest of Colorado River, unsurveyed;
Sec. 21, that portion lying northwest of Colorado River, unsurveyed;
Secs. 28, 29, and 30, those portions lying northwest of Colorado River, unsurveyed.
T. 41 N., R. 8 E.,
Sec. 1, lots 1 to 4, inclusive, S½N½ and S½;
Sec. 2, lots 1 to 4, inclusive, S½N½ and S½;
Sec. 3, lots 1 to 4, inclusive, S½N½ and S½;
Sec. 4, lots 1 to 4, inclusive, S½N½ and S½;
Sec. 5, lots 1 to 4, inclusive, S½N½ and S½;
Sec. 6, lots 1 to 7, inclusive, S½NE¼, SE¼NW¼, E½SW¼ and SE¼;
Sec. 7, lots 1 to 4, inclusive, E½ and E½W½;
Secs. 8 to 12, inclusive, all;
Sec. 13, N½ and that unsurveyed portion of S½ lying northwest of Colorado River;
Secs. 14 to 17, inclusive, all;
Sec. 18, lots 1 to 4, inclusive, E½ and E½W½;
Sec. 19, lots 1 to 4, inclusive, E½ and E½W½;
Secs. 20 to 23, inclusive, all;
Sec. 24, that portion lying northwest of Colorado River, unsurveyed;
Sec. 25, that portion lying northwest of Colorado River, unsurveyed;
Sec. 26, N½, SW¼ and that unsurveyed portion of SE¼ lying northwest of Colorado River;
Secs. 27, 28, and 29, all;
Sec. 30, lots 1 to 4, inclusive, E½ and E½W½;
Sec. 31, lots 1 to 4, inclusive, E½ and E½W½;
Secs. 32, 33, and 34, all;
Sec. 35, that portion lying northwest of Colorado River, unsurveyed.
T. 42 N., R. 8 E.,
Sec. 31, lots 1 to 6, inclusive, E½SW¼SE¼;
Sec. 32, lots 1 to 4, inclusive, and S½;
Sec. 33, lots 1 to 4, inclusive, and S½;
Sec. 34, lots 1 to 4, inclusive, and S½;
Sec. 35, lots 1 to 4, inclusive, and S½;
Sec. 36, lots 1 to 4, inclusive, and S½.
T. 41 N., R. 9 E.,
Sec. 2, that portion lying northwest of Colorado River, unsurveyed;
Sec. 3, W½, SE¼ and that unsurveyed portion of NE¼ lying northwest of Colorado River;
Secs. 4 to 7, inclusive, all;

Sec. 8, W½ and that unsurveyed portion of E½ lying northwest of Colorado River;
Sec. 9, that portion lying northwest of Colorado River, unsurveyed;
Sec. 10, all;
Sec. 11, W½ and that unsurveyed portion of E½ lying northwest of Colorado River;
Secs. 14, 15, and 16, those portions lying northwest of Colorado River, unsurveyed;
Sec. 17, W½ and that unsurveyed portion of E½ lying northwest of Colorado River;
Sec. 18, N½ and that unsurveyed portion of S½ lying northwest of Colorado River;
Secs. 19 and 20, those portions lying northwest of Colorado River, unsurveyed.

T. 42 N., R. 9 E.,
Sec. 31, lots 1 to 4, inclusive, and S½;
Sec. 32, lots 1 to 4, inclusive, and S½;
Sec. 33, lots 1 to 4, inclusive, and S½;
Sec. 34, that portion lying northwest of Colorado River, unsurveyed.

Salt Lake Base and Meridian, Utah

T. 43 S., R. 2 E.,
Secs. 1 and 2;
Sec. 11, N½, SW¼SW¼ and SE¼;
Secs. 12, 13, 14, 23 to 26, inclusive, 35 and 36;
T. 43 S., R. 3 E., entire township;
T. 44 S., R. 3 E., all of fractional township;
T. 42 S., R. 4 E., secs. 19 to 36, inclusive;
T. 43 S., R. 4 E., entire township;
T. 44 S., R. 4 E., all fractional township;
T. 41 S., R. 5 E., secs. 19 to 36, inclusive, unsurveyed;
T. 42 S., R. 5 E., secs. 1 to 18, inclusive, 22 to 27, inclusive, 34, 35, and 36, unsurveyed;
T. 43 S., R. 5 E., entire township;
T. 44 S., R. 5 E., all of fractional township;
T. 41 S., R. 6 E., secs. 19 to 36, inclusive, unsurveyed;
T. 42 S., R. 6 E., entire township, unsurveyed;
T. 43 S., R. 6 E., all of fractional township;
T. 41 S., R. 7 E., secs. 19, 20, 23 to 27, inclusive, and 29 to 36 inclusive, unsurveyed;
T. 42 S., R. 7 E., entire township, unsurveyed;
T. 42½ S., R. 6½ E., all of fractional township, unsurveyed;
T. 39 S., R. 8 E., secs. 1, 2, 11 to 14, inclusive, 23 to 26, inclusive, 35 and 36, unsurveyed;
T. 40 S., R. 8 E., entire township, unsurveyed;
T. 41 S., R. 8 E., entire township, unsurveyed;
T. 42 S., R. 8 E., entire township, unsurveyed;
T. 42½ S., R. 7½ E., all of fractional township, unsurveyed;
T. 37 S., R. 9 E., secs. 1 to 3, inclusive, 10 to 15, inclusive, 22 to 27, inclusive, and 34 to 36, inclusive, unsurveyed;
T. 38 S., R. 9 E., secs. 1 to 3, inclusive, and 10 to 15, inclusive, unsurveyed;
T. 39 S., R. 9 E., secs. 6, 7, 18 to 21, inclusive, and 28 to 36, inclusive, unsurveyed;
T. 40 S., R. 9 E., entire township, unsurveyed;
T. 40 S., R. 9½ E., all of fractional township, unsurveyed;
T. 41 S., R. 9 E., all of fractional township, unsurveyed;
T. 40½ S., R. 9½ E., all of fractional township, unsurveyed;
T. 41 S., R. 9½ E., all of fractional township, unsurveyed;
T. 42 S., R. 9 E., all of fractional township, unsurveyed;
T. 42 S., R. 9½ E., those portions of secs. 1 to 5, inclusive, lying north of San Juan River, unsurveyed;
T. 36 S., R. 10 E., secs. 19 to 21, inclusive, and 28 to 33, inclusive, unsurveyed;
T. 37 S., R. 10 E., entire township, unsurveyed;

T. 38 S., R. 10 E.,
Secs. 1 to 7, inclusive;
Sec. 8, NW¼NE¼, S½NE¼, W½ and SE¼;
Sec. 9, N½NE¼, W½SW¼, and SE¼SW¼;
Sec. 10, NE¼, N½NW¼, SE¼NW¼ and NE¼SE¼;
Secs. 11 to 16, inclusive;
Secs. 17 to 21, inclusive, unsurveyed;
Secs. 22 to 27, inclusive;
Secs. 28 to 33, inclusive, unsurveyed;
Secs. 34 to 36, inclusive;
T. 39 S., R. 10 E., secs. 1 to 3, inclusive, 10 to 15, inclusive, 22 to 27, inclusive, and 31 to 36, inclusive, unsurveyed;
T. 40 S., R. 10 E., all of fractional township, unsurveyed;
T. 40 S., R. 10½ E., all of fractional township, unsurveyed;
T. 41 S., R. 10 E., all of township north of San Juan River, unsurveyed;
T. 42 S., R. 10 E., those portions of secs. 1 to 6, inclusive, lying north of San Juan River, unsurveyed;
T. 37 S., R. 11 E., entire township unsurveyed;
T. 37½ S., R. 11 E., all of fractional township, unsurveyed;
T. 38 S., R. 10½ E., all of fractional township, unsurveyed;
T. 38 S., R. 11 E., all of fractional township, unsurveyed;
T. 39 S., R. 10½ E., all of fractional township, unsurveyed;
T. 39½ S., R. 10½ E., all of fractional township, unsurveyed;
T. 39 S., R. 11 E., secs. 1 to 5, inclusive, 7 to 21, inclusive, and 28 to 33, inclusive, unsurveyed;
T. 40 S., R. 11 E.,
Secs. 4 to 9, inclusive, 16 to 31, inclusive, those portions of,
Secs. 32, 33 and 34 lying north of San Juan River; and
Secs. 35 and 36, unsurveyed;
T. 41 S., R. 11 E.,
Sec. 1;
Sec. 2, lots 1, 2, 5, 6, 10, 11, and 14;
Sec. 3, lots 1, 2, 3, 7, and 8;
Sec. 4, lot 6;
Sec. 5, lots 3 to 6, inclusive, 9, 10, and 11, S½NW¼, SW¼ and SW¼SE¼;
Secs. 6, 7, and 8;
Sec 9, lots 2, 3, and 4, S½NE¼, NW¼NW¼, S½NW¼, and S½;
Sec. 10, lots 5 to 8, inclusive, and S½;
Sec. 11, lots 1, 7, and 8;
Sec. 12, lots 1 to 4, inclusive, and 8;
Sec. 14, lot 2;
Sec. 15, lots 1, 2, 3, 7, and 8, NW¼NE¼ and W½;
Secs 16 to 21, inclusive;
Sec. 22, lots 2 and 3, NW¼NE¼, S½NE¼, W½, N½SE¼ and SW¼SE¼;
Sec. 23 lots 3, 4, 7, 8, and 9, and SW¼NW¼;
Sec. 27, lots 1, 2, 3, 6, and 7, NW¼NE¼ and W½;
Sec. 28, lots 1 to 4, inclusive, N½ and N½S½;
Sec. 29, lots 1, 3, and 4, N½, E½SW¼, N½SE¼ and SW¼SE¼;
Sec. 30, lots 1 to 7, inclusive, NE¼, E½NW¼ and NE¼SW¼;
Sec. 31, lots 2 to 5, inclusive, 8 and 9;
Sec. 32, lots 2, 3, and 6, and NE¼NW¼;
Sec. 33, lot 1;
Sec. 34, lots 2 and 3;
T. 36 S., R. 12 E., secs. 1 to 3, inclusive, 10 to 15, inclusive, and 19 to 36, inclusive, unsurveyed;
T. 36½ S., R. 12 E., all of fractional township, unsurveyed;
T. 37 S., R. 11½ E., all of fractional township, unsurveyed;
T. 37 S., R. 12 E., all of fractional township, unsurveyed;
T. 38 S., R. 12 E., entire township, unsurveyed;
T. 39 S., R. 12 E., secs 4 to 9, inclusive, and 16 to 18, inclusive, unsurveyed;
T. 40 S., R. 12 E., secs. 22 to 27, inclusive, and 34 to 36, inclusive, unsurveyed;

T. 41 S., R. 12 E.,
Secs. 1 to 6 inclusive:
Sec. 7, lots 1 to 4, inclusive, and 6, E½ and E½NW¼;
Secs. 8 to 12, inclusive;
Sec. 13, lots 2, 3, 7, and 8, NW¼NE¼ and NW¼;
Sec. 14, lots 1 to 4, inclusive, and N½;
Sec. 15, lots 1, 2, and 3, N½, N½SW¼, SE¼SW¼ and W½SE¼;
Sec. 16, all;
Sec. 17, lots 1, 2, and 5, E½, E½W½ and NW¼NW¼;
Sec. 18, lots 1, 6, 7, and 8, and N½NE¼;
Sec. 20, lots 1, 4, 5, and 6, N½NE¼ and NE¼NW¼;
Sec. 21, lots 4 and 5;
Sec. 22, lots 2, 3, 4, and 7, and NW¼NE¼;
T. 31 S., R. 13 E., secs. 1, 12, 13, 22 to 27, inclusive, and 34 to 36, inclusive, unsurveyed;
T. 32 S., R. 13 E., Secs. 1, 12, 13, 24, 25, and 36, unsurveyed;
T. 33 S., R. 13 E., secs. 1 to 3, inclusive, 10 to 15, inclusive, 22 to 27, inclusive, and 34 to 36, inclusive, unsurveyed;
T. 34 S., R. 13 E.,
Secs. 1 to 24, inclusive, unsurveyed;
Sec. 25, lots 1 to 4, inclusive;
Secs. 26 and 27, partly unsurveyed;
Secs. 28 to 33, inclusive, unsurveyed;
Sec. 34, lots 2 to 6, inclusive;
Sec. 35, NE¼NE¼;
Sec. 36, lot 1;
T. 34½ S., R. 13 E., all of fractional township, unsurveyed;
T. 35 S., R. 13 E., all of fractional township, unsurveyed;
T. 35½ S., R. 13 E., all of fractional township, unsurveyed;
T. 36 S., R. 12½ E., all of fractional township, unsurveyed;
T. 36 S., R. 13 E., all of fractional township, unsurveyed;
T. 40 S., R. 13 E., entire township, north of San Juan River, unsurveyed;
T. 41 S., R. 13 E.,
Sec. 4, lots 2 and 3;
Sec. 5, lot 4;
Sec. 6, lots 1 to 6, inclusive, and 10;
Sec. 7, lots 2, 3, and 6;
T. 31 S., R. 14 E., secs. 4 to 9, inclusive, 16 to 21, inclusive, and 28 to 33, inclusive, unsurveyed;
T. 32 S., R. 14 E., entire township, unsurveyed;
T. 33 S., R. 14 E., entire township, unsurveyed;
T. 33½ S., R. 14 E., all of fractional township, unsurveyed;
T. 34 S., R. 13½ E., all of fractional township, unsurveyed;
T. 34 S., R. 14 E., entire township, unsurveyed;
T. 35 S., R. 14 E., secs. 3 to 10, inclusive, 15 to 22, inclusive, and 27 to 34, inclusive, unsurveyed;
T. 36 S., R. 14 E., secs. 4 to 9, inclusive, and 16 to 18, inclusive, unsurveyed;
T. 40 S., R. 14 E.,
Secs. 1 to 12, inclusive;
Sec. 13, lots 1, 2, and 4, N½, SW¼ and NW¼SE¼;
Secs. 14 to 18, inclusive;
Sec. 19, lots 1 to 5, inclusive, 8, 9, and 10, N½NE¼ and E½NW¼;
Sec. 20, lots 1, 2, 5, and 7, N½ and N½SE¼;
Sec. 21, lots 1 and 3, N½, N½SW¼ and SE¼;
Sec. 22, lots 1 and 2, N½, SW¼ and W½SE¼;
Sec. 23, lots 1 to 4, inclusive, and 10, and N½NW¼;
Sec. 24, lots 2, 3, and 5;
Sec. 27, lots 2, 3, 4, and 5;
Sec. 28, lots 1 and 3;
Sec. 30, lots 2, 5, and 6;
Sec. 31, lots 2 and 3;
T. 33 S., R. 15 E., secs. 1 to 3, inclusive, 10 to 15, inclusive, and 19 to 36, inclusive, unsurveyed;
T. 33½ S., R. 14½ E., all of fractional township, unsurveyed;
T. 33½ S., R. 15 E., all of fractional township, unsurveyed;

T. 34 S., R. 15 E., secs. 5 to 8, inclusive, and 17 to 20, inclusive;
T. 40 S., R. 15 E.,
Secs. 1 to 11, inclusive;
Sec. 12, lots 1 and 2, N½, SW¼, and N½SE¼;
Sec. 13, lots 2, 3, 4, 7, and 8, and W½NW¼;
Secs. 14 to 18, inclusive;
Sec. 19, lots 1, 4, 5, 6, and 11, NE¼, NE¼NW¼ and NE¼SE¼;
Sec. 20, lot 1, N½, SW, N½SE¼ and SW¼SE¼;
Sec. 21, lots 1, 2, 4, 8, and 9, N½N½ and SW¼NW¼;
Sec. 22, lots 1, 3, 5, and 7, and N½N½;
Sec. 23 lots 2 to 6, inclusive, and N½NW¼;
Sec. 29, lots 2, 4, and 6;
Sec. 30, lot 1;
T. 31 S., R. 16 E., secs. 24, 25, and 36, unsurveyed:
T. 32 S., R. 16 E., secs. 1, 12, 13, and 19 to 33, inclusive, of fractional township, unsurveyed;
T. 32½ S., R. 16 E., all of fractional township, unsurveyed;
T. 32 S., R. 15½ E., all of fractional township, unsurveyed;
T. 33 S., R. 16 E., secs. 4 to 9, inclusive, 16 to 21, inclusive, and 28 to 33, inclusive, unsurveyed;
T. 40 S., R. 16 E.,
Secs. 1 to 6, inclusive;
Sec. 7, lots 1 to 4, inclusive, 6, 8, and 10, NE¼, E½NW¼, NE¼SW¼ and N½SE¼;
Sec. 8, lots 1, 3, 5, and 7, N½ and N½S½;
Sec. 9, lots 1, 2, 3, 6, and 9, N½ and N½SW¼;
Secs. 10 to 15, inclusive;
Sec. 16, lots 1, 5, 6, 9, and 10, and NE¼SE¼;
Sec. 21, lot 1;
Sec. 22, lots 1, 2, 4, and 8, and NE¼NE¼;
Sec. 23, lots 1, 2, 3, and 8, NE¼, N½NW¼, SE¼NW¼ and NE¼SE¼;
Sec. 24, all;
Sec. 25, lots 1, 3, 4, 5, and 10, NE¼, NE¼NW¼, N½SE¼ and SE¼SE¼;
Sec. 26, lot 1;
Sec. 36, lots 1, 4, 5, and 8;
T. 41 S., R. 16 E., sec. 1, lot 1;
T. 31 S., R. 17 E., secs. 1 to 4, inclusive, 9 to 16, inclusive, 19 to 22, inclusive, and 27 to 33, inclusive, unsurveyed;
T. 31½ S., R. 17 E., all of fractional township, unsurveyed;
T. 32 S., R. 16½ E., all of fractional township, unsurveyed;
T. 32 S., R. 17 E., secs. 1 to 6, inclusive, and 8 to 24, inclusive, of fractional township, unsurveyed;
T. 40 S., R. 17 E., secs. 19 to 21, inclusive, and 28 to 33, inclusive;
T. 41 S., R. 17 E.,
Secs. 1 to 3, inclusive;
Sec. 4, lots 1, 2, and 3, N½, N½S½ and SE¼SE¼;
Sec. 5, lot 1, N½, SW¼, N½SE¼ and SW¼SE¼;
Sec. 6, lots 1 to 7, inclusive;
Sec. 7, lot 1;
Sec. 8, lots 1, 2, and 3;
Sec. 9, lots 1 to 4, inclusive, and E½SE¼;
Secs. 10 to 13, inclusive;
Sec. 14, lots 1 to 7, inclusive, and NE¼;
Sec. 15, lots 1 to 7, inclusive, NW¼ and N½SW¼;
Sec. 16, lots 1, 2, and 3;
Sec. 23, lots 1 to 7, inclusive;
Sec. 24, lots 1 to 8, inclusive, and W½NW¼;
Sec. 25, lot 1;
T. 29½ S., R. 18 E., all of fractional township, unsurveyed;
T. 30 S., R. 18 E., secs. 1 to 3, inclusive, 10 to 15, inclusive, and 19 to 35, inclusive, unsurveyed;
T. 30½ S., R. 18 E., all of fractional township, unsurveyed;
T. 31 S., R. 17½ E., all of fractional township, unsurveyed;

T. 31 S., R. 18 E., secs. 3 to 10, inclusive, and 15 to 18, inclusive, of fractional township, unsurveyed;
T. 41 S., R. 18 E.,
Secs. 4 to 9, inclusive, and 16 to 21, inclusive;
Sec. 28, all;
Sec. 29, lots 1, 2, and 3, E½, N½NW¼ and SE¼NW¼;
Sec. 30, lots 1 to 4, inclusive;
Sec. 31, lot 1;
Sec. 32, lots 1 to 5, inclusive, and E½;
Sec. 33, lots 1 to 3, inclusive, N½, NW¼SW¼ and E½SE¼;
T. 29½ S., R. 19 E., all of fractional township, unsurveyed;
T. 30 S., R. 19 E., secs. 1 to 21, inclusive, unsurveyed, and 28 to 33, inclusive.
The above areas contain approximately 1,178,300 acres.

BUREAU OF LAND MANAGEMENT,
W. A. DEXHEIMER,
Commissioner.

I concur. The records of the Bureau of Land Management will be noted accordingly.

EDWARD WOOZLEY, *Director.*

NOTICE FOR FILING OBJECTIONS ORDER WITHDRAWING PUBLIC LANDS FOR THE COLORADO RIVER STORAGE PROJECT, NEW MEXICO

Notice is hereby given that for a period of 30 days from the date of this notice, persons having cause to object to the terms of the above order withdrawing certain public lands in the State of New Mexico, for use in connection with the proposed Glen Canyon Reservoir, Colorado River storage project, may present their objections to the Secretary of the Interior. Such objections should be in writing, should be addressed to the Secretary of the Interior, and should be filed in duplicate in the Department of the Interior, Washington, D.C.

In case any objection is filed and the nature of the opposition is such as to warrant it, a public hearing will be held at a convenient time and place, which will be announced, where opponents to the order may state their views and where the proponents of the order can explain its purpose, intent, and extent. Should any objection be filed, notice of the determination by the Secretary as to whether the order should be rescinded, modified or let stand will be given to all interested parties of record and the general public.

W. A. DEXHEIMER, *Commissioner.*

FIRST FORM WITHDRAWAL

GLEN CANYON PROJECT, UTAH AND ARIZONA

SECRETARY ORDER DATED MARCH 26 AND APRIL 25, 1956

BUREAU OF RECLAMATION

COLORADO RIVER STORAGE PROJECT, UTAH

First Form Reclamation Withdrawal

APRIL 25, 1956.

Pursuant to the authority delegated by Departmental Order No. 2765 of July 30, 1954, I hereby withdraw the following described lands from public entry, under the first form of withdrawal, as provided by section 3 of the act of June 17, 1902 (32 Stat. 388):

Salt Lake Base and Meridian, Utah

T. 40 S., R. 1 E., (unsurveyed), all;
Tps. 41, 42 and 43 S., R. 1 E., all;
T. 41 S., R. 2 E., (unsurveyed), all;
T. 42 S., R. 2 E., all;
T. 43 S., R. 2 E., secs. 3 to 10, inclusive, secs. 15 to 22, inclusive, and secs. 27 to 34, inclusive, all.
The above areas aggregate approximately 153,600 acres.

E. G. NIELSEN,
Assistant Commissioner.

[71776]

MAY 18, 1956.

I concur. The records of the Bureau of Land Management will be noted accordingly: *Provided*, That this order shall be subject to valid existing rights and the provisions of existing withdrawals.

The Bureau of Land Management will administer the lands until they are needed for reclamation purposes.

EDWARD WOOZLEY,
Director, Bureau of Land Management.

Notice for filing objections to order withdrawing public lands for the Colorado River storage project, Utah.

Notice is hereby given that for a period of 30 days from the date of publication of this notice, persons having cause to object to the terms of the above order withdrawing certain public lands in the State of Utah for use in connection with the proposed Glen Canyon unit, Colorado River storage project may present their objections to the Secretary of the Interior. Such objections should be in writing, should be addressed to the Secretary of the Interior, and should be filed in duplicate in the Department of the Interior, Washington, D.C.

In case any objection is filed and the nature of the opposition is such as to warrant it, a public hearing will be held at a convenient time and place, which will be announced, where opponents to the order may state their views and where the proponents of the order can explain its purpose, intent, and extent. Should any objection be filed, notice of the determination by the Secretary as to whether the order should be rescinded, modified, or let stand will be given to all interested parties of record and the general public.

E. G. NIELSEN,
Assistant Commissioner.

[F.R. Doc. 56-4060; Filed, May 23, 1956; 8:46 a.m.]

COLORADO RIVER STORAGE PROJECT, ARIZONA

First Form Reclamation Withdrawal

MARCH 26, 1956.

Pursuant to the authority delegated by Departmental Order No. 2765 of July 30, 1954, I hereby withdraw the following described lands from public entry, under the first form of withdrawal, as provided by section 3 of the act of June 17, 1902 (32 Stat. 388):

Gila and Salt River Meridian, Arizona

T. 41 N., R. 7 E., unsurveyed, entire township;
T. 42 N., R. 7 E., unsurveyed, secs. 31 to 35, inclusive.
The above areas aggregate approximately 25,500 acres.

E. G. NIELSEN,
Assistant Commissioner.

I concur. The records of the Bureau of Land Management will be noted accordingly. The lands shall continue to be administered by the Bureau of Land Management until they are needed for reclamation purposes.

EDWARD WOOZLEY,
Director, Bureau of Land Management.

Notice for filing objections to order withdrawing public lands for the Colorado River storage project, Arizona.

Notice is hereby given that for a period of 30 days from the date of publication of this notice, persons having cause to object to the terms of the above order withdrawing certain public lands in the State of Arizona for use in connection with the proposed Colorado River storage project may present their objections to the Secretary of the Interior. Such objections should be in writing, should be addressed to the Secretary of the Interior, and should be filed in duplicate in the Department of the Interior, Washington, D.C.

In case any objection is filed and the nature of the opposition is such as to warrant it, a public hearing will be held at a convenient time and place, which will be announced, where opponents to the order may state their views and where the proponents of the order can explain its purpose, intent, and extent.

Should any objection be filed, notice of the determination by the Secretary as to whether the order should be rescinded, modified, or let stand will be given to all interested parties of record and the general public.

E. G. NIELSEN,
Assistant Commissioner.

[F.R. Doc. 56-4061; Filed, May 23, 1956; 8:46 a.m.]

FIRST FORM WITHDRAWAL

DATED MARCH 14, 1957

BUREAU OF RECLAMATION

MARBLE CANYON PROJECT, ARIZONA AND UTAH

FIRST FORM RECLAMATION WITHDRAWAL

MARCH 14, 1957.

Pursuant to the authority delegated by Departmental Order No. 2765 of July 30, 1954, I hereby withdraw the following described lands from public entry under the first form of withdrawal as provided by section 3 of the act of June 17, 1902 (32 Stat. 388):

Sale Lake Base and Meridian, Utah

T. 41 S., R. 1 W.,
Sec. 20, lot 1, E½, E½NW¼, SW¼NW¼, E½SW¼;
Sec. 29, E½, E½NW¼, NE¼SW¼;
Sec. 33, W½W½.
T. 42 S., R. 1 W.,
Sec. 4, lots 3, 4, 5, 6 and 7, SE¼NW¼, E½SW¼, W½SE¼;
Sec. 5, lots 1 and 2, S½NE¼, E½SE¼;
Sec. 8, E½NE¼, E½SW¼, SE¼;
Sec. 9, lots 1 to 6 inclusive, W½NE¼, E½W½, NW¼SE¼;
Sec. 17, E½NE¼, SE¼;
Sec. 20, E½E½;
Sec. 21, W½, S½SE¼;
Sec. 27, W½SW¼, SW¼SE¼;
Sec. 28, E½, NW¼, W½SW¼;
Sec. 29, E½NE¼, SW¼NW¼, S½;
Sec. 30, lots 2, 3 and 4, SW¼NE¼, SE¼NW¼, E½SW¼, SE¼;
Sec. 31, all;
Sec. 33, NE¼, W½NW¼, E½SE¼;
Sec. 34, all;
Sec. 35, SW¼, W½SE¼.
T. 43 S., R. 1 W.,
Sec. 1, lot 4, SW¼NE¼, S½NW¼, SW¼, W½SE¼;
Sec. 3, all;
Sec. 4, lot 1, SE¼NE¼, SW¼, NE¼SE¼, S½SE¼;
Sec. 5, lots 3 and 4, S½NW¼, NE¼SW¼, SE¼;
Sec. 6, lots 1 and 2, S½NE¼;
Sec. 8, lots 1, 2 and 5, SW¼NE¼;
Sec. 9, lots 1 to 4 inclusive, S½N½, N½S½;
Sec. 10, all;
Sec. 11, lots 1 to 4 inclusive, S½N½, SW¼;
Sec. 12, lots 2, 3, and 4, SW¼NE¼, S½NW¼;
Sec. 14, W½NE¼, W½, W½SE¼, SE¼SE¼;
Sec. 15, E½, E½W½;
Sec. 22, N½NE¼;
Sec. 23, N½, NE¼SW¼, SE¼;
Sec. 24, W½;
Sec. 25, W½;
Sec. 26, NE¼, E½SE¼;
Sec. 33, SW¼NE¼, NW¼, NE¼SW¼, W½SE¼, SE¼SE¼;
Sec. 35, E½E½.

T. 44 S., R. 1 W.,
Sec. 1, all;
Sec. 3, N½, N½S½;
Sec. 4, N½NE¼, SE¼NE¼;
Sec. 11, lots 3 and 4, N½NE¼;
Sec. 12, all, unsurveyed.
T. 44 S., R. 1 E., secs. 5, 6, 7 and 8, all.

Gila and Salt River Meridian, Arizona

T. 42 N., R. 5 E.,
Sec. 32, E½, unsurveyed;
Sec. 33, all, unsurveyed.
The above area aggregates approximately 17,255.89 acres.

E. G. NIELSEN,
Assistant Commissioner.

[74973]

JULY 18, 1957.

I concur. The records of the Bureau of Land Management will be noted accordingly.

The lands shall be administered by the Bureau of Land Management until such time as they are needed for reclamation purposes.

EDWARD WOOZLEY,
Director, Bureau of Land Management.

NOTICES

Notice for Filing Objections to Order Withdrawing Public Lands for the Marble Canyon Project, Arizona and Utah

MARCH 14, 1957.

Notice is hereby given that for a period of 30 days from the date of publication of this notice, persons having cause to object to the terms of the above order withdrawing certain public lands in the States of Arizona and Utah, for use in connection with the Marble Canyon project may present their objections to the Secretary of the Interior. Such objections should be in writing, should be addressed to the Secretary of the Interior, and should be filed in duplicate in the Department of the Interior, Washington, D.C.

In case any objection is filed and the nature of the opposition is such as to warrant it, a public hearing will be held at a convenient time and place, which will be announced, where opponents to the order may state their views and where the proponents of the order can explain its purpose, intent, and extent. Should any objection be filed, notice of the determination by the Secretary as to whether the order should be rescinded, modified or let stand will be given to all interested parties of record and the general public.

E. G. NIELSEN,
Assistant Commissioner.

[F.R. Doc. 57-6022; Filed, July 23, 1957; 8:47 a.m.]

FIRST FORM WITHDRAWAL

MARBLE CANYON PROJECT, ARIZONA

SECRETARY ORDER DATED JULY 17, 1959, FEDERAL REGISTER, JULY 23, 1959, PUBLIC LAND ORDER 1909, SERIAL NO. AR. 017177

U.S. DEPARTMENT OF THE INTERIOR

CODE OF FEDERAL REGULATIONS TITLE 43—PUBLIC LANDS: INTERIOR

Chapter I—Bureau of Land Management Appendix—Public Land Orders

[Public Land Order 1909]

[Arizona 017177]

ARIZONA

Withdrawing lands for reclamation purposes, Marble Canyon Project, Arizona

By virtue of the authority vested in the Secretary of the Interior by section 3 of the act of June 17, 1902 (32 Stat. 388; 43 U.S.C. 416), and subject to valid

existing rights, so much of the following described public lands as lies west of the Navajo Indian Reservation is hereby withdrawn in the first form for use by the Bureau of Reclamation in connection with the Marble Canyon project, Arizona:

Gila and Salt River Meridian

T. 36 N., R. 5 E. (partly unsurveyed),
Sec. 2, E½;
Sec. 10, E½SE¼;
Sec. 11, NE¼, E¼NW¼ and SW¼;
Sec. 15, NE¼, SE¼NW¼ and E½SW¼;
Sec. 21, SE¼NE¼ and E½SE¼;
Sec. 22, NW¼ and S½;
Sec. 27, All;
Sec. 28, E½NE¼.
T. 27 N., R. 5 E. (partly unsurveyed),
Sec. 25, SE¼NE¼, SE¼SW¼ and SE¼;
Sec. 35, SE¼SE¼;
Sec. 36, NE¼NW¼, S½ and SW¼.
T. 37 N., R. 6 E. (partly unsurveyed),
Sec. 4, W½;
Sec. 5, SE¼SE¼;
Sec. 9, W½ and SE¼;
Sec. 16, NW¼ and W½SW¼;
Sec. 17, E½NE¼, NE¼SE¼ and S½SE¼;
Sec. 19, SE¼SE¼;
Sec. 20, NE¼, SE¼NW¼ and SW¼;
Sec. 30, NE¼ and W½.
T. 38 N., R. 6 E (partly unsurveyed),
Sec. 1, NE¼, S½NW¼ and SW¼;
Sec. 11, E½SE¼;
Sec. 12, W½;
Sec. 13, NW¼;
Sec. 14, NE¼NE¼, S½NE¼ and S½;
Sec. 15, NE¼SE¼ and S½SE¼;
Sec. 21, SE¼SE¼;
Sec. 22, E½, E½NW¼, NE¼SW¼ and S½SW¼;
Sec. 27, W½NE¼, E½NW¼ and SW¼;
Sec. 33, NE¼, S½NW¼ and SW¼.
T. 39 N., R. 6 E (partly unsurveyed), Sec. 36, E½E½.
T. 39 N., R. 7 E. (partly unsurveyed),
Sec. 3, lots 3, 5, and 8;
Sec. 4, NE¼SE¼ and S½SE¼;
Sec. 9, E½;
Sec. 16, NE¼, SE¼NW¼ and SW¼;
Sec. 20, NE¼NE¼, S½NE¼ and SE¼;
Sec. 21, NW¼NW¼;
Sec. 29, NW¼NE¼, NW¼ and NW¼SW¼;
Sec. 30, SW¼NE¼, NE¼ SW¼, S½SW¼ and SE¼;
Sec. 31, W½W½.

The areas described contain approximately 10,040 acres.

ROGER ERNST,
Assistant Secretary of the Interior.

Copy to Regional Director, Boulder City, Nev.

UNITED STATES DEPARTMENT OF THE INTERIOR

CODE OF FEDERAL REGULATIONS
TITLE 43—PUBLIC LANDS: INTERIOR

Chapter I—Bureau of Land Management
Appendix—Public Land Orders

[Public Land Order 1909]

[Arizona 017177]

ARIZONA

Withdrawing Lands for Reclamation Purposes, Marble Canyon Project, Arizona

By virtue of the authority vested in the Secretary of the Interior by section 3 of the act of June 17, 1902 (32 Stat. 388; 43 U.S.C. 416), and subject to valid existing rights, so much of the following described public lands as lies west of the Navajo Indian Reservation is hereby withdrawn in the first form for use by the Bureau of Reclamation in connection with the Marble Canyon project, Arizona:

Gila and Salt River Meridian

T. 36 N., R. 5 E. (partly unsurveyed),
Sec. 2, E½;
Sec. 10, E½SE¼;
Sec. 11, NE¼, E¼NW¼, and SW¼; SE¼;
Sec. 15, NE¼, SE¼NW¼ and S½SW¼; E½SW¼;
Sec. 21, SE¼NE¼ and E½SE¼;
Sec. 22, NW¼ and S½;
Sec. 27, All;
Sec. 28, E½NE¼.
T. 37 N., R. 5 E (partly unsurveyed),
Sec. 25, SE¼NE¼, SE¼SW¼ and SE¼;
Sec. 35, SE¼SE¼;
Sec. 36, NE¼NW¼, S½NW¼ and SW¼.
T. 37 N., R. 6 E.)partly unsurveyed),
Sec. 4, W½;
Sec. 5, SE¼SE¼;
Sec. 9, W½ and SE¼;
Sec. 16, NW¼ and W½SW¼;
Sec. 17, E½NE¼, NE¼SE¼ and S½SE¼;
Sec. 19, SE¼SE¼;
Sec. 20, NE¼, SE¼NW¼ and SW¼;
Sec. 30, NE¼ and W½.
T. 38 N., R. 6 E (partly unsurveyed),
Sec. 1, NE¼, S½NW¼ and SW¼;
Sec. 11, N½SE¼;
Sec. 12, W½;
Sec. 13, NE¼;
Sec. 14, NE¼NE¼, S½NE¼ and S½;
Sec. 15, NE¼SE¼ and S½SE¼;
Sec. 21, SE¼SE¼;
Sec. 22, E½, E½NW¼, NE¼SW¼ and S½SW¼;
Sec. 27, W½NE¼, E½NW¼ and SW¼;
Sec. 33, NE¼, S½NW¼ and SW¼.
T. 37 N., R. 6 E (partly unsurveyed),
Sec. 36, E½E½.

T. 39 N., R. 7 E. (partly unsurveyed),
Sec. 3, lots 3, 5, and 8;
Sec. 4, NE¼SE¼ and S½SE¼;
Sec. 9, N½;
Sec. 16, NE¼, SE¼NW¼ and SW¼;
Sec. 20, NE¼NE¼, S½NE¼ and SE¼;
Sec. 21, NW¼NW¼;
Sec. 29, NW¼NE¼, NW¼ and NW¼SW¼;
Sec. 30, SW¼NE¼, NE¼SW¼, S½SW¼ and SE¼;
Sec. 31, W½W½.
The areas described contain approximately 10,040 acres.

ROGER ERNST,
Assistant Secretary of the Interior.

July 17, 1959.
Copy to Regional Director, Boulder City, Nev.

[Public Land Order 3287]

[Arizona 031559]

ARIZONA

Withdrawing lands for Reclamation Uses; Marble Canyon Dam, Alternate Site

By virtue of the authority contained in section 3 of the Act of June 17, 1902 (32 Stat. 388; 43 U.S.C. 416), it is ordered as follows:
Subject to valid existing rights, the following-described lands in the Kaibab National Forest are hereby withdrawn from prospecting, location, entry and purchase under the mining laws of the United States, pending determination of need for their use in connection with the Marble Canyon Reclamation Project provided, that, no use of the lands will be made that is inconsistent with the purposes of the Memorandum of Understanding dated August 8, 1950, between the Forest Service, the Arizona Game and Fish Commission, the Bureau of Land Management, R. B. Woolley and interested stockmen, relating to the grazing of livestock, deer, and the House Rock Buffalo herd:

Gila and Salt River Meridian

T. 35 N., R. 5 E. (unsurveyed).
All of township lying west of Navajo Indian Reservation boundary.
T. 36 N., R. 5 E.
Secs. 34 and 35 (Partially Unsurveyed)
Those portions lying west of Navajo Indian Reservation boundary.
Containing approximately 13,000 acres.
The Forest Service will continue to administer the lands until such time as they are needed for project purposes.

JOHN A. CARVER, Jr.,
Assistant Secretary of the Interior.

DECEMBER 3, 1963.

[F.R. Doc. 63-12683; filed, Dec. 6, 1963; 8:46 a.m.]

Mr. ROGERS. Mr. Horton?

STATEMENT OF HARRY HORTON, SPECIAL COUNSEL, IMPERIAL IRRIGATION DISTRICT

Mr. HORTON. My name is Harry Horton. I was chief counsel of the Imperial Irrigation District for 27 years and I am special counsel for the Imperial Irrigation District. I have been sent here by the board of directors for the purpose of presenting this paper and some thoughts.

I want to thank the committee for this opportunity. I also want to make the statement that I appreciate the diligence of the members of the committee throughout this hearing and their attendance has been perfectly wonderful.

In the interest of time, and because so much has been covered that possibly can be covered in my paper, I would like to ask that the paper be put into the record as if read and let me make some side comments in view of the testimony.

Mr. ROGER. Without objection your statement will be included in the record in full and you may summarize it as you may wish.

(The statement referred to follows:)

ANALYSIS AND COMMENTS ON PENDING CENTRAL ARIZONA PROJECT AND LOWER COLORADO RIVER BASIN PROJECT BILLS, PRESENTED BY HARRY W. HORTON, SPECIAL COUNSEL, IMPERIAL IRRIGATION DISTRICT

In anticipation of hearings on the above subjects Congressman Wayne N. Aspinall requested of the Governors of the Colorado River Basin States a study and report on available water supply and needs in the Colorado River Basin.

Working together, representatives of the three lower basin States of Arizona, Nevada, and California, have attempted to arrive at a joint report. On the basis of studies over several periods, covering as much as a 70-year period and intermediate periods and on the basis of virgin flow, the report apparently will indicate an average over the last 35 years of about 13 million acre-feet per year. The reasonably dependable virgin flow to be anticipated is given as 13.3 million acre-feet per year. (See p. 5 of draft report.)

The upper basin States have also prepared a study and while not released at this writing it is said to reach approximately the same result as to what may be anticipated. Put upon the basis of water available to the upper basin, if the upper basin makes good on its required delivery at Lee Ferry of 75 million acre-feet in each consecutive 10-year period (art. III(d) of Colorado River compact) the upper basin report is said to indicate there will be available to the upper basin only 6.1 million acre-feet per annum and not the 7.5 million acre-feet for use in the upper basin provided for in article III(a) of said compact.

EFFORTS TO REACH A COMMON POSITION OF ALL COLORADO RIVER BASIN STATES

After about 40 years of controversy over the beneficial use of the waters of the Colorado River and its tributaries, all of the Colorado River Basin States seem to be making a concerted effort to solve their common problems. Identical bills have been introduced in the House by Representatives of both Arizona and California (H.R. 4671–4706). Those who have worked long and hard to attempt a compromise in the lower basin are to be commended for their efforts. The upper basin seems to be in a mood to also join in efforts to solve the common problem. (See proposed redraft or amendment to H.R. 4671 said to be near final form for being offered on behalf of the upper basin interests.) It is indeed a happy day to find such an atmosphere of attempted reconciliation of a problem that is Colorado River Basin wide.

ANALYSIS OF BILLS

Section 201 of the several bills and section 201 as proposed to be amended by the upper basin States in H.R. 4671, all authorize the Secretary of the Interior to make investigations and studies and plans for a long-range water supply for the upper and lower basins. Section 201(b) sets the goal for water to be imported into the Colorado River Basin at not less than 2.5 million acre-feet per annum. While it is realized that not less than 2.5 acre-feet per annum does not limit the imports to 2.5 acre-feet per annum, the impression may be gained that if 2.5 acre-feet per annum are imported that the water problem of the Colorado River Basin will be solved. It is not to detract from a spirit of cooperation and friendliness but to continue a united front that the following analysis is called to the attention of the interested parties and the committee.

HOW MUCH ADDITIONAL WATER IS NEEDED FOR BENEFICIAL USE IN THE COLORADO RIVER BASIN?

The upper basin

The proposed upper basin amendment in section 201(c) puts the imports at not less than 2.5 acre-feet per annum but adds that the upper basin's required deliveries at Lee Ferry be assumed at not to exceed the 75 million acre-feet per

annum in each consecutive 10-year period (sec. 201(d)(1)). (This assumes no requirement on the upper basin to contribute to the Mexican treaty burden as per article III(c) of the Colorado River compact.) Also that the imports not only enable satisfaction of the 7.5 million acre-feet per annum of beneficial uses in the lower basin but that the upper basin have 7.5 acre-feet per annum of consumptive uses in the upper basin (sec. 304(c)(3)).

Certainly the upper basin cannot be criticized for wanting its full allotment of 7.5 for use in the upper basin or for not wanting to have to contribute at Lee Ferry more than 75 million acre-feet per annum in said 10-year period.

The upper basin has every reason to be apprehensive over the shortage. The lower basin is not obligated to contribute water for the Mexican treaty until after the lower basin has had the beneficial consumptive use of 8.5 million acre-feet per annum (art. III(c)), yet the treaty burden falls on the upper basin after its use of only 7.5 million acre-feet per annum. If there is not 16 million acre-feet per annum for beneficial consumptive uses, the burden falls half on each basin (art. III(c)). The lower basin is entitled to the beneficial use of 8.5 million acre-feet per annum (art. III(b)) and under the compact tributary uses were chargeable. The decision in *Arizona* v. *California* eliminated the accounting for tributary uses by Arizona and Nevada (art. II(c)). With this provision of the decree where does the lower basin get the additional 1 million acre-feet per annum it is entitled to use under article III(b) of the compact unless it gets it from the upper basin?

The upper basin is also confronted with the provisions of article III(e) of the compact which provides that the upper basin will not withhold water which cannot be there applied to domestic and agricultural uses if needed therefor by the lower basin. Can the upper basin store water for power if needed for domestic and agricultural purposes in the lower basin?

These are not pleasant thoughts. We all hope they will never have to be solved judicially. They all can be avoided by an adequate importation. No shortage, no problem.

But the upper basin, without considering contributions to the Mexican treaty and only on the basis of III(d) deliveries at Lee Ferry, are now short 1.4 million acre-feet per annum on its 7.5 million acre-feet per annum as a starter.

DIFFERENCE BETWEEN SUPPLY AND BENEFICIAL CONSUMPTIVE USE

Deliveries at Lee Ferry are in terms of wet water supplied at that point under article III(d) of the compact. Virgin flow studies by all parties are based on flow or supply. This is a far different thing from beneficial consumptive use at points of diversion or use, 7.5 million acre-feet per annum of supply at Lee Ferry, or 7.5 million acre-feet per annum of supply of the upper basin, will not enable that amount of beneficial consumptive use at the many scattered and distant points of use. If documentation is needed on this, it can be found at page 144 of the Special Master's Report in *Arizona* v. *California*. For instance, 7.5 million acre-feet per annum of supply at Lee Ferry will furnish only 6.5 million acre-feet per annum of beneficial consumptive use below because the reservoir evaporation and losses in transit between Lee Ferry and the Mexican border are calculated at 1 million acre-feet per annum.

Lower basin

Assuming delivery at Lee Ferry of 75 million acre-feet per annum in each said 10-year period and for convenience taking this as a supply of 7.5 million acre-feet per annum at said point—what are the demands on this supply?

1. 1.5 net deliveries at the international boundary. (No deductions for evaporation or losses in transit.)

2. 2.8 million acre-feet per annum to Arizona, 4.4 million acre-feet per annum to California and 0.3 million acre-feet per annum to Nevada under article II(b)(1) of the decree in the case of *Arizona* v. *California*—if there is enough supply for 7.5 million acre-feet per annum of beneficial consumptive uses—a nonexistent condition with only 7.5 million acre-feet per annum of supply.

To partially remedy this situation, the bills 4671 et al. as introduced and as proposed for amendment by the upper basin, 2.5 million acre-feet per annum as a minimum import to the Colorado River Basin is proposed in section 201(b) (and 201(c) of upper basin amendment). This is done to take care of the Mexican Treaty 1.5 million acre-feet per annum and 1 million acre-feet per annum for reservoir and transit losses. Thus the bills theoretically make up by imported

water enough for 7.5 million acre-feet per annum of beneficial consumptive uses in the lower basin and to care for the Mexican Treaty burden of 1.5 million acre-feet per annum.

THE INADEQUACY OF 2½ MILLION ACRE-FEET OF IMPORTS PER YEAR

If the pending bills were now enacted into law and there existed now the import of 2½ million acre-feet of water into the Colorado River Basin, it would be inadequate to meet present needs and uses.

For instance, 2½ million acre-feet per annum would merely firm up 7.5 million acre-feet of uses in the lower basin (1.5 for Mexico and 1 for reservoir evaporation losses below Lee Ferry). It would provide for California only 4.4 acre-feet per annum and leave California short by 800,000 acre-feet per annum of its present—not future needs and uses. California is now using 5,200,000 acre-feet per annum of its contract quantities of 5,362,000 acre-feet per annum.

Arizona, according to USGS and Arizona reports has been for some time and now is mining over 2 million acre-feet per annum by pumping, i.e., depleting and lowering its underground supply by over 2 million acre-feet per annum in central Arizona. If this present use is not to deplete its supply in the near future, Arizona must have a supply for use in central Arizona of at least 2 million acre-feet, not 1.2 acre-feet per annum.

If the upper basin is to make good on its deliveries at Lee Ferry and the controversies between basins are to be avoided, it must have additional water imported. The present shortage of its 7.5 acre-feet per annum of upper basin entitlement is about 1.4 acre-feet per annum exclusive of the Mexican Treaty burden.

Fish and Wildlife demands, limited by the decree in *Arizona* v. *California* in the lower Colorado (to 60,339 acre-feet per annum, article II(d) (7) and (8)), are being increased materially. These demands and quantities for Indian reservations (905,496 diversions article II(d) (1), (2), (3), (4), (5)) while chargeable to States in which used, diminish the water available for non-Indian and domestic and agricultural uses.

The foregoing deals only with present uses and not future needs. To implement the compact, project act, and the decree (article II(a)(2)) and enable the Secretary to provide California and Arizona with their present needs above 4.4 to California, 2.8 to Arizona, and 0.3 to Nevada, sustained quantities in excess of 2.5 of imports will be necessary.

Mr. ROGERS. Mr. Horton, you are recognized.

STATEMENT OF MR. HARRY HORTON, SPECIAL COUNSEL, IMPERIAL IRRIGATION DISTRICT

Mr. HORTON. In the first place, I want to make it clear that we are here in support of the central Arizona project bill and the bills as they have been introduced, this group of consolidated bills.

We feel that these bills are the avenue to the avoidance of an unlimited amount of litigation that will come about if the bills are not passed.

We feel they are a necessity and I want to say on behalf of Arizona, that I think their needs are not limited to the 1,200,000 that has been mentioned as an immediate diversion or immediate works, but from my knowledge of this area and from the testimony that came in in the Arizona case, I think it is apparent that at the present time their needs are over 2 million acre-feet of water to take care of their present economy. That is, put in land that has gone out of cultivation and their economy on its feet.

Mr. ASPINALL. That is in addition to what they are presently using?

Mr. HORTON. That's right.

Now, I would like to go to the upper basin. The upper basin has problems that are of just as great magnitude, if not greater magnitude.

The upper basin is confronted with the problems that I describe in my paper. They are short of water, the evidence shows, that they got to have supplemental water and we cannot ask to have the lower basin protected without the upper basin being made whole.

Therefore, as indicated in my paper, that's exactly what we are asking.

Now, as to California, our position is that a 2,500,000 acre-feet of import into the lower basin is inadequate. The reason for that is this: It simply puts us on the basis of a distribution in the lower basin of 7.5 which does not take care of present uses as has been testified. California is using 5.1 or 5.2, so we got to go above 2,500,000 acre-feet.

I can shorten this by quite a little bit but I ask you to take these figures. Let's assume the time when we are only receiving at Lee Ferry 7.5 but we are getting it and nothing more. There has been no provision for the imports to take care of the Mexican Treaty so we take out a million and a half of the 7.5 and that leaves us with 6. There has been no import to take care of the evaporation loss so that cuts us down to 5. How are we going to supply the needs of the lower basin even present day, let alone any of these projects out of the amount that is left? It simply is not in the cards and my paper is directed to the proposition, that of emphasizing that exact situation. it is so acute that the only alternative is a sizable importation into the upper and lower basin and I have worked through the National Reclamation Association, the States of the upper basin to bring about a cooperative study and I think in some measure I am responsible for the fact that the upper basin States have initiated studies. I think time is running. I think we can get together. I think what we need today as I understand it, we got to have Congress authorize a study because of the rider that Senator Jackson has in effect now to prohibit a study being made without the authorization of Congress.

So I would ask the committee to seriously consider the study of an importation of adequate water. Let us do it on a cooperative basis.

Thank you.

Mr. ROGERS. Thank you, Mr. Horton.

Mr. Aspinall?

Mr. ASPINALL. Mr. Horton, you have made a very straightforward statement and as I look over your statement it is a very factual statement. Of course the facts that you set forth in your statement and as you project them was the reason why the southern California interests opposed the Colorado River storage project, is that not true?

Mr. HORTON. Well, I was not in the opposition of the upper basin project and consequently I can only say that it was probably done in the fear that there would be water used in the upper basin which would be needed in the lower basin. I think we are done with the proposition of worrying about lawsuits. We want to avoid them. We want to bring enough water in so there is no necessity for those problems.

Mr. ASPINALL. I think that is all right. I think we are all agreed on that proposition. The question is whether or not we have a method by which we can protect the upper basin as it endeavors to develop its area and at the same time authorize another project. Of course, your figure of 6,100,000 acre-feet of water for use in the up-

per basin makes it that much more difficult to foresee the continued delivery of the water to the lower basin for the use of the central Arizona project.

Mr. HORTON. I pointed that out to show that the upper basin has got to have that much more additional import.

Mr. ASPINALL. We contend we can withhold 6.3 million with present storage and anticipated water conditions. There is this difference of 200,000 acre-feet which is a sizable difference as far as the Arizona project is concerned. I have no objection to your study. I think your study, as it is put forth, is in good shape. I may not agree with some of the conclusions. But you have done a lot of good homework on this matter.

Mr. HORTON. One thing that has not been emphasized here is the fact that when we are talking about use, the upper basin has got to have an added million acre-feet more to get the use of 7.5.

Mr. ASPINALL. So they can use it. Everything is based on the fact that the upper basin is not going to use any part of the amount that is necessary to take care of the full supply that the central Arizona project needs until 1985 or 1995 or 2000. From that time on the upper basin is going to be in need of water for any further development.

Mr. HORTON. Mr. Aspinall, I don't concede the upper basin is not capable of finding uses for water.

Mr. ASPINALL. We talk about conditional authorization for the importation of water. I am wondering if all of us could reach agreement on conditional authorization based upon a finding of feasibility for these planned projects in the upper basin which are now receiving consideration of the Bureau of Reclamation.

Mr. HORTON. I am a great believer of feasibility in these projects, I will say that. I don't like the idea of a conditional authorization if we can get around it.

Mr. ASPINALL. Neither do I and on that I will give back my time.

Mr. ROGERS. Mr. Hosmer?

Mr. HOSMER. Has the Imperial Irrigation District seceded from other water organizations in California?

Mr. HORTON. No, we have not.

Mr. HOSMER. How come you are the only one that is representing itself here?

Mr. HORTON. Well, we are on the other end of the river, Congressman Hosmer. Anything that happens on the river above us, we are the goat. We have the oldest rights on the river. We have we think—we think we have the best protection. We got present perfected rights on the river that are nearly adequate to take care of our needs. But sitting on the river above us is the Metropolitan Water District that is going to face a shortage even if you get 2,500,000 added acre-feet of water in this river. From 600,000 to 800,000 acre-feet a year. We don't want them coming down into our backyards and taking agricultural water for domestic purposes in Los Angeles. We want to get enough water into the river. I think our district is more conscious of the needs of additional water than the rest of them.

Mr. HOSMER. Your rights are present and perfected. They cannot take them away.

Mr. HORTON. I wish that were true. But under this new system of apportioning Senators, I don't think the rural people are going to have

much to say of what goes on in their legislation. We are a rural community.

Mr. HOSMER. You said you could use some more water.

Mr. HORTON. I didn't say we wanted more water than we are getting now.

Mr. HOSMER. You said your present perfected rights were almost enough. You had some idea about some more and also your testimony was on the importation of a much larger quantity than 2.5.

Mr. HORTON. We have under the agreement with the United States in 1918, we undertook the tying in with a dam on the Colorado River above our intake. In that agreement we agreed to put up half of the money to make the studies. In that agreement we agreed to build the canal where it would irrigate—U.S. Government lands. In 1932—in our 1932 contract we were required by the Government to bring inside of our district these additional Government lands. The capacity to irrigate those lands was built into our canal. The canal has a capacity at the Imperial Dam of 15,155 feet. We have a capacity of 10,000 across the south side of the valley and an additional 1,000 feet north. We are paying on that cost.

Mr. HOSMER. You want 4,000 more feet of water in other words?

Mr. HORTON. 4,000 feet?

Mr. HOSMER. Is that what you want?

Mr. HORTON. I am not trying to get into this question of increasing acreage beyond what it is now in this particular time. I will ask—I will confer with Congressman Tunney on a presentation of a paper on what the United States has required us to build and prepare for the delivery of additional water which will take in some additional lands which is not the land we are talking about now. What we are trying—fighting for now is to keep water on the land we are now irrigating.

Mr. ROGERS. The time of the gentleman has expired. The gentleman from Arizona, Mr. Udall.

Mr. UDALL. No questions. I just want to compliment Mr. Horton for a fine presentation and I appreciate the spirit in which he is here.

Mr. ROGERS. Mr. Reinecke.

Mr. REINECKE. I will yield my time to Mr. Hosmer.

Mr. HOSMER. Do you have any disagreements with the statements made by Attorney General Lynch and the other gentlemen?

Mr. HORTON. I think there were some legal conclusions in some of those statements I might disagree with. Basically in the general structure of them, no, I would not.

Mr. HOSMER. Would you be in favor of this legislation if title II relative to importation studies, if that were removed from the bill—would you still favor it?

Mr. HORTON. I would have to take a look at what was left of the proposition. After all, we might just as well be frank. We got a package bill. Arizona needs the import, the upper basin needs the import. California needs the import. Why try and raise that question?

Mr. HOSMER. I only raise it because we have a dropout dam and proposals for a dropout importation project and it looks like something Sargent Shriver might have to get into instead of ourselves.

Mr. HORTON. Our efforts to get together, our discussing and trying to find common ground, importation has been an integral part of it.

Mr. HOSMER. I think that is a good statement.

Mr. ROGERS. Mr. Burton?

Mr. BURTON of California. No questions.

Mr. ROGERS. Mr. Tunney?

Mr. TUNNEY. I would like to compliment Mr. Horton on a fine statement and I personally appreciate it and I know the committee appreciates the time and effort that you underwent to come back here to testify on behalf of the noble citizens of Imperial County. I would like to ask a couple of questions.

Is it not true that we had all the water we wanted in Imperial Valley—if we all could put into production—if we put into production more acres of lands—we would have all the water we would need?

Mr. HORTON. Oh, yes.

Mr. TUNNEY. Do you have any idea how many acres?

Mr. HORTON. About 250,000 additional acres and the canal system is built to it already. It is lying there idle.

Mr. TUNNEY. Is is not also true that we in Imperial Valley do not produce any surplus crops, crops that go into Government warehouses? Our crops are sold.

Mr. HORTON. To answer that I would have to know more about what happens to cotton. We are pretty heavy cotton producers in Imperial Valley.

Mr. TUNNEY. We sell 99 percent of the cotton we grow. Last year we sold 99 percent of the cotton we grew.

Mr. HORTON. I am not sufficiently familiar with the support proposition to know that.

Mr. TUNNEY. Do you favor having Bridge Canyon Dam included in this legislation?

Mr. HORTON. I sure do.

Mr. TUNNEY. I have no further questions.

Mr. ROGERS. Mr. Foley.

Mr. FOLEY. I would just ask the gentleman to yield.

Mr. ROGERS. There is but 1 minute left.

Mr. TUNNEY. I will yield.

Mr. FOLEY. One question. In your opinion, is there sufficient water in northern California to provide for these additional acres in Imperial Valley?

Mr. HORTON. It depends on what use the water is put to. The best studies we have show so far that water brought into the area is—that that water brought into the areas of the Colorado Basin would cost $100 an acre-foot and that's out of the question as far as farming.

Mr. FOLEY. I am talking about water itself. Is that available?

Mr. HORTON. There is an abundance of water, I will put it this way, in California, that cannot be captured, cannot be put into dams and reservoirs because of the topography and the ultimate need in northern California has not been touched yet as far as their uses are concerned. We in southern California are being crowded off the highways and in northern California there are lots of undeveloped areas and how much water they are going to need I just can't—Mr. Steiner—these gentlemen here are the best judges. Mr. Steiner is the man you should ask that question of.

Mr. ROGERS. Thank you very much, Mr. Horton, for your testimony.

The Chair recognizes Mr. Kenneth Balcomb, counsel, Colorado River Water Conservation District, who is accompanied by Phil Smith, secretary-engineer.

Mr. ASPINALL. Mr. Chairman, these two gentlemen come before the committee as representatives of an area where 35 percent of all Colorado Basin water originates. Phil Smith has been before this committee on many occasions. He is happy to take hold of some of the responsibility of the older attorneys who have been in this game for a long, long time. I wish to welcome him here.

STATEMENT OF KENNETH BALCOMB, COUNSEL, COLORADO RIVER WATER CONSERVATION DISTRICT, GLENWOOD SPRINGS, COLO.

Mr. BALCOMB. In the hope of saving this committee as much time as possible, I ask that my statement with the appendages be introduced as though read in full and I will make a few brief comments about it.

Mr. ROGERS. Without objection your statement and the appendix will be included in the record.

(The statement referred to follows:)

STATEMENT OF KENNETH BALCOMB, COUNSEL, COLORADO RIVER WATER CONSERVATION DISTRICT, GLENWOOD SPRINGS, COLO.

My name is Kenneth Balcomb. I reside in Glenwood Springs, Colo. Our law firm, Delaney & Balcomb, represents the Colorado River Water Conservation District whose business office is likewise in Glenwood Springs, Colo. The Colorado River Water Conservation District is a quasi-municipal corporation created by a special status of the State of Colarodo, primarily for the purpose of conserving the waters of the Colorado River originating within Colorado and aiding in the application of the same to beneficial uses in the western half of the State. The district is representative of practically all of western Colorado.

As an introductory generality, western Colorado believes that the project proposed for authorization by H.R. 4671, the Lower Colorado River Basin project, must depend to a substantial extent for its water supply upon water of the Colorado River allocated to the upper basin States by virtue of the Colorado River compact. Consequently, western Colorado is opposed to the project unless appropriate guarantees are written into the authorization protecting the upper basin States and the substantial investment the United States has already put in the area.

This committee will be deluged wih figures, many of which will be contradictory, reflecting past and anticipated river flows and consumptive uses. Whatever else may be said of the figures all must show, if anywhere near authentic, that the Colorado River is running out of water. We will not add our figures to this confusion to show that the central Arizona project must rely in part on the use of upper basin water because many other witnesses will cover this point. Our figures are designed to show what Colorado can reasonably expect in the way of water and when this committee can reasonably anticipate its being put to use.

Attached as appendix A is a chart reflecting what appears to us to be the maximum possible upper basin delivery obligation to the lower basin, assuming, but not admitting the upper basin has any Mexican treaty obligation. The average virgin flow figures at Lee Ferry for the periods indicated were obtained either from the 1963–64 annual report of the Colorado River Board of California or the July 1965 Tipton & Kalmbach, Inc., Denver, Colo., report. The lower basin virgin flow estimate is based on Bureau of Reclamation figures, and is assumed to be static. The estimated future is based on the California board's annual report.

With such a chart it appears there will be available to Colorado a possible average maximum of 4,177,000 acre-feet and a possible average minimum of 2,415,000 acre-feet. Mr. Tipton, in his report heretofore referred to, estimated a

maximum 6,300,000 acre-feet available to the upper basin before evaporation losses, of which, Colorado would be entitled to 3,230,000 acre-feet.

Colorado's depletions are estimated in the Tipton report, and were likewise heretofore estimated by Mr. Philip P. Smith, secretary-engineer for the Colorado River Water Conservation District before your subcommittee on Irrigation and Reclamation on May 9, 1957, in connection with the Frying Pan-Arkansas project. The figures are, for all practical purposes, the same.

We cannot agree with the Tipton report insofar as it sets forth the time when the water will be put to beneficial use. Accordingly, we have prepared a tabulation of our contentions and beliefs in this regard and attach the same as appendix B hereto. Oil shale appears relatively imminent, in our opinion, because of the large sums presently being expended by interested people and companies, and because most contracts and options regarding water for the industry expire within either 10 or 15 years of this date.

The Colorado Water Conservation Board, the official water agency of the State of Colorado, and the Upper Colorado River Commission, the administrative agency for the States of the upper division (Colorado, New Mexico, Utah, and Wyoming) have suggested that the lower Colorado River project can be authorized if the bill for the same provides at least four things in protection of the upper basin.

Those protections, in abbreviated form, are—

1. That the States of the upper division shall never be required to deliver, at Lee Ferry in excess of 75 million acre-feet of water for any period of 10 consecutive years reckoned in continuing progressive series.
2. That any authorizing act likewise provide for conditional authorization for the importation of water into the Colorado River Basin.
3. That Lake Powell not be drawn below its rated power head.
4. That all moneys expended from the upper basin fund for Hoover Dam generation deficiencies and power losses resulting from Lake Powell drawdowns be reimbursed.

Western Colorado certainly does not want to interfere in any way with Arizona's development, so long as that development is consistent with the Colorado River compact and does not impair western Colorado's continued development. The project act here under consideration as introduced will impair our growth and development, but we believe the protections outlined above will aid the entire river basin without detriment to any portion thereof, including western Colorado. We strongly feel, however, that any authorization for importation of water to the Colorado River system must contain protective clauses for the basin of origin of that water.

If H.R. 4671 is amended to provide these protective features, western Colorado would urge its passage.

APPENDIX A

	1896–1964	1906–65	1914–64	1921–64	1930–64	Estimate, future
Virgin flow at Lee Ferry (average annual—million acre-feet)	14.878	15.058	14.551	13.951	12.968	13.7
Lower basin tributaries	2.800	2.800	2.800	2.800	2.800	2.8
Total virgin flow of system	17.678	17.858	17.351	16.751	15.768	16.5
Compact and possible treaty commitment	17.500	17.500	17.500	17.500	17.500	17.5
Shortage	0	0	.149	.749	1.732	1.0
Possible upper basin obligation under trexty	0	0	.0745	.374	.750	.5
Upper basin obligation at Lee Ferry (compact) average annual	7.500	7.500	7.5000	7.500	7.500	7.5
Total upper basin obligation at Lee Ferry	7.500	7.500	7.5745	7.874	8.25	8.0
Balance remaining to upper basin (under compact) (7.5 million acre-feet maximum—no division of excess, if any)	7.378	7.500	6.9765	6.077	4.718	5.70
Arizona under compact	.050	.0500	.0500	.050	.050	.05
Balance	7.328	7.450	6.9270	6.027	4.668	5.65
Colorado's share (51.75 percent)	3.7924	4.177	3.584	3.119	2.415	2.923

APPENDIX B

Project reservoir evaporation	326,025
Present basin depletions	1,782,000
Silt project	7,500
Evaporation-Colorado reservoirs	15,975
Authorized projects (Fruitland Mesa, Bostwick Park, Savory-Pot Hook including Two Bar)	62,400
Private projects under construction (Homestake)	74,000
Immediate use (subtotal)	2,267,900
Projects before Congress for authorization (Animas-La Plata, Dolores)	152,050
Authorizing report out (Dallas Creek)	18,000
Immediate and immediately contemplated use	2,437,950
Oil Shale, including related domestic and municipal	300,000
Use by 1975	2,737,950
Industries relating to oil shale, and coal hydrogeneration, woodpulp, thermal energy	200,000
Use by 1980	2,937,950
Projects undergoing authorizing type investigations (West Divide, Bluestone, Battlement Mesa, Grand Mesa, Basalt)	164,700
Use by 1990	3,102,650
Potential projects (Parshall, Troublesome, Rabbit Ear, Eagle Divide, Tomichi Creek, Ohio Creek, East River, Juniper, Yellow Jacket, San Miguel, Wessels, Hayden Mesa, Great Northern)	281,030
Use by 2000	3,383,680
Proposel or potential transmountain diversions not included in above, including four counties, Denver, and other claims	910,000
Total	4,293,680

(This list does not include any allocation to the Gunnison-Arkansas private projects, and the rights, if any, of Indian tribes.)

Mr. BALCOMB. As the Congressman indicated the Colorado River Conservation District is largely the representative of let me say of the counties in the western slope of Colorado and that is most of the projects not yet considered by Congress under the Colorado River Storage Act, and they will be built in that general area so that possibly, selfishly we are quite concerned about what will happen to Colorado's share of the water in the event central Arizona is constructed.

We also wish to state, and this is the feeling of the river district, that they want very much if it can possibly be done, that everyone who has had a project before Congress or hopes to get a project before Congress can have the same authorized and completed. Because apparently only with these projects can we all put the water and river to use.

In addition to the proposed or contemplated Federal project in western Colorado, and I am sure you all are aware of the situation, there is a great deal of activity in the area concerning the production of oil from shale. This is the only place with which I think western Colorado will depart from Mr. Tipton's report.

We did not believe that he is assigning enough water for this purpose nor do we believe that he is assigning it at an early enough date.

As I indicated in my statement, there has been executed to date several contracts with various major oil companies regarding the use of some projects which were considered by the Bureau of Reclamation and apparently later discarded as a source for water in industry.

These contracts for this what was then public water or public projects for the longest period of time only allowed the oil companies to make up their minds 15 years after the date of signature at the longest.

There are other contracts to my knowledge which are optioned only for 10 years. It is hard to say in view of the quantities of money which are necessary under Colorado law to perform what is called diligence work to keep the appropriations alive, but I would estimate that these companies will spend in the next 10 to 15 years only on due diligence work if that is all they are going to do, well in excess of $8 or $10 million.

These sums are really rather insignificant as I understand it alongside the sums these companies are spending. At the old Bureau of Mines plant at Rifle two or three of them engaged in operations in the basin or in their laboratories. The tremendous amounts of money they are spending trying to develop a process where they can extract on an economic basis oil from shale. It is our very grave concern that if these are not brought up on a realistic date and we hope by 1967, we would not be able to get them back for companies so they could be used.

I wish to express the appreciation of Mr. Smith and myself for the opportunity to appear before you.

I might say in connection with a great many of these matters involving both the projects in the upper and lower basin, Mr. Smith is very familiar with them having worked for Bureau of Reclamation and having since his selection as secretary-engineer for the district been directly involved in an investigation and other matters in that connection, so that he is well familiar with most of the projects contemplated, constructed, in operation or whatever you may say about them.

Mr. ROGERS. Thank you, Mr. Balcomb.

Did you have a statement, Mr. Smith?

Mr. SMITH. No, sir; I don't.

Mr. ROGERS. Mr. Aspinall?

Mr. ASPINALL. I would say, Mr. Balcomb we appreciate your presentation. You have done a magnificient job. These appendixes that are attached are your work, are they not, Mr. Smith?

Mr. SMITH. No, I furnished Mr. Balcomb some of the information.

Mr. ASPINALL. It is a joint operation.

As I understand your statement, it is that you differ from the Tipton analysis in two particulars, one, the rapidity by which the waters of western Colorado could be put to use, providing the projects studies were ready and they could be programed, and second, the amount of water that more than likely will be necessary to the development of the oil shale industry when it gets underway, is that correct?

Mr. BALCOMB. That's correct.

Mr. ASPINALL. If the in situ operation should prove successful—of course everyone realizes that the reason stress is being put on in situ work is because if the oil is taken from subsurface and is brought in the form of shale oil, it will then be entitled to 27½ percent depletion allowance while at the present time it is only entitled to the 15 percent. Now, if this should happen to be successful, is it not likely that the oil shale operation may be much sooner than many, many people expect?

Mr. BALCOMB. I believe that is correct. Of course, I anticipate the possible construction of water projects will be much greater than the figures indicated in this report. They are largely based upon estimates for the mining operation and retort as opposed to the in situ method.

Mr. ASPINALL. If that is the one approved and it is proved to be successful you more than likely would find the refinement in that area; is that correct?

Mr. BALCOMB. Yes.

Mr. ROGERS. Mr. Hosmer?

Mr. HOSMER. No questions.

Mr. ROGERS. Mr. Udall?

Mr. UDALL. Thank you for a very effective presentation of your points here. I am sure you knew before you arrived, and you have confirmed by attending these hearings, that western Colorado is more than adequately represented in this Congress by the distinguished chairman of this committee and we are very fond of him and he does a great job for his State and for the country.

Mr. BALCOMB. Thank you.

Mr. ROGERS. Mr. Reinecke?

Mr. REINECKE. No questions.

Mr. ROGERS. Mr. Tunney?

Mr. TUNNEY. I have no questions. If the chairman wants to use my time up I am happy to yield. Thank you very much.

Mr. ROGERS. Mr. Foley?

Mr. FOLEY. I will yield to the Chairman.

Mr. ROGERS. Gentlemen, it is very nice to have you before the subcommittee. We appreciate the manner in which you presented your statement.

Mr. BALCOMB. Thank you.

Mr. ROGERS. Is there anything to come before this subcommittee this afternoon? If not, the subcommittee will stand adjourned until 9:45 Monday morning.

(Whereupon, at 5 p.m., the subcommittee adjourned, to reconvene at 9:45 a.m., Monday, August 30, 1965.)

H.R. 4671 AND SIMILAR BILLS TO AUTHORIZE THE CONSTRUCTION, OPERATION, AND MAINTENANCE OF THE LOWER COLORADO RIVER BASIN PROJECT, AND FOR OTHER PURPOSES

MONDAY, AUGUST 30, 1965

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 9:45 a.m., in room 1324, Longworth House Office Building, Hon. Wayne N. Aspinall (chairman of the full committee) presiding.

The CHAIRMAN. The Subcommittee on Irrigation and Reclamation will now be in session for the taking of testimony in further consideration of H.R. 4671.

Our first witness this morning is the Honorable Barry Goldwater, former U.S. Senator from Arizona and a longtime resident of Arizona, I guess a lifetime resident of Arizona if I remember correctly.

STATEMENT OF BARRY M. GOLDWATER, FORMER U.S. SENATOR FROM THE STATE OF ARIZONA

Mr. GOLDWATER. That is right.

The CHAIRMAN. I am not going to go into that, Barry. I got in trouble the last time. We are very glad to have you here and to have your statement.

Mr. GOLDWATER. Thank you very, very much, Mr. Aspinall. I guess if you take the Udalls and the Goldwaters out of the State you would just have a few Indians left.

Mr. Chairman and members of the committee, I welcome the opportunity to submit this statement in support of legislation to authorize the construction of the Lower Colorado River Basin project.

As a member of the first Interstate Stream Commission of Arizona, I offered statements to Congress in support of the central Arizona project. As a Member of the U.S. Senate for 12 years I supported not only this proposal but other reclamation projects of value to the Nation. I still strongly urge the authorization of this legislation.

While I realize that some changes in the original concept of the central Arizona project have been made since it was first presented to the Congress, the major thrust of the project, however, remains what it was when it was presented to the Congress first in the 1940's. It is a project to preserve an existing economy in the central part of the State of Arizona in addition to which it will give invaluable

assistance to the development of the entire basin. It is a feasible project both from the engineering and financial points of view.

In fact, in the passage of time since this was first presented to the Congress, it has become a much more financially feasible plan than it was then, and I might say, Mr. Chairman, this is due in a large measure to the influx in our population in our great Southwest which results in a great emphasis being placed upon the provision of water for household and industrial purposes than upon agriculture. I know that has been brought out in this hearing, but I cannot conceive of any of this water being used for agricultural purposes. I believe by the time we get it, it will go almost entirely to domestic uses, which, I feel, with no disparagement on agriculture, is a better guarantee of payment.

Of course, any hearings before any committee must involve the consideration of facts and figures; whether such and such a dam ought to be built, where it should be located, and whether it ought to be erected to one height or another. 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 full development of the Colorado River Basin and contrary to much unfair and uninformed propaganda, does not violate the grandeur and 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.

I might say that I ran the Rainbow Lodge and Trading Post for nearly 25 years and kept up the trail and ran the mules down to the Rainbow Natural Bridge, and the best year we ever had, 400 people saw the Rainbow Bridge. When boat trips started down Glen Canyon, as many as 2,000 people a summer would see the Rainbow Bridge. and I dare say that in the near future that many people a day will see this greatest of all the natural arches. During this last trip that I made in July I paid particular attention to the type of terrain and canyon that a lake formed by Bridge Canyon would offer to the visitor. It is unusual in that it is not found at the upper reaches of the canyon. It is different in almost every mile of its extent. It would be, in my opinion, one of the great attractions in the West which would add to rather than detract from the beauties of the monument and the park.

I might say at the present time to see the lower gorge of the Grand Canyon requires a boat trip, and this boat trip costs from $350 to $1,000 according to the way that you care to travel. The canyon at

this point; namely, below Kanab Creek, particularly below Lava Falls, widens out into more of a wide desert valley than an actual canyon as we think of a canyon. It would make a rather large lake, bounded, of course, by the Hualapai Indian Reservation on the south and by the Lake Mead Recreational Area on the west, the Grand Canyon National Monument and Grand Canyon National Park on the east, and again, as I said, would open this area up where today to see this requires either a boat trip or a very laborious trip down Spencer Canyon on a trail that is almost gone and over roads that the modern tourist just does not care to drive over.

Another point to consider is that this dam and lake would contribute immeasurably to the economic welfare of the Hualapai Indians in that it would open to them really the only solution to their economic problems. These are an industrious, honorable and deserving tribe of American Indians, and I urge you to take into consideration this facet of our argument.

From a technical point of view, there is no question that before the turn of the century this basin will need outside waters introduced into them. Two and one-half million acre-feet is what we are discussing as an amount from outside sources, and while I do not pretend to be an expert on this subject, I would recommend the full study of the possibilities of the surplus waters in the northern waters of California, the Columbia and, yes, even into the wasting waters of Canada, which could be exported as a profit to that country to the water-hungry areas of the United States.

I feel sure you are acquainted with the plan that has been formulated in Los Angeles that would call for meetings with Canada to the end that we would dam up all of the wasting rivers going out into the Pacific and creating a gigantic lake in that area of Canada, and from that lake export water through two giant canals, one across the border to the Great Lakes and the other down through the western Rockies, even into Mexico itself. This is a terrifically expensive project and believe it or not, there are private enterprise people looking into it because they feel that it is a major source of water that we could use.

In closing, let me stress again the importance, in my opinion, of the construction of one of the Bridge Canyon Dams. In fact, if I were to be asked whether it should be Bridge or Marble Canyon, I would take Bridge, not just because of my great interest in the Canyon itself, but because I believe that Bridge Canyon will give far more people the opportunity of visiting the canyon than other structures would, and at the same time would produce a badly needed revenue-producing adjunct to the project.

Before I end, let me again thank you, Mr. Chairman and your members, and let me, as an Arizonan, pay my respects to Congressman John Rhodes, Congressman Morris Udall, and Congressman George Senner for the industrious and nonpartisan way they have applied themselves to the solution of the water needs of Arizona. With this same feeling I extend my congratulations to Senator Carl Hayden and Senator Paul Fannin for their untiring efforts on behalf of this project.

Thank you very much, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Goldwater.

Any questions? The gentleman from California.

Mr. HOSMER. I would like to congratulate Senator Goldwater on a fine statement he has made. I think that, as much as any man in this country, you have been associated with the preservation of many of the natural and beautiful resources of our country, have you not?

Mr. GOLDWATER. I have great love for them, and I hope to see them perpetuated for my children and grandchildren.

Mr. HOSMER. At the same time the vastly increasing population of the United States does require some minimal adjustment to the necessity to bring up our resources of water and power and other natural resources to meet the needs of that increasing population. Is that the way you see it?

Mr. GOLDWATER. Yes, and I would hope to see the day come very soon, Mr. Hosmer, where we could forget about dams for electric development, look to the use of atomic or nuclear power. I hope the day comes soon when we can start pumping water out of the Pacific Ocean to use in the far reaches of the West, and I think we are very close to both of these things happening. When that happens, then, of course, I think we can forget about dams except for possible reclamation purposes for agriculture.

But along with everybody who opposes these dams, I understand the opposition. I can think of delightful places now 400 or 500 feet under Lake Powell that I would like to see again, but the waters have opened up some equally beautiful places never before seen by man, and this is what will happen particularly in the lower reaches of the Grand Canyon if either of the bridges are built.

But you just cannot ignore people. I remind you that, where we live in Arizona, we are the sixth civilization to have lived there in history, and these go back—these civilizations go back—probably 3,000 years and are called the Hohokam, or the people who have gone, and they had to leave because they ran out of water.

We still run our canals mostly on the surveys of these ancient Indians. We just do not want to become civilization No. 6, and we are, as has been testified to, we are getting in bad shape with water, as are many parts of California, parts of Utah, Nevada, Idaho. We just have to take care of these things.

Mr. HOSMER. Thank you, Mr. Chairman.

The CHAIRMAN. Mr. Udall.

Mr. UDALL. Mr. Chairman, I wanted to commend Senator Goldwater for a most effective statement and thank him for coming here. He is one of Arizona's most illustrious native sons. His forebears and mine have much in common and came to Arizona about the same time and faced many similar difficulties. When he tells this subcommittee that these lakes or dams are necessary and that they will do no damage to the scenery but in fact will enhance it, in my heart I know that he is right.

Mr. GOLDWATER. You are just about a year late for that.

Mr. UDALL. I do not think there is a person in the country who knows this great northern area, the Grand Canyon, the beauties of this area, better, and loves it more, than the witness before us now.

I have worked with him on a bipartisan basis during the time I have been in Congress to preserve, protect, and extend our great natural beauties, and, as I said, he is one of Arizona's most illustrious sons.

He is a lover of the West and of conservation, and I am proud of him and proud of the statement he has made here today.

Mr. GOLDWATER. Thank you.

The CHAIRMAN. Congressman Wyatt.

Mr. WYATT. Senator, I appreciate your statement, and I, with other members of the committee, welcome you here, and we appreciate what you have to say.

Mr. GOLDWATER. Thank you very much.

The CHAIRMAN. Mr. Foley.

Mr. FOLEY. I would like to join my chairman and colleagues, Senator Goldwater, in welcoming you here before the committee this morning. My colleagues from Utah and Arizona spoke of the bipartisan support for the central Arizona project. I want to assure you and the other members of the committee that those of us from the Northwest also feel that the central Arizona project is a worthy and suitable project for Federal authorization. Our concern arises, Senator, over recommendations to authorize either works or studies to import Columbia River water into the Colorado Basin. On this question we in the Northwest have a deep and bipartisan concern.

I would like to ask you whether you do not feel that full exploration of the water resources of the Colorado River Basin and California should be made before engaging in studies to import water from outside the area.

Mr. GOLDWATER. Oh, I do. I think there is great possibility in some of the northern rivers of California. We have no possibilities in my State, nor has Nevada or Utah. We are just about as developed as developed can be. But I do think any study that the Congress suggests should include some priority. I know—having served in the other body on the Interior Committee with Senator Jackson—I know that there are great plans for the Columbia, and I know there is a lot of wasted water and there is a lot of that wasted water that is going to be used, and I certainly think that any thought of use in the South would be contingent upon the priority of the needs of the Northwest. That is why this plan of the diversion of the Canadian waters is so intriguing to me, because they are talking about canals a mile wide and 50 feet deep, and a lake 400 miles long and 200 miles wide.

When I first heard it, I thought my friend had just come from a long seige with marijuana, but the more I study it, the more I think this has merit. It would be very, very expensive. But on the other hand when we get through developing all of the places we need to develop for water, it is going to be an expensive process. But I would agree with you that the interests and the rights, prerogatives of the Northwest, certainly cannot be overridden.

We just cannot say that we are going to take Columbia River water any more than we can say we are going to take water out of the rushing Sacramento. But I think any study should be an overall study.

Mr. FOLEY. Would you, then, favor the official position of the administration, the creation of a National Water Commission?

Mr. GOLDWATER. We have had in effect a National Water Commission. I remember Members who served on this body. Senator Kerr of Oklahoma was most active in it. I think that water certainly is becoming one of our major problems. I can recall the day when 50 gallons of water a day was supposed to be enough to keep a man or a woman alive,

and today it runs over 400, what with all of our hot water gadgets and dishwashers and garbage disposal units and things like that—air conditioning. Water is a real problem, and I do not think we can neglect it.

I do not think, either, that the solution of the water problems of the eastern part of the United States are necessarily related to the water problems of the West or the water problems of the Middle West, so I would favor any group that would study this with solutions being sought.

I look very favorably on desalinization, even though this is expensive.

The CHAIRMAN. May the Chair state that this morning was set aside for the people who are appearing against the Bridge Canyon primarily, and we just do not have too much time to go into an extended treatment of this.

Mr. FOLEY. Very well.

Well, Senator, again it is a pleasure to see you here, and I think your support for this project is commendable, and may do something to soften the misguided impression of some in the Northwest that you were opposed to reclamation projects. I know your history in the Senate has been one of support for reclamation.

Thank you.

Mr. GOLDWATER. Thank you.

The CHAIRMAN. The gentleman from Idaho.

Mr. HANSEN. Thank you, Mr. Chairman.

I wish to thank you, Mr. Goldwater, for appearing. It has been an honor for us, and I enjoyed your statement very much. Thank you very much.

Mr. GOLDWATER. Thank you.

The CHAIRMAN. The gentleman from California.

Mr. REINECKE. It is an honor to have you with us, Senator. I share your love of the canyon, and I also share your opinion that the view from the bottom is better than the view from the rim. No further questions.

The CHAIRMAN. Thank you very much.

Thank you, Senator Goldwater.

Mr. GOLDWATER. Thank you very much, Mr. Chairman.

The CHAIRMAN. The next witness is the Honorable John Sanborn, former Member of Congress, former member of this committee, and director of the Idaho Farm Bureau, accompanied by Sam High, president of the Idaho State Reclamation Association.

Mr. Sanborn, do you have Mr. High with you?

Mr. HANSEN. Mr. Chairman, if I might, Mr. High asked for this time to testify, and if it might be appropriate, he is submitting a statement which I would like included in the record, along with a statement from Mr. Ray Ward, also a director of the Idaho State Reclamation Association.

The CHAIRMAN. It will be included in the record after the Honorable John Sanborn's statement provided it conforms with the rules of the subcommittee.

Nice to have you back here in this room again, John.

STATEMENT OF JOHN SANBORN, FORMER MEMBER OF CONGRESS, AND DIRECTOR, IDAHO FARM BUREAU

Mr. SANBORN. Thank you.

Mr. Chairman and members of the committee, I am John Sanborn of Hagerman, Idaho. It was my privilege and pleasure to serve on this committee as a Member of Congress from 1947 to 1951. Some of my former colleagues are still serving with distinction on this committee. There is your chairman, Mr. Aspinall, and the ranking Republican, Mr. Saylor, and also Mr. Baring. The father of our Congressman White was also on the committee at that time.

I am very happy to see my Congressman, Mr. Hansen, sitting on this committee. I have great confidence in his ability and integrity.

It is a distinct pleasure to have this opportunity to appear before you. The membership is changed very largely, but the room is a familiar site even to the Indian pictures on the wall.

I am here representing the Idaho Farm Bureau Federation, the largest and most active farm organization in Idaho. Its membership is awake to the welfare and progress of Idaho. It is alarmed at the suggestion contained in title II of the bill under discussion, H.R. 4674, where, under subsection (2), it makes provision for planning works to import water into the Colorado River Basin from sources outside the natural drainage area of the Colorado River system when it has been made all too clear that the thirsty glance is on the Snake or Columbia Rivers.

It is true that location, transportation, climate, and early expansion have zoomed the population of California and some other spots in the Colorado River area. Poor planning and management of the water there have caused friction and disappointments. The water mess that has developed there is a fine example of what can happen to other areas if the attempted cure of this mess is to involve and encroach on said other areas.

When I was serving on this House committee, the controversy was going strong and had been for years before. Then, finally, the Supreme Court clarified the issue between California and Arizona. And what happened? It seems expediency intrigued Arizona into jeopardizing her advantage, and now the upper and lower Colorado Basin States have agreed on a love feast, so it is reported, if they can raid another river basin sufficiently.

In this same subsection (2) it is noted that the Secretary shall make provision for adequate and equitable protection of the interests of the States and areas of origin, and so forth. The Secretary has not been able to provide adequate and equitable protection of the interests of the various States presently involved in the Colorado River Basin. No law such as the present proposal can guarantee adequate and equitable protection.

After subtracting Federal and State land from the land area of Idaho, there remains approximately 28 percent in private ownership to furnish the major portion of the expense of State government. Approximately 3 million acres have been withdrawn in wilderness legislation from further private development. A Sawtooth National Park is proposed to lock up more land. A wild rivers bill, if passed, will crowd out more private ownership on two of Idaho's main rivers.

Now, here is a proposal to grab some of her water, at least after it flows into the Columbia, thus handicapping future development of Idaho. Man, is Idaho beset upon.

Idaho's location, in from the coast with much of it desert in the south, caused a retarded growth for many years. Idaho was a slow starter. But now she is starting to move. The country is beginning to discover that Idaho has a great potential that is unfolding with increasing acceleration. Idaho, today, ranks third in the Nation for irrigated lands. Over 3 million acres of this lie in the Snake River Valley. One and one-half million acres of this have been developed by private enterprise. Another 1½ million acres has been similarly developed but is receiving supplementary water from Federal storage projects.

Desert land has been irrigated and reclaimed on an average of 50,000 acres a year for the last 20 years by private effort. There are more than 3 million acres of fine land still waiting for development. Twenty years ago there were three potato processing plants. Now there are 21. The phosphate industry represents an investment of $150 million, its major development coming in the last 20 years.

I could burden you with the enumeration of enterprise after enterprise that have made phenomenal growth in the last 20 years in Idaho. One cannot imagine the projected growth in the next 20 years. It will mean an accelerated use of water—domestic, industrial, and irrigation. Idaho may need the water then as intensely as other areas.

Idaho must insist that the Southwestern States make full utilization of their own water before searching for outside water. California must develop the water she now has in northern California and which is wasting into the sea in enormous quantities before she should be allowed to disturb other regions, even if the costs are somewhat more. Desalinization must be further explored, with the possibility in mind that it may be the answer.

In the arid West, water is the lifeblood of the region, but in Idaho the Snake River is a river of gold. Water is Idaho's greatest natural resource and her only source of economic survival.

There have been proposed before this committee three departures from established procedures that could shake the very foundations of reclamation law and decisions. Two of these proposed departures are asking you to approve this bill on either a "conditional" or "contingency" basis, pledging both money and water in the future without present definition.

The third departure is that of authorizing in the Western States a project to take water from one basin to another outside of a State, and this especially when within the Colorado Basin signatory States there is sufficient water to remedy their foreseeable problem if put to beneficial use. This departure, if carried out, will create a loss of faith in the fairness of reclamation law and cause bitter acrimonious actions in the future.

This authorization request for such transportation is distinctly in contrast to the publicized statement of Secretary Udall only a little over a year ago that he was "categorically" opposed to transportation of water from one basin to another. Those were most reassuring words to Idaho then, and Governor Smylie has recently referred to those words through the press.

May we, for the record, quote from the Salt Lake Tribune of August 21 commenting on remarks of Governor Smylie of Idaho:

Secretary Udall's commitment in 1964, that basin-to-basin export of water was not the policy of his administration, needs to be recalled and renewed.

In conclusion, it would be much cheaper and better to urge people to go to the land of water rather than make such expensive and controversial efforts to transport water to congested areas with the end result of encouraging further congestion and concentration of people such as is occurring in southern California.

Again, I thank you, Mr. Chairman, for the opportunity to express these views here.

The CHAIRMAN. Thank you very much, Mr. Sanborn.

The Congressman from California.

Mr. JOHNSON. Thank you, Mr. Chairman.

Mr. Sanborn, you have a very fine statement here. I would like to know if you would have any objection to taking some of the surplus water just prior to the time it goes into the sea for this purpose.

Mr. SANBORN. Mr. Johnson, the trouble with that is you know as well as the rest of us that once you establish priority on water, no matter what is done afterward, that priority will stand against future development, and of course the Snake River does contribute to the water in the Columbia. Now, if there were some way of guaranteeing that the Snake River water would not be used in figuring the surplus that is going into the sea, that would make me feel a lot better. But I do not see how you are going to do it.

Mr. JOHNSON. Well, as you know, the facilities on the Columbia River at their last point there require about 96 million acre-feet of water for their operation to develop the full power potential. That is a tremendous amount of water that moves on from that point into the sea, you might say. Now, if there were a priority protection to the people on the Snake River—and I know what you mean because in northern California we have been carrying on our negotiations with southern California for a long time on water projects—if that priority were protected, I do not think anyone should look at the diversion of a certain amount of that water that would be going into the ocean after it was put to beneficial use as far as the States of Idaho and Washington and Oregon were concerned.

I think that is the intent of the Secretary and also the intent of most of us on this committee; if we were going to consider that as a source, we should certainly grant the priorities to the States and only think about taking water that was just about to go into the ocean.

We know what a job it is to try to clean up that ocean water. We are not too far along in bringing that into reality and as far as costs are concerned for agricultural purposes.

Mr. SANBORN. I can see your thinking all right. But we simply cannot project our needs into the future because we have seen in the last few years the rapidity of development in various areas. It is just almost impossible, with the increase in population that is occurring, that we can have any idea of what the unpopulated areas of Idaho will receive and how much of the water they will need.

I do know that priorities are an established law of use of water, and that is what bothers me. I know there is a tremendous amount of water there. There is also a tremendous amount of water in north-

ern California that is not being presently used, and it just seems to me more logical for California to use their own water rather than to step outside into another area.

Mr. JOHNSON. I believe California is developing its own water for most of her own uses, as was testified here by our people from the State, that there is approximately 70 million acre-feet of water available within the boundaries of California, and the ultimate need would be about 50 million acre-feet of that to be developed.

We are developing our water for the most part, but California's entitlement from Colorado is another matter. We are able to make the Colorado whole—the guarantee is 4.4 million that we are enitled to out of the Colorado for California's uses and needs. We are looking toward a supplemental supply for the Colorado River Basin to make the whole, and also to divert in there, if possible, a supply that will take care of some of the future needs.

Your State, I know, is very much concerned about the point of diversion out of any of the rivers in the Northwest, but I am sure that all of us recognize that and that we are only talking about what might be surplus prior to going into the sea.

Mr. SANBORN. Of course, the bill says not less than two and a half million acre-feet for diversion, but it does not say how much, and I have heard from various sources that the minimum would be 10 million acre-feet.

Well, that is the present projection, but what might it work into?

Mr. JOHNSON. I want to thank you, Mr. Sanborn, again. That is all, Mr. Chairman.

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

Mr. HOSMER. I gather that you view this as a plot by California to steal Idaho's water, from what you have said. Is that a correct characterization of your statement?

Mr. SANBORN. I would like to see California have all the water that she can possibly use, but I do not want her to disturb our water.

Mr. HOSMER. Do you know that there are six other States in addition to California and one foreign country that have a stake in augmenting the supply of the Colorado River system?

Mr. SANBORN. Yes, that is another proposition, too. For instance, the Honorable Ed Johnson, of Colorado, proposed before the Colorado Water Conservation Board a proposition that was carried and adopted by the Upper Colorado compact meeting in Salt Lake City on the 16th of this month, and it states very clearly in there that they are not going along with this basin proposition unless they can be relieved of the obligation, of any obligation to deliver water to the Republic of Mexico.

Mr. HOSMER. Why do you use California as a whipping boy in your statement then?

Mr. SANBORN. What is that?

Mr. HOSMER. Why are you using California as a whipping boy in this statement?

Mr. SANBORN. I am not, except that—I did not mean to use California as a whipping boy. I know the other States—for instance, I am just telling you about Colorado, and they make no bones about it. They want to saddle the obligation to furnish Mexico with a million and a half acre-feet of water on to us.

Mr. HOSMER. I have never heard any of you witnesses from the Pacific Northwest come in here yet and state what water you have, and what uses you are making of it and what you intend to use. You have not even done so about Idaho. You have at least 10 million acre-feet in the Snake River, have you not?

Mr. SANBORN. In that connection there has just been created by the last Legislature of Idaho a water commission, and this water commission was just organized, and we certainly would feel that the State of Idaho should be given the opportunity to have this commission work up such a report before any legislation contrary to their economy be passed.

Mr. HOSMER. Do you mean to infer that the State of Idaho, up until the date that its late water commission was established by public vote, has been totally inactive in the matter of water resources and inventories thereof and projection of future use?

Mr. SANBORN. Well, I think until recently they did not realize that other areas were eyeing the Columbia River Basin with such grasping notions.

Mr. HOSMER. Do you want to stand before this committee with the proposition——

Mr. SANBORN. I did not understand.

Mr. HOSMER. Do you want to stand before this committee for a proposition that for all time water must waste down the Columbia River into the Pacific Ocean when it could be used elsewhere without harm——

Mr. SANBORN. No.

Mr. HOSMER (continuing). To anybody in the Pacific Northwest?

Mr. SANBORN. No, I would not say so. What I would say is that I think that the report on investigation of the needs of the Columbia River Basin should be thoroughly investigated before any legislation contrary to their economy.

Mr. HOSMER. If you want to say that a reasonable time should be allowed for investigation——

Mr. SANBORN. Yes, sir.

Mr. HOSMER (continuing). That is one thing.

Mr. SANBORN. Yes, sir.

Mr. HOSMER. If you want to say that the Pacific Northwest should stall the project indefinitely by not pursuing with due diligence its studies, that is another thing. Which do you think?

Mr. SANBORN. I cannot see the point.

Mr. HOSMER. You are not a lawyer, are you?

Mr. SANBORN. No; I am not.

Mr. HOSMER. Lawyers have a proposition that the longer they can delay, you will never get anything settled, and a lack of due diligence in pursuing a case is one of those means of delay. You are not looking forward to the next hundred years to study this water situation in the Pacific Northwest, are you?

Mr. SANBORN. You mentioned a reasonable time. I am willing to go along with that.

Mr. HOSMER. And also do you see any benefits to the Pacific Northwest or to the Nation, assuming that there is water that can be used in the Pacific Northwest——

Mr. SANBORN. What is the——

Mr. HOSMER (continuing). Of requiring that that water not be used even though it could be used for half the cost that it would take to use the water for this project from California?

Mr. SANBORN. If you once use it, it is your water, and no matter how badly we might need it, it is gone.

Mr. HOSMER. And you just totally disregard the bill's provision for protecting areas of origin, is that right?

Mr. SANBORN. Why should California not utilize the water she has before she looks at the Columbia River?

Mr. HOSMER. Why should a portion of the United States be required to use water, say, that costs $150 an acre to produce when it could be using water that costs $60 to $75 an acre-foot to produce? What rationale is there behind that? What godliness and sanctity is there about State lines that causes you to stand for a proposition of that nature?

Mr. SANBORN. The difference is that you are encroaching on water that really belongs in another area instead of your own area.

Mr. HOSMER. Water that is wasting to the sea.

Mr. SANBORN. Well, at present, yes.

Mr. HOSMER. And being used by California and six other States and one country to ameliorate difficult conditions.

Mr. SANBORN. And water is wasting into the sea in California, too, and besides California——

Mr. HOSMER. Is Idaho still part of the Union?

Mr. SANBORN. How is that?

Mr. HOSMER. Is Idaho still a part of the Union?

Mr. SANBORN. No; I do not think so.

Mr. HOSMER. I do not think so either. Thank you.

The CHAIRMAN. The gentleman from——

Mr. SANBORN. Just a minute. In connection with California's position and Idaho's, Idaho has no sea that eventually might produce water for usage. We have to depend upon our rivers.

Mr. HOSMER. I do not know a place that can store all that water.

Mr. SANBORN. California has excess water today, and she also has the full Pacific Ocean to draw on if the time comes when it is feasible to do it.

Mr. HOSMER. Thank you.

The CHAIRMAN. The gentleman from Arizona.

Mr. UDALL. Mr. Sanborn, I thing I understand your point of view and the fears of the people of Idaho, and I have just one question. I think it has been clearly developed in these hearings that it is not feasible and that no one is looking to a direct diversion of the Snake River water. Now, if you assume that this is the case, if you assume that Idaho is given enough water to develop all the acres you are talking about and all of its future needs, that legislation is written which privides that the Northwest has first call on every gallon of water that it could conceivably use in the next hundred years——

Mr. SANBORN. For all purposes, domestic and——

Mr. UDALL. For all purposes.

Mr. SANBORN (continuing). And industrial.

Mr. UDALL. To develop 10 cities the size of New York in the Northwest and irrigate every acre in Idaho, Oregon, and Washington that might conceivably be irrigated, the legislation provides that in the

event we are wrong and you need your water back that we have to go out and pay the difference that might be required to get you Canadian water or Puget Sound water at some long future date, and we set up a fund to do this under the area of origin protection, that even after all of these things, there is a hundred million acre-feet leftover flowing into the ocean, and that all these 7 States need is 5 million acre-feet out of that flowing into the ocean, you would still object to our using it.

Mr. SANBORN. Certainly not.

The CHAIRMAN. This is assuming, of course, that good God in heaven keeps the rain coming down. We have got so many assumptions here we might as well put that one in.

Mr. SANBORN. Mr. Chairman, I would like to ask Mr. Udall, however——

The CHAIRMAN. You do not have any right as a witness.

Mr. SANBORN (continuing). How he can explain that.

The CHAIRMAN. All right, go ahead.

Mr. UDALL. This area of origin business has been pioneered in California, and it simply says if one region goes to another region and gets water that is developed in that region that appears to be surplus, and later on it turns out that that region that is exporting the water really needs that, 25, 50, or 100 years from now, the area that took water and began to use it has an obligation to pay the difference between developing new water supplies from secondary sources and what it would have cost them to use the original water that was there.

Mr. SANBORN. Can that be absolutely guaranteed by legislation?

Mr. UDALL. I think it could be guaranteed to the satisfaction of any reasonable man.

Mr. SANBORN. You know this Congress cannot obligate the next Congress very readily.

Mr. UDALL. No; but it can set up a fund and place an obligation on that fund to pay the difference in developing difference in cost, in developing secondary water supplies. They have done it in California.

What my question is, if you do all of these things and you still have a hundred million acre-feet left over and you are reasonably satisfied that your needs are taken care of and that this is going to waste into the ocean, would you object to using 5 million acre-feet to resolve the problems in your sister States?

Mr. SANBORN. No; but the big word in there is "if."

Mr. UDALL. I recognize that. I put it in there.

That is all I have, Mr. Chairman.

The CHAIRMAN. Mr. Skubitz.

Mr. SKUBITZ. I have no questions.

The CHAIRMAN. The gentleman from Washington.

Mr. FOLEY. Thank you, Mr. Chairman.

It is a pleasure to see you here, Mr. Sanborn. You served on this committee at a time when my distinguished predecessor in the Congress, Walt Horan, was a colleague of yours.

I think you have made an excellent statement, a very realistic statement, and I would just like to ask you this question. Is it a fair assumption from your testimony that before other regions are asked to show what their water needs are and what their so-called surplus

might be, that those who are seeking the water should prove conclusively that they have made full beneficial use of all the water resources within the area, such as the Colorado River Basin and the State of California generally?

Mr. SANBORN. That is right.

Mr. FOLEY. That should be the priority, is that not true?

Mr. SANBORN. That is right.

Mr. FOLEY. Thank you.

The CHAIRMAN. The gentleman from Oregon.

Mr. WYATT. Mr. Sanborn, I thank you for your statement, and I welcome you here, too. I would first like to disassociate myself from the remarks made by my distinguished colleague from California, Mr. Hosmer, about attorneys. Attorneys serve a very useful function.

Mr. SANBORN. I might say that I——

The CHAIRMAN. I doubt if this is the place for attorneys to defend themselves.

Mr. SANBORN. I might say this. That I am a graduate of the Columbia Law School.

Mr. WYATT. I will not pursue the matter any further.

Mr. Sanborn, is this fair as a conclusion from your testimony? That you would certainly want to wait until the States in the Northwest have studied their present water inventories, projected them into the future, and studied water needs, before writing a blank check as to diverting water from the Northwest to another river basin?

M. SANBORN. That is correct.

Mr. WYATT. And is it fair that your position is that no one, including California, knows of the water needs at the present time of the States in the Northwest?

Mr. SANBORN. What has troubled me all the time, and others with me, is that we know what priorities mean, and if a person establishes a right, even though on a contingent basis as has been suggested here, and spends a great amount of money in developing that, and then we suddenly discover that they are really taking more water than they initially suggested, that that water might come to a place where they would interfere with our future development, and we know, even though they suggest that it might be that they would be the ones to suffer if there were a shortage, at the same time these priorities get in the way.

Mr. WYATT. I have one other question, Mr. Sanborn: Do you know of any person or any governmental agency at the present time that knows with any degree of certainty what the water needs are going to be in the Northwest in 25 or 50 or 100 years?

Mr. SANBORN. I imagine that any guess that any organization might come up with could very well fall short of——

Mr. WYATT. It is pure speculation at this time.

Mr. SANBORN. It is mere speculation is right.

Mr. WYATT. That is all. Thank you.

The CHAIRMAN. The gentleman from Texas?

Mr. WHITE of Texas. No questions, thank you, Mr. Chairman.

The CHAIRMAN. The gentleman from Idaho?

Mr. HANSEN. Mr. Chairman, I would like to ask Mr. Sanborn a couple of questions: First, I would like to say that I am proud to be holding the seat Mr. Sanborn once held in the Congress. He has

been a great help to me, and I am very happy to welcome you here this morning, Mr. Sanborn.

I would like to ask you with regard to the Snake River, I think my colleague from California, Mr. Hosmer, mentioned something to the effect that nothing has been said from witnesses in the Northwest as to what we would use the water for. I think you brought it out, correct, that much of the pressure has not been put on us until recently to decide just exactly how far into the future you have to plan, is that correct?

Mr. SANBORN. That is correct.

Mr. HANSEN. And the second thing is that you would say that possibly because Idaho has created the water resources board—Oregon and Washington are also making studies—that this shows that because of this pressure that we are making some studies and some advances in this respect, is this correct?

Mr. SANBORN. That is right.

Mr. HANSEN. And another question, that one of the problems of water rights is the fact that after something is established, a right is established, that you can sit on the headwaters somewhere and watch the water go right by you and somebody can be using it clear down to the mouth of the river, is that correct?

Mr. SANBORN. Correct.

Mr. HANSEN. I think these are all the questions I have.

Thank you, Mr. Chairman.

The CHAIRMAN. The gentleman from California?

Mr. REINECKE. Thank you.

Mr. Sanborn, did I understand your response to Mr. Foley's question that you feel that the basin should develop all of its water regardless of the cost before investigating any possibilities of the importation from another basin?

Mr. SANBORN. I should not think that cost should enter into this.

Mr. REINECKE. Recognizing that these are Federal funds, you still feel that they should be spent regardless of cost before even looking to another basin?

Mr. SANBORN. Well, unless the other costs, of course, are prohibitive, yes.

Mr. REINECKE. No further questions, Mr. Chairman.

The CHAIRMAN. Thank you very much, Mr. Sanborn, for your presentation.

(Permission to include the following two statements will be found on p. 700.)

STATEMENT OF SAM HIGH

I am Sam High; I live in Twin Falls, Idaho. I am president of the Idaho State Reclamation Association which has been active in Idaho irrigation problems for more than 30 years. The Idaho State Reclamation Association represents 159 irrigation districts and canal companies which cover over 2,600,000 acres of surface water and approximately 1 million acres from ground water pumping. Irrigation is increasing annually in Idaho at approximately 70,000 acres. In addition, there are approximately 3 million acres of irrigable land not now irrigated which can be irrigated from the Snake River and its tributaries. This would require approximately 12 million acre-feet.

At the outset, I would like to say that the Idaho State Reclamation Association concurs fully in the statement made before this committee by George L. Crookham, chairman of the Idaho Water Resources Board and we endorse the actions of that board. Our association intends to cooperate closely with that

organization, particularly in completing an inventory of Idaho's water supplies and future water requirements.

Common to all the States of the West has been the demand on their resources to supply the needs of a growing population and the influx of people from other areas. In Idaho the greatest demand has been upon land and water. The amount required for the 70,000 acres annually now being increased is at the rate of 300,000 acre-feet per year. At this rate there would be a shortage of water in Idaho long before any Paul Bunyan dream of transporting a river over a thousand miles of mountain range could be made a reality. In our opinion every State has an equal right to develop its own resources and economy to the fullest extent. Idaho has a tremendous acreage of arable land with excellent soil and fine growing climate which only needs water to produce abundantly. The potential needs in Idaho require every acre-foot of water in Snake River and for this reason we feel that any consideration of Snake River water in the Lower Colorado River Basin project should be eliminated.

I am glad to have this opportunity to submit the view of the Idaho State Reclamation Association on H.R. 4671 and similar bills.

STATEMENT OF RAY WARD

My name is Ray Ward and I live in Wendell, Idaho, which is a part of an irrigation project of 160,000 acres known as the North Side Tract.

I have been a director of the North Side Canal Co., which manages this project for many years, and am also a director of the Idaho State Reclamation Association.

I have lived in this area for 60 years, during which time I have been actively engaged in farming and the produce business.

During this whole period of time, I have been in close touch with the general water situation in southern Idaho and the long and continuous effort which has been required to bring Idaho's irrigation to its present stage. I have seen the necessity of building storage reservoirs, first, Jackson Lake, then American Falls, and lastly, Palisades Reservoir to furnish supplemental water for lands with partial water rights from natural flow. I have experienced the dry cycles in which these reservoirs did not fill; and in which even American Falls only filled approximately 50 percent.

From all of this background, I am certain that there is no water available from the Snake River Basin for export to any other area. All of the water available in the Snake River and its tributaries will, in a short period of time, be required for servicing the presently irrigated lands and the rapidly expanding new areas. With modern pumping equipment, all available water can and will be put to beneficial use in Idaho.

In this state of facts, it seems unrealistic for anyone to talk of depleting Snake River, either directly or indirectly, by exporting water. Even any studies along that line would be a waste of time, manpower, and money.

Accordingly, I wish to go on record as opposing any Federal legislation purporting to authorize studies of this character, and I join with Mr. Crookham, chairman of the Idaho Water Resources Board and Mr. Sam High, president of the Idaho State Reclamation Association in their views which they have expressed on H.R. 4671 and similar bills.

The CHAIRMAN. The next witness will be Anthony Wayne Smith, representing National Parks Association. He is known to all people who are interested in conservation matters, whether they agree with him or not.

We are glad to have you here and will be glad to listen to your presentation.

STATEMENT OF ANTHONY WAYNE SMITH, PRESIDENT AND GENERAL COUNSEL, NATIONAL PARKS ASSOCIATION

Mr. SMITH. Mr. Chairman and gentlemen of the subcommittee, it is always a pleasure to have the opportunity to appear before this committee, because we always know that what we have to say is going

to be seriously considered, and considered by very able minds with excellent backgrounds in the field, responsible members of the Congress of the United States.

My name is Anthony Wayne Smith. I am president and general counsel of the National Parks Association, which is a private, nonprofit, membership organization, educational and scientific in nature, with about 30,000 members throughout the United States and abroad. The association publishes the monthly National Parks magazine, received by all members. I am an attorney admitted to practice in New York and the District of Columbia and a specialist in river basin planning and natural resources management. I appreciate the invitation to present this statement to the subcommittee.

Analyses of the central Arizona project and the Pacific Southwest water plan by Mr. Stephen Raushenbush, former Chief of Research, Power Division, Department of the Interior, now economic consultant to the National Parks Association, were published in the National Parks magazine, April and June 1964. Supporting data for the conclusions reached by Mr. Raushenbush were tabulated at the request of the Assistant Secretary of the Interior, Mr. Kenneth Holum, later that year and submitted to him and Commissioner Dominy of the Bureau of Reclamation, together with a covering memorandum and letter of transmittal. I submit copies of all these documents for your convenience; much of what I have to say in my present testimony is based on the data previously made public in these documents.

The CHAIRMAN. Unless there is an objection, the letter of Mr. Smith to Secretary Holum, together with the analysis to which he makes reference, which is in the form of memorandum prepared by the National Park Association under date of October 20, 1964—is that correct?

Mr. SMITH. That is correct, sir.

The CHAIRMAN. Will be made a part of the record immediately following Mr. Smith's presentation. (See p. 721.)

Mr. HOSMER. I reserve the right to object, Mr. Chairman. Is this the October 20, 1964, document?

The CHAIRMAN. Yes.

Mr. HOSMER. You say it was prepared by whom?

The CHAIRMAN. Prepared by the National Parks Association, as I understand it, in answer to the request by Mr. Smith.

Mr. SMITH. The memorandum, sir, was prepared by me. It submits data developed by the economic consultants to the National Parks Association.

Mr. HOSMER. There is a considerable amount of statistical material in this document, is there not?

Mr. SMITH. That is right.

Mr. HOSMER. Mr. Smith, on the statistical material in here usually it is prepared according to some formula or other. Do you know what formulas were used in preparing this?

Mr. SMITH. It is not statistical material in the first place. It is computations. The Assistant Secretary of the Interior asked us—and Commissioner Dominy, as I recall—asked us to submit the compilation on which we based the articles that appeared in the April and June issues of National Parks magazine. We previously asked them for comment on these issues, and these articles, and these two copies of National Parks magazine I would like to offer also in evidence.

The CHAIRMAN. They will be placed in the record and filed.

Mr. HOSMER. Mr. Chairman, subject to the understanding that the calculations may be based upon certain assumptions and certain formulas that either may be or may not be standard in the calculations of these projects, I will withdraw my reservation.

The CHAIRMAN. The gentleman's assumptions are, of course, correct. Hearing no objection, it is so ordered.

The material will be found on p. 721.)

Now, you may proceed, Mr. Smith.

Mr. SMITH. Mr. Chairman, the documents that I have included in the folders include this October 20 memorandum, the letter to Secretary Holum, the two issues of National Parks magazine that I have referred to, April and June 1964, which contained both analyses of the economics and electric power aspects of these projects, and also editorials by me commenting on them.

I have also included, if I may, excerpts from the biography of Mr. Raushenbush, which appear in Who's Who in America, for your convenience.

Mr. HOSMER. I cannot hear you.

The CHAIRMAN. He asked to have the biography of Mr. Raushenbush included and made a part of the file.

You may proceed.

Mr. SMITH. I submit also copies of the current September 1965 issue of National Parks magazine which contains editorial comment by me on the problem before you. If the subcommittee, the committee, or the committee staff desire further information on any points which I may deal with or which are covered in the supporting material, we shall be happy to attempt to supply it.

In recommending recently that authorization of the proposed Bridge Canyon Dam on the Colorado River below Grand Canyon National Park and Monument be deferred for more careful study and later consideration, the Bureau of the Budget rendered a significant public service.

Bridge Canyon Dam, if constructed to the elevation presently proposed by the Department of the Interior, would flood reservoir water into Grand Canyon National Monument throughout the entire length of the river through the monument and into Grand Canyon National Park some 13 miles. Such inundation would be in violation of the established national policy against reservoirs in national parks and monuments; it would not fall within the proviso of the Grand Canyon Park Act which has been relied upon the justify it, and which I shall discuss in a moment.

The scenic resources of the Grand Canyon of the Colorado, whether in the monument or the park, are irreplaceable. These resources have worldwide significance, and their wanton destruction for questionable utilitarian purposes would have serious repercussions on the American image abroad. The cultural, scenic, and ecological values at stake in this situation are, of course, intangible; they cannot be measured in dollars and cents as monetary economic advantages can; but in our judgment, which we think is likely to be the ultimate judgment of the American people as a whole, they far outweigh the very doubtful dollar values on which these projects purport to be justified.

While the Secretary of the Interior has recommended the authorization of Bridge Canyon Dam, and the project has been a favorite of the Bureau of Reclamation for many years, other agencies of the Department of the Interior seemingly dissent. The National Park Service has stated that the reservoir would inevitably result in the loss of park values of national significance. The Bureau of Outdoor Recreation has stated that no new recreation benefits can be claimed, and pointed to the unusual existing recreation values of the area and the adverse effects the reservoir would have on them; it has elaborated its position at some length along such lines. Unfortunately, we have the impression that these agencies do not feel entirely free to state their honest opinions in this situation, in view of the position of the Department; if this subcommittee has not already done so, I would suggest that the Directors of the National Park Service and the Bureau of Outdoor Recreation be called to this stand and asked to state their views as they would state them if they were not component parts of the Department of the Interior. You might also wish to call two former Directors of the National Park Service, Conrad L. Wirth and Newton B. Drury, again with the reassurance that their uninhibited opinions are being sought.

This subcommittee and the full committee will, in our opinion, wish to give careful consideration to the implications of the last sentence in section 302 of the proposed legislation, which says that "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)," the act which created Grand Canyon National Park.

The Grand Canyon Park Act contains the following section 7:

> That, whenever consistent with the primary purposes of said park, the Secretary of the Interior is authorized to permit the utilization of areas therein which may be necessary for the development and maintenance of a Government reclamation project. (16 United States Code 227.)

Obviously, the questions are whether the utilization of areas of Grand Canyon National Park for the Bridge Canyon Reservoir is consistent with the primary purposes of the park and necessary for the development and maintenance of a reclamation project.

The entire tradition of the protection of national parks in this country is eloquent testimony against the proposition that flooding a reservoir into Grand Canyon Park is consistent with the primary purposes of the park; we suggest that by far the dominant sentiment of the American people runs counter to the declaration of consistency contained in the measure under consideration.

Moreover, it is quite clear that this use of the land is not necessary to any Government reclamation project. Bridge Canyon Dam could be eliminated completely from the central Arizona project, as far as pumping is concerned, and such elimination would not have the slightest effect on this project; the pumping power could be supplied entirely from Marble Canyon. Bridge Canyon has been represented as being entirely a peaking power project, and this has nothing whatsoever to do with any Government reclamation project; it has been represented as a money earner for the construction of reclamation projects elsewhere; but such money can just as well be provided out of the General Treasury, and Bridge Canyon is not necessary to such financing. If it be true, as now suggested, that Bridge Canyon may

be used to provide a small measure of pumping power, it is not necessary that it should be so used. There is no way in which the language of the Grand Canyon Park Act can be tortured into consistency with the provisions of the measure under consideration. Needless to say, Congress is privileged, if it wishes to modify basic national policy in regard to park protection, to do so; but in that event, it would be preferable, in all candor, to state frankly that such a course had been chosen. A declaration of consistency where no consistency exists would, in our judgment, be unbecoming to the Congress of the United States.

I need hardly say to this subcommittee, which is already well informed about these projects, that neither Bridge Canyon nor Marble Canyon Dam will store any water whatsoever for irrigation purposes; in fact, both of them will cause severe losses of the irreplaceable water resources of the Pacific Southwest through evaporation.

Nor will Bridge Canyon be used in any significant measure for pumping water into central Arizona or elsewhere. In the original proposal for the central Arizona project and the Pacific Southwest water plan, advanced by the Department of the Interior, Bridge Canyon would not have been used at all for pumping; its functions would have been to supply peaking power, mainly for sale in California; it would earn money for the basin account which could be used for subsequent projects, mainly in California. We have been told recently that some of the Bridge Canyon power would be used for pumping, but a relatively small amount; apparently the purpose of this adjustment is to bring the project within the exception of the Grand Canyon Park Act as a reclamation project; but the power is not needed for this purpose.

As originally presented, Bridge Canyon was to produce and sell peaking power at about 6 mills; after the retirement of the investment, it would earn money for a basin account for new construction, mainly in California. This inducement was thought to insure support by California for the project as a whole. However, there seems to be no good reason why any further projects, if desirable, should not be financed directly from the General Treasury of the United States; such direct financing might give Congress greater control over the basic decisions; moreover, the projects could be authorized later, if, as, and when the need for them became more apparent.

But the truth is that Bridge Canyon Dam is not needed as a money earner. A much larger percentage of the water which will be pumped into central Arizona from the lower Colorado River near the Mexican border pursuant to any central Arizona project will be sold at high municipal and industrial prices, as contrasted with low irrigation prices, than the Department of the Interior originally represented. At least 100,000 acre-feet more municipal and industrial water will be sold at $45 an acre-foot than originally stated; this is in contrast with irrigation water at $10 an acre-foot; if realistic estimates of urban population growth and water consumption are made, the shift may be much higher.

I was very much interested this morning in hearing the distinguished former Senator, Barry Goldwater from Arizona, making the comment that—let me see, what was it—the water that is going into Arizona will be used, he said, almost entirely for municipal purposes.

Now, we agree with the Senator. This is the way it is going to go, and it is going to go to $45 water instead of $10 water, and it is going to earn an enormous amount of money. The Senator apparently did not realize that when he made that statement, he destroyed the case for Bridge Canyon Dam, because the purpose of Bridge Canyon Dam was represented as being to sell hydropower for the purpose of earning money to go into a basin account, and the central Arizona project, because of the high prices that will be realized on the water, will in itself raise whatever money is necessary to go into a basin account.

The result is to make the central Arizona project more of a money earner, considered merely as a water-pumping project, than was represented to the public; Bridge Canyon becomes a fifth wheel, even if we really want to earn money in this way in a public enterprise. There may be some people who would question the desirability of the Government getting into purely moneymaking operations of this kind. By that I mean nothing whatsoever to do with pumping, nothing necessarily to do with pumping water, nothing to do with storing water, but simply a question of earning money to go into a basin account.

I suggest that the committee give careful consideration to this question.

We had originally supposed that the changeover from irrigation to industrial and municipal water in Arizona would be even higher than the amount I have mentioned, 100,000 acre-feet. The Senator was suggesting that it would be much larger than that, and I think he is right. Certain it is that M. & I. use will grow much more rapidly than that in the Phoenix-Tucson area. However, it seems that some of this M. & I. use will be satisfied from water in the old Salt River project; this is a situation where the landowners acquired a vested interest in reclamation water at low prices and can retain that interest even though the water is put to a much more profitable use by municipalities and industries. The old laws provided no safeguards against such speculative profits. The landowners and water users can therefore split the difference, and Salt River water will be more attractive than central Arizona project water, but not if the actual growth rates, which will probably occur there, take place, as the Senator said. It will probably all be picked up. But putting it on a very conservative municipal-and-industrial growth rate, some of this water, the Salt River project will supply some of it. We suggest that the subcommittee look into this situation very carefully. This requires very, very careful examination, gentlemen, which your staff is in a position to make, and you gentlemen are in the position to get the necessary information. You might wish to call Commissioner Dominy to the stand on that point.

Just what is happening here with the Salt River water a distinguished from the CAP water, the proposed CAP water.

There is another question which deserves attention by this subcommittee. There will be a considerable amount of effluent from the municipal and industrial projects using both Salt River and central Arizona project water. It is not at all clear who will get the advantage of this water; who will own it, buy it, reap the profits inherent in it. Much of it may have great value for both irrigation and

fertilizing purposes. This subcommitte might consider safeguards against unreasonable speculative advantages going to persons who do not deserve them; Commissioner Dominy might be able to shed some light on this question.

There will also be some exchanges of water among these various projects in Arizona: Salt River, municipal effluents, and the CAP, which become rather complex; in view of the amount of land speculation likely to be involved, you might wish to question the Commissioner on these points.

Bridge Canyon Dam and Reservoir would be highly destructive in terms of the scenic, recreational, ecological, and cultural values of the Grand Canyon in both the monument and the park. It is not needed, and it is of questionable desirability, as a money-making project. It will not store any water for irrigation anywhere, but will, on the contrary, evaporate water; it will do little, if any, pumping. Its only value, if any, would be for generating power, and I would now like to turn to this point.

About a year ago a spokesman for the Bureau of Reclamation stated that the cost of power generated at coal-fired thermal plants in the Colorado Basin was being brought down to 5 mills a kilowatt-hour or less. Just a month ago the Commissioner stated that it was coming down in larger plants to 3 or 4 mills or less. Bridge Canyon Dam will produce peaking power at 6 mills; with firm power at 3 or 4 mills or less, it would behoove this subcommittee to inquire very carefully into the profitability of peaking power at 6 mills. The Department of the Interior has not yet demonstrated, as far as we know, that Bridge Canyon Dam would pay its way, principal and interest, over the 50-year repayment period, as a peaking powerplant, as against such competition.

The Office of Science and Technology has indicated that nuclear power produced by the fission process, in conjunction with the desaltation of saline water, will probably be available within the next 10 or 15 years at a cost of 3 or 4 mills. There have been suggestions that such power will be well adapted to peakload purposes, and not merely to baseload. If so, Bridge Canyon Dam cannot be justified for peaking purposes; this last possible justification collapses. Presumably, this was one of the questions which the Bureau of the Budget thought should be very carefully examined before this project had serious consideration for authorization. It seems quite likely that in the 4- or 5-year period suggested by the Bureau for restudy, it will become abundantly apparent that better alternatives than Bridge Canyon for peaking power production exist.

Since the time when plans were crystallized for Bridge and Marble Canyon Dams by the Department of the Interior, a serious doubt has been growing as to the probable quantities of water available in the Colorado River Basin. The very low flows of recent years may be more typical than otherwise. If so, the big reservoirs, including Glen Canyon, and most certainly Marble Canyon and Bridge Canyon, will not fill or refill on schedule. To the extent that their schedules are unmet, interest on the investment will rise, and power costs with them; Bridge Canyon power might be 6.5 mills instead of 6 mills, making it even more vulnerable to competition from coal-fired and nuclear-fission energy. By the time the waiting period of 4 or 5

years suggested by the Bureau of the Budget has passed, we shall have better information on weather cycles in the basin; this is another excellent reason for denying authorization.

Just beyond the horizon is nuclear fusion. This process, as you certainly know, will produce fresh water as well as abundant power. The Office of Science and Technology has suggested that the cost would be between 2 and 3 mills. It is widely supposed that this process will have been developed by the end of this century, before the end of the payout period for Marble and Bridge Canyon Dams. Any such development could bankrupt both of these projects.

I am sure that the members of the subcommittee have in mind that we are talking about the probable inability of Bridge Canyon Dam to make payments on principal and interest throughout the payout period. Even if debt service proved possible at the beginning, it might fail in later years. It is not at all certain that competing power sources are not superior even now; it is almost certain that they will prove superior by the end of another decade or so, and that either the power consumers will be caught with long-term contracts at high prices or prices will have to be reduced, and the project will prove to be uneconomic.

Turning to Marble Canyon Dam, this project would be located above Grand Canyon Park, and the reservoir would not invade any unit of the national park system. However, Marble Canyon is also famous for its wild scenery and natural outdoor recreation opportunites, and most of the same cultural evaluations are applicable at Marble as at Bridge. Marble Canyon should not be destroyed for the sake of an unnecessary and unprofitable hydroelectric power project; certainly not where superior sources of power exist.

The comments made about Bridge Canyon are in the main applicable at Marble except that the purpose of Marble was announced originally as that of pumping water from the Colorado River near the Mexican border into central Arizona for reclamation and municipal and industrial purposes. It was represented as producing firm power at 4.2 mills a killowatt-hour; and apparently no peaking power, and no uses other than those of the central Arizona project, were at that time contemplated. We are now being told that it will also produce peaking power; this appears to be in line with the current thinking of the Department of the Interior that coal-fixed plants will beat hydropower for base-load purposes, and that hydropower can be used only for peaking purposes. This subcommittee will probably, therefore, receive the Marble Canyon proposal as a peaking power proposal, and the considerations involved will be more similar to those discussed in connection with Bridge Canyon.

But even the original proposal was unsound, if we accept the present analyses of the Department of the Interior. If it be true, as the Commissioner of the Bureau of Reclamation has said, that coal-fired plants may shortly be able to produce power at 3 or 4 mills or less, then they will obviously beat Marble Canyon at 4.2 mills. Moreover, the cost of hydropower production, following construction costs generally, is constantly increasing, while the cost of coal-fired thermal power, due to advancing technology, is constantly declininng.

It is difficult to understand how a project of this kind can be realistically appraised, whether by the Bureau of the Budget, or this sub-

committee, or public service organizations like the National Parks Association, interested in presenting an objective analysis of the situation, if the purported justification of such projects changes from year to year in this chameleon fashion. I feel sure that this subcommittee will take a great interest in finding out whether the Marble Canyon project is intended for pumping purposes, and hence for reclamation, with about 15 percent of the investment nonreimbursable, and about 50 percent interest free, or whether it is a peakload project, not intended for irrigation, with principal and interest fully repayable.

If the Marble Canyon project is an irrigation project, intended for pumping, then we need to add the amount of interest lost and the nonreimbursable principal if we are to make a proper comparison with coal-fired costs at plants constructed by privately owned, publicly regulated electrical utilities. If this be done, the gap, if any, between hydropower at 4.2 mills and coal power at 5 mills or less, as estimated by the Bureau last year, probably disappears. And of course if coal costs are 3 or 4 mills or less, as apparently now admitted, the advantage is on the side of coal, even without consideration of the subsidy given to hydropower.

You will bear in mind also, of course, that in the offing, first of all, is nuclear fission, with power costs at 3 or 4 mills; moreover; it is not at all clear that peaking power will not be produced by these methods at rates lower than hydropower. This is a question of a 10- or 15-year development, and this competition will be in the picture long before any investment in the Marble Canyon Dam, or Bridge Canyon, can be repaid. And in the longer perspective, but still within a generation's time, in all probability, there will be nuclear fusion, with power costs at 2 or 3 mills, according to the Office of Science and Technology.

We are not urging that nuclear fission plants be substituted for coal-fired steamplants, or for hydropower plants, for that matter, because we are not satisfied as yet that the problem of disposing of radioactive wastes has been sufficiently solved. But it seems quite certain that atomic fission will be used for the desaltation of sea water and the generation of power in the Pacific Southwest in the readily foreseeable future; even if opposed on radioactive waste grounds, these developments are almost certain to take place. We mention the prospect merely as a fact, and without advocacy of any kind.

Atomic fusion, as we understand the situation, presents different questions. Radioactive wastes are not produced, and on the other hand, quantities of excellent water are developed. Large quantities, vast quantities. The difficulty appears to be the generation of enormous quantities of heat with adverse effects on waters and atmosphere, and unpredictable results in respect to weather, climate, and the environment generally. It seems probable that these considerations will have a limiting effect on nuclear fusion use, but will not preclude such use entirely. Admittedly, we are in the realm of rather broad speculation; yet the march of technology is so rapid that this prospect must be considered.

We have urged, and I would be inclined to emphasize at the risk of prolonging this testimony unduly, that more research and development work needs to be done in the field of solar energy. The development of solar energy in a sunny climate like that of the Pacific Southwest and particularly in the desert country of portions of the Colorado

Basin holds great promise. Funds which might otherwise be expended on destructive hydropower development might better be used in moving forward into the future in search of practical methods for harnessing solar energy.

This is a question of the kind of program a truly Great Society would adopt for the Colorado. It seems to many people that a high civilization will set great store by the scenic and recreational values of the canyons between Glen Canyon Dam and Lake Mead; the Congress might well recommend to the President that he declare this stretch of the river a national monument, or might itself incorporate it all into Grand Canyon National Park, thus giving it full protection under the National Parks Act, the Federal Power Act, and otherwise. Coal-fired steamplants would then be relied on to provide the electrical energy needed for pumping, both for irrigation and for municipal and industrial purposes, as far as this portion of the river is concerned; such surplus coal capacity as might be required, or such nuclear capacity, would be provided for peaking purposes; if this were considered too costly, which seems doubtful, the hydropower potentials of Glen Canyon, Hoover Dam, and other existing hydropower structures in the Basin, could be devoted more completely to peaking purposes, and the baseload could be picked up by thermal plants.

We would expect nuclear energy to produce additional prime power at costs at least as low as coal-fired thermal plants, and perhaps even to produce peaking power more inexpensively; moreover, fission plants could pump desalted water from the Pacific and from the Gulf of California into both southern California and central Arizona, and if I were representing the State of Arizona in this Congress, I would be interested in looking into the question of getting water from the Gulf of California as rapidly as possible by the nuclear desaltation process directly into southern Arizona.

Quarrels about the division of water between the two States would thus be decreased, and I might say quarrels which we have had some intimation of here this morning as between these two States and northern California and Washington and Oregon and Idaho—the potential disputes here might be decreased also.

In due course, if the promise of nuclear fusion is fulfilled, and the problem of heat is not insurmountable, newly manufactured water will be available, and abundant power can be tapped.

The notion that more and more water should be brought south from northern California into southern California and even exported to Arizona becomes less and less attractive as these potentialities unfold. There has even been a threat to the Columbia River Basin with covetous eyes appraising the enormous water resources of the Pacific Northwest; such notions are also probably unrealistic in the long perspective.

In our judgment, the questions raised by the Bureau of the Budget with respect to Bridge Canyon are equally applicable to Marble Canyon Dam. Both structures would contribute energy to the network, and it would be difficult to identify and earmark separate supplies. Neither project can be justified for baseload purposes; it is highly questionable whether they are needed or can be justified for peaking power. This last question is the most important one for this subcommittee, as for the Bureau of the Budget, and it needs much

more thorough investigation than it has had thus far. The 4- to 5-year moratorium suggested by the Bureau for Bridge Canyon should be imposed on Marble Canyon as well, because the situations are similar. Bridge Canyon could not be built without congressional authorization, in view of the strictures of the Federal Power Act prohibiting the Federal Power Commission from licensing projects constructed for reservoirs in national parks; this restriction applies to Grand Canyon National Monument.

In the case of Marble Canyon, however, there is no such protection; Congress has properly imposed a moratorium on the issuance of licenses at these points by the Federal Power Commission pending a preliminary examination of the problem: this safeguard should be continued pending decision by Congress itself as to its course of action at both of these sites; that is, we suggest that you might wish to propose a moratorium on the issuance of any licenses at either Marble or Bridge Canyon for hydropower construction until Congress itself has acted either to authorize construction, or, as appears to be the sounder policy, to give permanent protection to the entire Colorado in this area as a national monument, or, indeed, as a national park.

The Bureau of the Budget made one further excellent recommendation, that a Water Policy Commission be established composed of persons from outside the Government, to review our entire national policy with respect to water resources; the Bureau may have had reclamation problems very much in mind. Many people feel that a review of this nature, and a commission of this kind, are long overdue. Should we be subsidizing irrigation, as a nation, at a time when the Department of Agriculture is trying to retire many millions of acres of croplands from production? Should we be shifting agricultural production in, let us say, cotton, from the Southeast to the Southwest, with the aid of reclamation subsidies? Should we be pressing for the development of every last kilowatt of hydroelectric power for peaking purposes or should we set higher store by the remaining scenic resources of our western canyons, and of our eastern river valleys, for that matter? Should the least-cost criterion retain its present high priority in the evaluation of specific projects, or should important ecological, social, and cultural values be given greater weight?

The same question should be asked about the entire cost-benefit approach; should we not give much more consideration to both monetary and nonmonetary intangibles? Should not the programing of water development projects be subordinated to either an interdepartmental commission or a White House level agency, or, better, to a commission composed of policy-minded persons, rather than operating agencies?

These river basin planning problems are not primarily engineering problems, and therein lies the source of many of our mistakes; they are problems in economics, sociology, and indeed, in political philosophy, in the sense of the study of social values and objectives. These present hearings, and this subcommittee and committee, might well be an excellent time and excellent agencies to initiate an inquiry into a problem like the continued subsidy of reclamation. In addition, the Budget Bureau's proposal for a comprehensive commission to review other broad aspects of national water policy might well be given favorable consideration.

Gentlemen, I thank you, and will be happy to answer any questions you may have.

(The documents referred to above, designated by the chairman to be entered in the record at the close of Mr. Smith's formal statement, are as follows:)

NATIONAL PARKS ASSOCIATION,
Washington, D.C., November 4, 1964.

Mr. KENNETH HOLUM,
Assistant Secretary of the Interior,
U.S. Department of the Interior,
Washington, D.C.

DEAR MR. HOLUM: Some time ago you replied to letters I had written to you and to the Commissioner of the Bureau of Reclamation asking for comment on an article about the proposed Bridge Canyon Dam by Mr. Stephen Raushenbush in the April 1964 National Parks magazine.

You stated for the Commissioner and yourself that you could not comment adequately without exhaustive analysis of the data supporting Mr. Raushenbush's conclusions.

We have taken the time necessary to tabulate and annotate the supporting data in question and to prepare a memorandum for your convenience tying the data together and drawing certain further conclusions.

When I replied to the above-mentioned letter from you I sent you the June issue of National Parks magazine carrying a second article by Mr. Raushenbush on the Pacific Southwest water plan.

Both the April and the June issues of National Parks magazine contain editorials on the topics in question, expressing the point of view of this association.

The tabulations, annotations, and memorandum referred to above are enclosed herewith. They provide solid support for the conclusions drawn in the two articles in the magazine, and for the policy recommendations of the editorials.

As I said in my most recent letter, I feel sure that Mr. Raushenbush would be happy to consult with your technicians or with you if you desire further information from us.

The material supplied to you herewith shows that the Bridge Canyon Dam and appurtenant works are completely unnecessary for the success of the programs developed by the Bureau of Reclamation for central Arizona, southern California, and related areas; further, that they will in all probability be uneconomic for the Pacific Southwest; and further, that the same may well prove to be true for the Marble Canyon project under certain circumstances.

We call your attention to the fact that the plans of the Bureau for central Arizona do not provide for the delivery to Arizona of all the water from the Colorado River to which Arizona has a proper claim; our analysis shows that a sound Pacific Southwest water plan could provide Arizona with its entire entitlement without depriving irrigators in California of such quantities of water as they may consider theirs as of right by prior appropriation or otherwise.

As a matter of law, in our opinion, the construction of Bridge Canyon Dam in such manner as to intrude reservoir waters into any portion of Grand Canyon Park would conflict with the policies of the National Park Service Act and the Grand Canyon Park Act, in that such construction would not be consistent with the primary purposes of the park, and in that the areas of the park to be submerged would not be necessary for any Government reclamation project; the dam is not a reclamation project in itself, but only (at the most) in relation to reclamation projects in central Arizona or (even more remotely) in southern California, and for these, and all related projects, our analysis shows it to be unnecessary; hence, the areas which would be submerged by its construction are unnecessary for any reclamation project.

In our judgment a reexamination of the economic aspects of the Pacific Southwest water plan is quite imperative in the public interest. Such a reexamination, to be meaningful, should be undertaken by a task force representing the Department of the Interior, the Atomic Energy Commission, the Federal Power Commission, and the Office of Science and Technology. Representation for the Department of the Interior should comprise the Bureau of Reclamation, the Office of Saline Water, the Bureau of Mines, the Bureau of Land Management, the Bureau of Outdoor Recreation and the National Park Service. If initiated promptly, we are of the opinion that such reexamination could be concluded within the first quarter of 1965. We believe that the comprehensive data will

indicate that Bridge Canyon Dam should be eliminated as unnecessary; further, that Bridge Canyon Dam and perhaps Marble Canyon Dam as well should be eliminated as uneconomic.

Decisions of this kind in regional planning should not, however, be made on economic engineering, or other operational grounds alone; they should be made in the last analysis on determinations of public interest involving social and cultural, and not merely technical, considerations. The scenic resources of the canyons between Lake Mead and Glen Canyon Dam are of such great national, and even worldwide, significance that they should not in our judgment be sacrificed, even if there were some slight economic advantage to be gained by the construction of Marble Canyon Dam or Bridge Canyon Dam for power production purposes. Proposals in these matters are not for the technical and operating agencies to formulate, whether alone, or in combination; they are properly to be developed by officials or commissions qualified and trained for policy, as distinguished from operating, formulations; thus, they must necessarily be developed at the secretarial, interdepartmental, Cabinet, or Presidential levels.

Sincerely yours,

(S) Anthony Wayne Smith,
ANTHONY WAYNE SMITH,
President and General Counsel.

Enclosure.

A MEMORANDUM PREPARED BY THE NATIONAL PARKS ASSOCIATION, OCTOBER 20, 1964, ON THE BRIDGE CANYON AND THE MARBLE CANYON COMPONENTS OF THE PACIFIC SOUTHWEST WATER PLAN

The construction of the Bridge Canyon and Marble Canyon components of the Pacific Southwest water plan would be contrary to the public interest.

The conclusions of the National Parks Association to such effect have been expressed publicly on a number of occasions, and editorially in National Parks magazine.[1]

The association has taken the position, which is concurred in by most conservationists, and which is reaffirmed in this memorandum, that the construction of these dams, with reservoirs invading Grand Canyon National Park and Monument, or other wise harmful to the canyons in the vicinity of the park and Monument, would do irreparable injury to scenic and cultural resources of national, and indeed worldwide, importance, and would be in conflict with the law and established public policy governing the management of the park and monument.

Articles on the subject by Mr. Stephen Raushenbush have appeared in the April and June issues of the magazine.[2] These articles were based on intensive examinations of probable revenues from from the sale of water to be delivered pursuant to the plan in central Arizona and of the cost producing electric power and water by methods other than those proposed in the plan. Tabulations and annotations presenting these calculations are submitted with this memorandum.[3]

Basing itself in the main on the articles and supporting data developed by Mr. Raushenbush, the association draws the further conclusions that the Bridge Canyon component of the Pacific Southwest water plan is unnecessary to the success of the plan in central Arizona, southern California, or elsewhere; further, that it will in all probability be uneconomic for the Pacific Southwest; and further, that the same may well prove to be true for the Marble Canyon project under certain circumstances.

Specifically, we conclude as follows:

1. The central Arizona project, a component of the plan, can be highly profitable without the Bridge Canyon Dam, reservoir, powerplant, and transmission system. That $544 million system is simply unnecessary.

All that is needed to make the project extremely profitable is a more realistic division of the 1,200,000 acre-feet of Colorado River water between irrigation and municipal and industrial use. The Bureau of Reclamation's proposal is based on a distribution which will leave the people in the cities and the industries of the State without adequate water supplies within 5 years after the structures have been finished.[4] This is absurd. The people will not stand for it. The water will inevitably go to the people in the cities and to the industries; they are willing and able to pay $45 per acre-foot instead of the $10 per acre-

[1] April 1962; October 1963; April 1964; June 1964.
[2] "A Bridge Canyon Dam Is Not Necessary," April, p. 4; "Water Challenge of the Pacific Southwest," June, p. 4.
[3] Tables I–A, I–B, II–A, II–B, and III, with notes hereto attached.
[4] Table I–B.

foot charged to irrigators. They are, in effect, carrying the costs for the irrigators and they will not allow themselves to be parched for lack of water.

In table A below, which outlines a proposed alternative plan, an equal distribution of water between the two groups is affected by year 16—one which meets all the growing M. & I. demands up to that year—and is shown to produce a 78-year surplus of $794 million, without any investment in the Bridge Canyon system at all. We suggest that only by an unrealistic and unendurable division of water can the central Arizona project be presented in such a light as to make surplus revenues from Bridge Canyon seem necessary to the welfare of the project. We suggest further that the Bureau's original plans for giving the irrigators 76 percent of the new water be revised to give them 50 percent of the new water plus all the increased effluent which can come from the larger supply of water to be devoted to M. & I. use. The total available to irrigators in year 16 can be almost 700,000 acre-feet. The Bureau planning should provide for this use of effluent in the next statement of the project.

2. Advancing power technology, and the advent of lower power costs over the next 25 years will probably make both the Bridge Canyon and the Marble Canyon power systems uneconomic and undesirable for the region.

Hydroelectric projects cannot be justified on the basis of present power costs alone. They are required to pay off their investment over a 50-year period. If lower average costs of power than those obtainable at these hydroelectric plants can be obtained from other sources for project pumping (in the case of Marble Canyon) or for peaking power (in the case of Bridge Canyon), the two hydropower systems, and their dams and reservoirs, will be uneconomic for the region. Even if Bridge Canyon peaking power is protected by long-term contracts, those contracts will be undesirable for the region if, when and as lower peaking power costs become available.

We suggest that there is some persuasive evidence already available that power technology will reduce costs considerably over even the first half of the payout period of the central Arizona project (years 1970–95). We call your attention first to the large coal reserves in the Four Corners area, and the frequent reports that one or more of the local utilities are considering the development of those reserves in spite of the expected construction of Marble and Bridge Canyon components. This would give employment to a large number of coal miners in the area, and be a benefit to it. We note that the electric power industry organs have reported the expectation that firm power by coal-fired thermal plants will be delivered below a total 5 mill cost within the next 10 years. There have been suggestions that these costs might drop to 4 mills. According to our calculations any 50-year average cost below 4.2 mills would make it more economic for the project to purchase pumping energy than to construct Marble Canyon. We suggest that the public and private utilities in the region be questioned on their expectations of long-term costs for pumping power before Marble Canyon is considered further for that purpose. With interest during construction, it represents an investment of $258 million, even at present estimates.

Next, we note the decreasing costs of producing atomic energy. Within the next 10 years (before the central Arizona project would be 5 years old) delivered firm power at a total cost of between 3.8 and 3.2 mills is considered possible.

Finally, we recall the figures used in the study of nuclear-powered desaltation plants in March 1964 by the task group in the President's Office of Science and Technology. That group, which included Bureau personnel, based its cost estimates for water on the following figures for delivered costs of firm power:[5] 1970 from 3.2 mills up; 1975 from 2.7 mills up; 1980 from 2.1 mills up.

With a payout period which will not end before the year 2030, these figures become extremely significant for the central Arizona project. We believe that any pumping power cost averaging below 4.2 mills over the 50-year period will make Marble Canyon uneconomic. There is a definite probability that the average cost of pumping power from coal-fired thermal, atomic, or desaltation plants will be below that figure over the 50-year payout period. Further, we cannot see how the 6-mill peaking power rate required to retire the investment in Bridge Canyon (100 percent interest bearing), can remain competitive if and when firm power costs are in the 2–3-mill range as they may be by 1980. Peaking power costs can be expected to drop somewhat as a result. We believe that upon thorough examination, Bridge Canyon will not only be seen to be unnecessary but also uneconomic, and not in the interests of the region.

[5] Large nuclear-powered sea water distillation plants.

We note, in addition, that any delay in filling the Bridge Canyon Reservoir would increase the interest charges on that structure by $16 million annually. In view of the difficulty in filling Lake Powell, this fact should be taken into consideration. A 3-year delay in filling the reservoir behind Bridge Canyon would add $49 million to its cost, and raise the required revenue for its operation and capital costs by approximately one-half a mill. The structure would be less economic as a result. This possibility should also be considered in calculating the economic disadvantages of the Bridge Canyon system.

3. We note the advantage to central Arizona of eliminating the evaporation loss of 100,000 acre-feet which will be caused by the Bridge Canyon and Marble Canyon Reservoirs. Presumably 15 percent of this 100,000 acre-feet would be lost by seepage or evaporation in the canals. However, a net gain of 85,000 acre-feet of delivered water is possible. We believe it desirable that 60,000 acre-feet out of this 85,000 acre-feet be delivered free near central Arizona population centers for the creation of 60 constant-level lakes. The sale of the remaining 25,000 acre-feet to municipal and industrial users at $45 per acre-foot could cover the costs of pumping the water for the lakes and some of the cost of creating them. Water put near the population centers will supply far more needed recreation opportunities than the reservoirs in the unpopulated and remote areas. Irrigators below the lakes will also gain some advantage from them.

4. In this connection, we wish to emphasize how little recreation opportunity will be created, and how much damage will be done, by the reservoirs on the Colorado. The Bureau of Outdoor Recreation has stated the matter quite clearly. It said:

"No additional recreation benefits can be claimed for the proposed Bridge Canyon Dam because of the unusual existing recreation values of the proposed reservoir area and the adverse affects the dam and reservoir would have on these values.

"Water-oriented recreation cannot be considered one of the primary purposes for constructing the Bridge Canyon and Marble Canyon Dams because less costly alternatives for expanding recreation facilities in this area are available.

"The types of water-oriented recreation which could be supplied by the reservoirs are available at Lake Mead and Glen Canyon National Recreation Areas. These recreation areas serve the same population centers, and facilities could be added as recreation demand expands." [6]

5. In this connection also we point out that as a matter of law, in our opinion, the constuction of Bridge Canyon Dam, as planned, in such manner as to intrude reservoir waters into any portion of Grand Canyon Park would conflict with the policies of the National Park Service Act and the Grand Canyon Park Act, in that such construction would not be consistent with the primary purposes of the park, and in that the areas of the park which would be submerged would not be necessary for any Government reclamation project; the dam is not a reclamation project in itself, but only (at the most) in relation to reclamation projects in central Arizona or (even more remotely) in southern California, and for those projects it is unnecesary; hence, the areas which would be submerged by its construction are unnecessary for any reclamation project.

6. Invaluable water rights of Arizona are ignored in the present plan. According to statements made to Congress, Arizona has unused rights of 1,829,000 acre-feet. The Bureau plans for the central Arizona project, however, only take into account 1,200,000 acre-feet. Some 629,000 acre-feet (possibly 534,650 acre-feet delivered) with a potential gross value for municipal and industrial use of $24 million annually are involved. It may be that Arizona has ceded these rights, but there is no public record of it. No water plan for the region or for Arizona can be considered complete which ignores this situation.

It is possible and may be desirable to consider a program for the area which allows downriver irrigators in California to purchase this water at nominal price until Arizona's needs exceed the water now to be made available in the central Arizona project in its current form (1,070,000 acre-feet delivered). Its use after that time in Central Arizona by municipal and industrial users can make the Central Arizona project a source of funds, amounting to more than $1.34 billion, for the further development of water for the whole region. A total supply of 1,572,000 acre-feet of delivered water is involved in this alternative.[7]

This alternative project would require an expansion of the capacity of the Central Arizona canals. It would cover in whole or in part many of the costs of

[6] Pacific Southwest water plan. Appendix of August 1963, report as modified January 1964. Bureau of Outdoor Recreation, appendix, pp. 2–3.
[7] Tables I–A, II–A, II–B, III.

auxiliary projects in Nevada, New Mexico, and Utah. It would eliminate Bridge Canyon; and if alternative power costs are as anticipated, Marble Canyon. The total investment, including interest during construction, would be $1 billion. It would repay 50 percent of its cost with interest at 3 percent, and 50 percent without interest, both within 50 years, and provide the surplus indicated as well.

7. It would seem desirable that if the Nation invests funds in experimentation with larger nuclear-powered desaltation plants, one intermediate plant should be located above the Mexican outlet. Without going into the question of whether Mexico obligated itself to take any kind of water, no matter how alkaline, left for it under the treaty, it would be in the interest of simple good neighbor relations to allow Mexico to share some of the advantages of our improved technology and to improve the quality of the water it can take.

8. The association does not urge the development of atomic powerplants in the Pacific Southwest or elsewhere; we believe that inadequate attention has been given to the problems of heat generation and radioactive waste disposal. We recognize, however, that such developments are on the way and that even if resisted they could probably not be stopped; they must therefore be taken into account in the formulation of plans and policies for managing the water resources of a region like the Pacific Southwest.

Nor has any consideration been given in this memorandum, nor to the best of our knowledge by the agencies making plans for the Pacific Southwest, to the potentialities of solar energy and magmatic heat. It is an ironic commentary on our lack of foresight that in a sun-drenched region like the Pacific Southwest the possibilities of solar energy have not so much as been touched upon by any official proposals. Yet both solar energy and magmatic heat as sources of abundant energy will probably be in use before the end of the century. Magmatic sources suffer from the same drawback as atomic fission and fusion, the ultimate danger of overheating not only the waters of the region but the atmosphere of the earth; not so with solar energy, and a farsighted governmental program would be exploring this last possibility far more vigorously than at present.

TABLE I–A.—*Colorado River water distribution, Central Arizona project*

[In acre-feet]

	Alternative project	Percent	Bureau of Reclamation project	Percent
Arizona allocation	2,800,000		2,800,000	
Now used	[1] 970,000		[1] 970,000	
Total	1,830,000		1,830,000	
Remaining unused	0		−630,000	
Total	[2] 1,830,000		1,200,000	
Seepage and evaporation	−275,000	15.0	−180,000	15.0
Total	1,555,000		1,020,000	
Exchange	[3] +77,000		[3] +50,000	
Total use	1,632,000		1,070,000	
Recreation water grant	−60,000			
Commercial use—Years 1 to 20	1,572,000		[4] 1,070,000	
Allowance for diminishing flow	−114,000			
50-year average commercial use (not including effluent)	[4] 1,458,000		1,070,000	
Base (alternative)		100.0		73.4
Base (Bureau of Reclamation)		136.2		100.0
50-year sales average:				
Irrigation (primary water)	758,220	52.0	814,000	[5] 76
Municipal and industrial	700,280	48.0	256,000	[5] 24
Potential irrigation water (including use of effluent):				
Primary	758,220		814,000	
Effluent (average)	[6] 210,000		[7] [8] 77,000	
Total	968,220		891,000	

[1] Rounded from 971,000 acre-feet.
[2] 50-year average pumped from Colorado River 1,725,000 acre-feet.
[3] 5 percent of Colorado River water after losses.
[4] 50-year average.
[5] Years 26 to 50: Irrigation, 758,000 acre-feet; municipal and industrial, 312,000 acre-feet.
[6] Effluent estimated at 50 percent of average 50-year municipal and industrial use with a recovery rate of 60 percent.
[7] Maximum.
[8] Estimated at 50 percent of maximum (years 26 to 50) municipal and industrial use of 312,000 acre-feet with a recovery rate of 60 percent.

TABLE II–A.—*Capital investment—Central Arizona project*

	Alternative project	Bureau of Reclamation project
Bridge Canyon: [1]		
Dam and reservoir	----------	[2] $164, 894, 000
Powerplant	----------	140, 530, 000
Transmission system	----------	187, 500, 000
Coconino Dam	----------	11, 820, 000
Recreation, fish and wildlife	----------	6, 582, 000
Subtotal	----------	511, 326, 000
Marble Canyon: [3]		
Dam and reservoir [4]	$75, 538, 000	----------
Powerplant	79, 104, 000	----------
Transmission system	81, 000, 000	----------
Recreation, fish and wildlife	2, 846, 000	----------
Subtotal	238, 488, 000	----------
Other dams and reservoirs: [5]		
Maxwell	31, 865, 000	31, 865, 000
Buttes	[6] 29, 432, 000	29, 432, 000
Hooker	28, 128, 000	28, 128, 000
Charleston	15, 974, 000	15, 974, 000
Subtotal	105, 399, 000	105, 399, 000
Pumping plants: [5]		
Havasu No. 1	10, 890, 000	10, 890, 000
Havasu No. 2	14, 180, 000	14, 180, 000
Havasu No. 3	14, 180, 000	14, 180, 000
Hassayampa	12, 730, 000	12, 730, 000
Salt-Gila	5, 120, 000	5, 120, 000
Tucson:		
(San Pedro River)	240, 000	240, 000
(Colorado River)	6, 170, 000	6, 170, 000
Subtotal	63, 510, 000	63, 510, 000
Increase in capacity	[7] 25, 410, 000	----------
	88, 920, 000	----------
Aqueducts and canals: [5]		
Granite Reef	222, 310, 000	222, 310, 000
Salt-Gila	31, 800, 000	31, 800, 000
Maxwell-Granite Reef	3, 301, 000	3, 301, 000
Buttes	2, 011, 000	2, 011, 000
Tucson:		
(San Pedro River)	15, 528, 000	15, 528, 000
(Colorado River)	35, 860, 000	35, 860, 000
Subtotal	310, 810, 000	310, 810, 000
Increase in Capacity	[8] 69, 000, 000	----------
Subtotal	379, 810, 000	----------
Other costs: [5]		
Drainage system	10, 500, 000	10, 500, 000
Maxwell pumping plant [5]	5, 906, 000	5, 906, 000
Agua Fria power drop	1, 248, 000	1, 248, 000
Granite Reef drop	1, 510, 000	1, 510, 000
General facilities (additional)	[9] 10, 000, 000	[10] 13, 266, 000
Recreation (additional) (fish, wildlife, parks, lakes)	[11] 25, 000, 000	[12] 1, 685, 000
Subtotal	54, 164, 000	34, 115, 000
Totals before interest during construction	866, 781, 000	[13] 1, 025, 160, 000
Estimated interest during construction	[14] 65, 009, 000	[15] 74, 858, 000
Subtotal	931, 790, 000	1, 100, 018, 000
Nonreimbursable	[16] 40, 320, 000	[17] 52, 308, 000
Reimbursable	891, 470, 000	[18] 1, 047, 710, 000

See footnotes on p. 719.

TABLE II-A.—*Capital investment—Central Arizona project*—Continued

	Alternative project	Bureau of Reclamation project
Additional projects: [19]		
A. 100 percent repayable in 50 years from central Arizona revenues:		
Water salvage	$9,200,000	----------
Coconino Dam	[6] 12,700,000	----------
Indian irrigation	10,590,000	----------
Tributary projects (Arizona, New Mexico, Utah)	10,540,000	----------
Subtotal	43,030,000	----------
B. 50 percent repayable in 50 years from central Arizona revenues: [20]		
Dixie (Utah) (total, $46,600,000)	23,300,000	----------
Southern Nevada water supply 1st stage (total, $45,600,000)	22,800,000	----------
Ground water recovery (total, $38,800,000)	19,400,000	----------
Subtotal	65,500,000	----------
Reimbursable total additional projects	108,530,000	----------
Reimbursable central Arizona project	891,470,000	$1,047,710,000
Reimbursable total	1,000,000,000	1,047,710,000

	Percent
Proposed allocation:	
Irrigation 50 percent ($500 M)	[20] 35.2
Municipal and industrial 50 percent ($500 M)	[20] 22.0
Commercial power 0 percent	[20] 42.8
Interest rate: 3 percent	------

[1] Table 1, Bridge Canyon project report, January 1964.
[2] Including general property. The cost of the dam and reservoir alone is $149,440,000.
[3] Table 2, Pacific Southwest water plan, supplemental information report on Marble Canyon project, January 1964.
[4] Including Paria Dam ($10,670,000) and other facilities.
[5] Table 6, supplemental report on central Arizona project, June 1963.
[6] Construction costs of a pilot nuclear desalting plant or of effluent recovery structures could be substituted for these items.
[7] Estimated 40 percent increase in cost for 50 percent increase in capacity.
[8] 25 percent increast in cost for 30 percent increase in capacity of canals conveying Colorado River water (Planned capacity under Bureau plan: 1,450,000 acre-feet).
[9] Marble Canyon costs include $6,055,000 for general facilities, Marble Canyon report, January 1964, table 1.
[10] Bridge Canyon costs include $15,454,000 for this purpose, Bridge Canyon report, January 1964, table 1.
[11] A total of $27,846,000 for constant level lakes, parks, fish and wildlife, recreation.
[12] A total of $8,267,000 for recreation.
[13] The figure is larger than the $1,001,331,000 given in table 6, June 1963, central Arizona project report, because of the addition of Coconino and other item changes.
[14] 7.5 percent average.
[15] Id., table 10, the interest during construction on construction costs of $999,474,000 or 7.5 percent.
[16] June 1963, central Arizona project report, table 6, indicates an investment in recreation in the central Arizona project of $8,267,000 and on table 11 a nonreimbursable allowance for recreation $24,130,000. The same ratio (1:2.9) would give a nonreimbursable allowance of $80,740,000 for the $27,846,000 investment in recreation under the alternative program.
[17] Id., table 11.
[18] Id., table 11, gives $1,018,465 as reimbursable costs.
[19] Project costs taken from the "Immediate Action Program," table 19 VI-2, of August 1963 Pacific Southwest water plan, except for Coconino, with interest during construction estimated and added to totals.
[20] Central Arizona project report, June 1963, table 11, gives reimbursable total of $1,018,465,000 and allocations.

TABLE I–B.—*Estimate of 30-year growth of municipal and industrial demand for water—Central Arizona area*

Years	Estimate of total M. & I. demand (1962—556,000 acre-feet [1])	Incremental demand above 1962 base	Incremental demand met by alternative project	Percent of incremental demand met by alternative project	Incremental demand met by Bureau of Reclamation project	Percent of incremental demand met by Bureau of Reclamation project [2]
	Acre-feet	*Acre-feet*	*Acre-feet*		*Acre-feet*	
1—1970	762,000	206,000	206,000	100.0	256,000	124.2
5—1975	857,000	281,000	281,000	100.0	256,000	9.11
10—1980	950,000	394,000	394,000	100.0	256,000	64.9
15—1985	1,087,000	531,000	531,000	100.0	256,000	48.2
20—1990	1,252,000	696,000	696,000	100.0	256,000	36.8
25—2000	1,443,000	887,000	887,000	100.0	256,000	28.7
30—2010	1,652,000	1,096,000	900,000	82.1	312,000	28.4

[1] "Bureau of Reclamation Report on Central Arizona Project, June 1963," p. 17, gives a "present use" of 370,000 acre-feet for M. & I. for Phoenix and Tucson alone and indicates a growth rate of 3½ percent annually. This table assumes a 4-percent growth rate 1962–70, 2 percent 1970–75, 2+ percent 1975–80, 2¾ percent 1980–2000. This is a moderate estimate. (A 4-percent growth rate from 1962 to 2000 (38 years) would involve a total demand for M. & I. use of 2,468,000 acre-feet in 2000—year 30.)

[2] "Supplemental Report, Central Arizona Project, June 1963," p. 70 table 12 footnote.

TABLE II–B.—*Estimates of operation, maintenance, and replacement expenses—Central Arizona project*

	Alternative project	Bureau of Reclamation project
Bridge Canyon:		
Dam and reservoir		[1] $108,700
Powerplant		[1] 1,823,300
Transmission system		[1] 2,279,600
Total, Bridge Canyon		4,211,500
Marble Canyon:		
Dam and reservoir	[2] $136,000	
Powerplant	[2] 451,000	
Transmission system	[2] 1,215,000	
Total, Marble Canyon	1,802,000	
All others:		
Central Arizona projects O.M. & R. costs	[3] 4,465,000	[1] 3,189,000
Energy purchased (average)	[4] 1,650,000	[1] 1,510,000
Total	7,917,000	8,910,600
Nonreimbursable	[5] 525,000	[6] 767,000
Reimbursable	7,392,000	(8,142,900)

[1] Central Arizona project report, June 1963, table 8, p. 55.

[2] Marble Canyon project report, January 1964, p. 20.

[3] Increase of 40 percent, $1,276,000, over Bureau figure for central Arizona project to cover increased O.M. & R. of aqueducts, pumping plant, and recreation.

[4] 50-year average. Marble Canyon usable production is taken here at 2,359,000,000 delivered kilowatt-hours (equal to the total estimated by the Central Arizona Power Commission project for Marble Canyon, FPC report on Project 2248, p. 8). This is adequate to lift an annual average of 1,530,000 acre-feet. The maximum to be pumped is 1,830,000 acre-feet, of which recreation use is 70,000 acre-feet before seepage and evaporation, leaving 1,760,000 acre-feet to be paid out of project revenues. The maximum remaining (years 1–20) is (1,760,000—1,530,000) 230,000 acre-feet, decreasing to an average of 130,000 (years 21–28) and then 30,000 acre-feet (years 29–50). The average 50-year remainder requiring purchased energy is therefore 126,000 acre-feet. The average 50-year sum allowed for power purchases ($1,650,000) permits the purchase of sufficient power at 5 mills per kilowatt-hour ($7.70 per acre-foot) to lift an average of 214,000 acre-feet. An additional allowance of $660,000 annually for possible increases in power purchases and O.M. & R. items has been made (table III, year 50).

Purchases of excess central Arizona allocated project water by California irrigation districts at approximately $2 to $2.25 per acre-foot, measured at Havasu Lake, would eliminate the need for most power purchases by the alternative project during years 1–28, and would produce the same net revenues from the alternative project indicated in table III.

[5] 70,000 acre-feet of recreation water before losses at $7.70 per acre-foot for pumping costs.

[6] Central Arizona project report, January 1964, table 12, reimbursable O.M. & R. $8,142,900. However, table 11 indicates $468,000 nonreimbursable on a 100-year basis.

The CHAIRMAN. Thank you very much, Mr. Smith.

Just one question before I call on the other members. Who do you think should have the right to make policy decisions as related to governmental matters, Mr. Smith?

Mr. SMITH. The Congress of the United States has not only the right but the obligation.

The CHAIRMAN. That is what I thought, but you talk about a policy-minded commission outside of Government, and I wondered if you were meaning that they should go ahead and tell us what to do or just go ahead and make the decisions.

Mr. SMITH. Of course not.

The CHAIRMAN. And then come to us with their recommendations. You have answered it.

The gentleman from California.

Mr. JOHNSON. Thank you, Mr. Chairman.

Mr. SMITH. Might I add just one other word to that, Mr. Chairman? The point is very important, of course. What we have had too often, not only in the Bureau of Reclamation project but in the projects of the Army Engineers, has been a proposal put together entirely in terms of engineering feasibility of some kind of water control operation, and it has been this kind of project which has been laid before you without any alternative.

Now, we are suggesting simply that the engineering agencies are not the people to prepare recommendations for you, and that you are entitled to far better proposals than this kind of thing.

The CHAIRMAN. I defy you to find too much criticism with what this committee has done since the authorization of the Colburn project. I think you will find out that we understand what is involved here regardless of where we get our data or our engineering.

Mr. SMITH. I am sure you do.

The CHAIRMAN. The gentleman from California.

Mr. JOHNSON. Thank you, Mr. Chairman.

I want to commend you, Mr. Smith, for a very comprehensive statement here, setting out your views, yourself and your organization. You took great stock in what Senator Goldwater had to say this morning about the increased industrial uses of water. I wonder if you agree with Senator Goldwater in what he had to say about trips up and down the river as to cost. Do you agree with him as to the costs of those trips?

Mr. SMITH. I do not know what the cost of the trips is. These things are not to be judged in terms of this kind of monetary value, sir. There are plenty of places on the Colorado River where people can make motorboat trips the enormous length of the shore now, Lake Powell. We have Lake Mead. We have in the canyons of Colorado an irreplaceable recreational feature of a completely different kind, and the American people are entitled to have that, too.

Mr. JOHNSON. Do you also agree with him on the number of people that have availed themselves to the river canyon prior to the construction of Lake Powell?

Mr. SMITH. The number of people that will use the canyon in its present form will undoubtedly increase. There is, for one thing, a greatly increased interest in it. It has been publicized more widely. The number of expeditions is increasing. The means of getting into

it are increasing. There are all sorts of new boats and gadgets and whatnot that people can travel with.

There is no problem in getting into that canyon as it is, and the lake will not help that very much.

I suggest that you check this out with the Bureau of Outdoor Recreation. Their announced impression—and we quote one of their statements in, I think, the April issue of National Parks magazine, 1964—is to the effect that access to this canyon, when it is flooded, will not be good.

Mr. JOHNSON. It was my experience on my recent trip on Lake Powell to notice there were quite a few people taking advantage of the scenic values from the lake of the canyon, and also the famous natural bridge there, and I presume that will pick up as to what he had to say from a few thousand to millions of people who will take advantage of that.

Now, this same type of scenery would be exposed in Marble Canyon Dam and lake as well as Bridge Canyon Dam and lake if it were to be built, would it not?

Mr. SMITH. No; not necessarily at all.

Mr. JOHNSON. You do not think there would be any increase?

Mr. SMITH. As I have just said, the Bureau of Outdoor Recreation considers that it will not be accessible by motorboat, not very accessible by motorboat. The places you can get down to it are not good access.

Mr. JOHNSON. I beg to differ with you there, because I think there are studies of these reservoirs by the Bureau of Outdoor Recreation and the Bureau of Reclamation itself, I presume, and also some agencies who operate the recreation have looked into those matters and have set this up as being one of the real benefits of this project.

Mr. SMITH. I would say to you again, sir, that the Bureau of Outdoor Recreation is the agency of the Government that is supposed to have the special knowledge of these particular matters, and its recommendation has been against this project and against it on the ground that the recreational opportunities created would not be significant, and that those destroyed would be important.

Mr. JOHNSON. We did not hear that information from the witness stand here when the Secretary of the Interior was here representing the overall agency.

Mr. SMITH. Of course, but I suggest it to you, and I would repeat my suggestion that you call the Director of the Bureau of Outdoor Recreation.

Mr. JOHNSON. Again you state that the coal reserves should be used there to fire these coal-fired plants, any mining operation for a power-plant using coal is going to destroy a great deal of the area, too, and this is an expendable resource.

Once the coal is gone, the coal is gone. In contrast to that, if we can generate power from the resources of the river, it will be there for here and ever after. Do you agree with that?

Mr. SMITH. No; I do not agree with that, because we are in a transition period at the present time between water power, coal on the one hand, and fission and fusion on the other, and further, I think that if we put our minds to it in an area like this, we will find that the proper research and development on solar energy is your ultimate answer.

Mr. UDALL. Will the gentleman yield on this point?

Mr. JOHNSON. Yes.

Mr. UDALL. I have a clipping here from the "Arizona Republic," which I would like to pass around to my colleagues, showing a coal mine at Four Corners with an ugly scar in the earth that is going to be 23 miles long where they dig out coal, plus a huge plant that spews out smog and coal smoke into the atmosphere, some of which eventually ends up in the Grand Canyon.

I would simply like to ask the witness which does more violence to his idea of natural beauty, an open-pit coal mine of this kind running 23 miles across the Navajo Reservation, or a lake like Lake Powell shown in these magazines that are before the committee?

Mr. SMITH. Strip coal mining can be perfectly compatible with the preservation of the natural environment if the overburden is replaced, and there is no reason why it should not be replaced in this situation.

As far as spewing out smoke and ashes are concerned, there is no reason at all why this has to occur if the plant is properly managed.

Mr. UDALL. My question was which does the most violence to outdoor beauty in your judgment, the picture I have shown here of the coal mine as they are operating it, not as you would have them operate, but as they are now operating——

Mr. SMITH. My answer is the reservoir does more violence because the strip mining does not need to do any violence whatsoever if the overburden is replaced, and it should be and it can be.

Mr. UDALL. I thank the gentleman for yielding.

Mr. JOHNSON. The gentleman from Arizona asked one or two of my next questions. But you are concerned with waste from the atomic nuclear plants as I saw from your statement, and I might say that with these plants, either the atomic nuclear plants or the coal plants, there is a great amount of water to be used, waste water for cooling purposes to be disposed of, as well as the waste from the atomic nuclear materials.

This is of grave concern to many, many people who have tried to locate plants in my own State, and they have had a considerable amount of trouble trying to locate due to the opposition, the very thing that you spoke about in your statement.

Would it not be better to use this water resource here to generate power in this area where this would be there for here and after? Resource water is renewable and coal and nuclear materials are not, and as the gentleman from Arizona so ably pointed out, the difference between a coal-burning plant and a beautiful reservoir. From this coal-burning plant, no matter how thin you slice it, there is a residue that comes from that, and it creates a haze over the whole area. As I have been able to learn here, as the coal deposits are very close to Lake Powell and the canyon, and anyone who is going in there to develop these coal-fired plants would use the resource, and they would take their water from Lake Powell, I presume, for cooling purposes. There could be a possibility that we would create a haze over the entire canyon for many, many miles. It has been my experience that when a haze is created in a canyon, it remains there.

Mr. SMITH. I know of no reason to think that these coal-fired plants are going to produce anything like this haze. These hazes that are produced largely by the automobiles in the cities—that is what we are

fighting. We are not fighting coal-fired powerplants when we are fighting smog.

Moreover, it is coming, sir. I mean it is not a question of what we are going to do. The privately owned utilities can go in there and build their plants, and the Federal Power Commission will presumably license them to do it, and it is coming.

Now, what we are saying here is that the proposal here is to build a couple of dams which will produce power at higher prices than coal will produce them. They will not be economic. Before the end of their payout period they will be bankrupt.

Mr. JOHNSON. Well, I presume if Arizona was going to get water from Colorado, if they were going to buy their power at the private utility prices, that would almost prohibit the placing of any water on the lands of Arizona. I do believe that——

Mr. SMITH. No, no.

Mr. JOHNSON. That the estimated costs of power out of this power facility here are much cheaper than they can buy power for at the present time.

Mr. SMITH. No, sir; I have just given you the figures, and these are figures that——

Mr. JOHNSON. There is very little power from private sources available in the State of Arizona at the figures quoted from the Federal power project as to pump water.

Mr. SMITH. The Commissioner has stated it will be available at 3 or 4 mills or less. That is less than 4.2 at Marble Canyon Dam, and it can be used for pumping water.

Mr. JOHNSON. That is something that I doubt that the Bureau of Reclamation would recommend if we set aside this project.

Mr. SMITH. Of course they have not.

Mr. JOHNSON. They testified here in favor of it.

The CHAIRMAN. We are not going to have any arguing back and forth between the witness and the members. I wish the member would confine himself to questioning.

Mr. JOHNSON. I presume, Mr. Chairman, that would be a question, because the testimony we have had here is to the effect that this project would pay itself out, and I am asking the gentleman there if he would agree with the testimony of the Bureau of Reclamation through the Commission, Mr. Dominy, on the payout period of Marble Dam.

Mr. SMITH. I do not know which statement you are referring to, but let me, if I may, just read his statement on this question. This was his statement in June 1965, as released by the Department of the Interior. He is talking about the new coal plants.

"These are plants with tremendous generators, some of them 750 kilowatts or more capacity. Those in the Colorado Basin contemplate coal firing. These generators may be able to bring the cost of energy down to 3 or 4 mills or less if they can achieve a high load factor operation. This is possible," he says, "only if they have peaking capacity which can most logically come from hydropower operations."

Most logically. Now, I have questioned that in my statement on the ground that the peaking power can come also from coal, if properly managed, and it will in all probability come from fission, whether we like it or not, whether we approve of fission or not. It is coming, because it is going to do just this kind of thing economically.

Mr. JOHNSON. That is cost of production with power. That did not answer my question as to the payout period on the Marble project.

Mr. SMITH. Well, of course, the Commissioner has represented the thing as being a profitable operation. We can test that representation on the grounds that I gave you in my statement. I do not see how a 6.5 mill—it will probably be 6.5 mills by the time they get that reservoir filled—can be said with any assurance to be able to compete with coal power which produces base power at 3 or 4 mills or atomic energy which produces base power at 3 or 4 mills, because those base power rates will inevitably bring the peaking power rates down.

Mr. HOSMER. Will the gentleman yield?

Mr. JOHNSON. Yes.

Mr. HOSMER. Are you or do you claim to be an expert on electric utility economics and operation?

Mr. SMITH. I claim to be an expert on river management planning.

Mr. HOSMER. But not on utility operations and economics.

Mr. SMITH. I have had a very active working life in connection with that as well as other matters for the last 20 years.

Mr. HOSMER. What electric utility have you worked for?

Mr. SMITH. I have not worked for an electric utility, and that is not necessary in order to understand the electric power business.

Mr. HOSMER. Where did you take your graduate work on electric utility economics?

Mr. SMITH. I spent 20 years as the river basin and natural resources expert for the Congress of Industrial Organizations. I have spent another 8 years as the specialist in this field for the National Parks Association. My degree is a law degree from Yale School of Law, and that has quite an adequate academic standing I might say.

Mr. HOSMER. Do you have the same type of expertise with respect to water utility economics?

Mr. SMITH. Yes.

Mr. HOSMER. Do you claim the same type of expertise with respect to nuclear power production?

Mr. SMITH. I claim sufficient expertise to make the statements I have made to you here today.

Mr. HOSMER. We are to be the judge of that, sir.

Mr. SMITH. I claim it. You asked me whether I claimed it, and I said yes.

Mr. HOSMER. Do you claim expertise with respect to desalting technology techniques operations?

Mr. SMITH. Yes.

Mr. HOSMER. And do you claim the same expertise with respect to the problems in developments in nuclear fusion?

Mr. SMITH. Yes.

Mr. HOSMER. Very well.

The CHAIRMAN. The gentleman from California.

Mr. JOHNSON. I have just one question left, Mr. Smith. If we were going to place a series of coal-fired powerplants in the area of the Grand Canyon, I am afraid you would not see the Grand Canyon, would you, with the smoke and haze?

Mr. SMITH. Mr. Congressman, you are not going to place them in the Grand Canyon. You are going to put them in the Four Corners area where they are already going. You are going to put them in

other places where they are close to the coal supplies and you will transmit the energy by wire.

Mr. JOHNSON. Is Lake Powell on the Grand Canyon?

Mr. SMITH. No; Lake Powell, as you know, sir, is above the Grand Canyon, well above the Grand Canyon.

Mr. JOHNSON. It is fairly close to it, and the proposed large coal-fired plants that are being proposed are going to secure their water for the most part, I presume, from Lake Powell. They are going to be very much in the area of the Grand Canyon, are they not?

Mr. SMITH. I do not know exactly where they would go.

Mr. JOHNSON. Well, that was the testimony given.

Mr. SMITH. The Four Corners area is not Lake Powell.

Mr. JOHNSON. What is that?

Mr. SMITH. The Four Corners area is not Lake Powell.

Mr. JOHNSON. There were people here who testified before this committee that the availability of the coal as a source of energy was located where they could take their water from Lake Powell.

Mr. SMITH. Some of it probably.

Mr. JOHNSON. Then you would recommend that that type of power facility be built over the hydro facilities at Marble.

Mr. SMITH. Yes, sir.

Mr. JOHNSON. That is all, Mr. Chairman.

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

Mr. HOSMER. In light of the witness' answers to my previous questions, I do not think he is qualified to answer any that I might ask, so I will pass.

The CHAIRMAN. The gentleman from Arizona, Mr. Udall?

Mr. UDALL. Mr. Smith, does your organization deny that there is a serious water crisis in Arizona?

Mr. SMITH. No; we are interested in getting it solved as rapidly as possible.

Mr. UDALL. But you do not want it solved by hydro dams in the Colorado.

Mr. SMITH. We want it solved by thermal powerplants to pump the water from the Colorado River into Arizona. You will get that a lot faster, Congressman.

Mr. UDALL. We have waited 15 years on a lawsuit. We have waited longer than that on congressional authorization and, as I read the testimony, you are suggesting that we wait until there is a breakthrough in atomic energy, a breakthrough in desalting water, a breakthrough in solar energy.

Mr. SMITH. No.

Mr. UDALL. A national study of water resources, and then and only then do we do something about the water crisis.

Mr. SMITH. No, sir; I did not say that. I said go ahead with coal-fired plants immediately. Now, you are going to get those fast if you want them. If the fight hangs on hydropower, all the conservationists in the country are going to fight you from here on out. You know that. You can get your coal plants much faster than you can get your hydro powerplants.

Mr. UDALL. I respect your sincerity, and I hope you respect mine, and I respect your organization, and I have worked with you on many occasions.

But, Mr. Chairman, in the light of the extended testimony on economics of the production of power, I want to say that we have had our staff of the Arizona Interstate Stream Commission prepare a very brief study on the effect on the development fund and the financial feasibility of this project of constructing Federal thermal plants, and I have several copies of this study available, and I would like to ask unanimous consent that one of them be placed in the hearing record at this point. I also ask unanimous consent that a letter I have received commenting on Mr. Raushenbush's study be included in the record.

The CHAIRMAN. They will be placed at the end of the questioning of Mr. Smith.

Is the gentleman through?

Mr. UDALL. I have a couple of more questions.

The CHAIRMAN. I would like to finish with this witness, because we are not going to meet until tomorrow morning.

Mr. UDALL. Mr. Chairman, I understand that, and I have 2 or 3 hours I could take up, but give me about 5 more minutes, if I may.

The CHAIRMAN. The Chair will give you 3 minutes, and we will recess.

Mr. UDALL. All right, sir.

Mr. Smith, your organization is one that has a goal of protecting natural beauty and promoting natural beauty wherever you can, is that correct?

Mr. SMITH. Yes, sir.

Mr. UDALL. I notice in one of these brochures or the magazines you handed out, you had a picture of the Grand Teton National Park on the cover. I would show you a picture here and ask you if this in your judgment violates esthetics and violates a sense of outdoor beauty, a proper sense of outdoor beauty.

Mr. SMITH. Well, as that picture is taken at that point at the particular season it was taken, it presents a very fine picture.

Mr. UDALL. In the foreground is another outrage perpetrated by the Bureau of Reclamation, namely the Jackson Dam, and the lake in the background is entirely within the Grand Teton National Park. Does your organization advocate the dismantling of this dam?

Mr. SMITH. Of course not.

Mr. UDALL. Would you not say that this lake——

Mr. SMITH. That lake was there when the area was set up. Moreover, have you seen that lake when it was drawn down, Congressman?

The CHAIRMAN. I said that there would be no questions asked by the witness. After all, we have got to have a little dignity to the procedure of the committee. The member will keep his questions in line, and the witness will answer the questions, and then maybe sometime we will sit before Mr. Smith's body and he will ask us questions.

Mr. UDALL. Just a couple of more points, Mr. Smith, in my time remaining.

In your statement you referred to a statement or you suggested that Mr. Wirth and Mr. Drury be brought before this committee to give their opinion on these dams, and I would like to read into the record just one sentence from a letter by a man named Horace Albright who is a very famous Director of the National Park Service. He was commenting on the effect of the Grand Canyon National Monument proclamation on the proposed Bridge Canyon power development project.

Mr. Albright said in reference to that legislation—he said in 1933:

As I see it, the Bridge Canyon project is in no way affected by the Grand Canyon National Monument Proclamation. 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 man who did handle it for me kept the project in mind in formulating the Grand Canyon National Monument plan.

So it has seemed to us that the National Park people or National Parks Association comes a little late when in 1919 and again in 1933 Arizona has contemplated and Congress laid down that the establishment of Grand Canyon National Park and Grand Canyon National Monument does not interfere with the reclamation project of this kind.

In closing, Mr. Chairman, I would simply like to call to the attention of my colleagues the scale map which is before us here showing the Grand Canyon, the little lake that Bridge Canyon would form up on the left there running along the boundaries, and to give you a focus for it, we have the original District of Columbia on the right showing the Potomac River below Memorial Bridge and above it here indicating the extent of this "flooding out of the Grand Canyon" we are going to do.

At the bottom of the profile at the place where the river enters the National Park and the tiny blue thing you can hardly see at the lowest point is the extent of the water in scale with regard to the canyon walls.

Finally I would like to announce to my colleagues that in the basement rotunda on the way to the Capitol there has been placed a scale model of the whole Grand Canyon showing the extent of the Bridge Canyon Reservoir in the bottom. You can pick it out and lift it up and see just to what extent the water would invade the Grand Canyon.

I thank the Chair for his courtesy.

Mr. SMITH. Mr. Chairman, could I make one very brief point?

The CHAIRMAN. Yes.

Mr. SMITH. What I had in mind in connection with Jackson Lake and Grand Teton Park is simply the way the question was put to me did not give me an opportunity to make a quite important point.

The CHAIRMAN. You will have that chance tomorrow morning. You will be right there in the same place at 9:45 to give your answer.

(The study referred to above by Mr. Udall is as follows:)

STUDY OF DETRIMENTAL EFFECT ON LOWER COLORADO RIVER DEVELOPMENT FUND, OF SUBSTITUTING FEDERAL STEAMPLANTS FOR HYDROPLANTS

As a part of the Lower Colorado River Basin project, the Bureau of Reclamation is proposing hydroplants both to produce pumping power and to provide revenue to repay U.S. investment. After investment repayment, revenues in excess of operating expenses will provide funds for water developments.

This application of the "reclamation principle," as it is represented by Bridge and Marble Canyon Dams and powerplants, has been demonstrated by charts such as the attached. Without these power sources, the project would be deprived of power revenues helping to repay construction costs. Also, it would be necessary to purchase power for pumping. Direct Federal subsidy would then be required to meet the project water costs in excess of the payment ability of customers, most of whom are agricultural users. Obviously, the Bureau's proposed hydroplants represent a better plan.

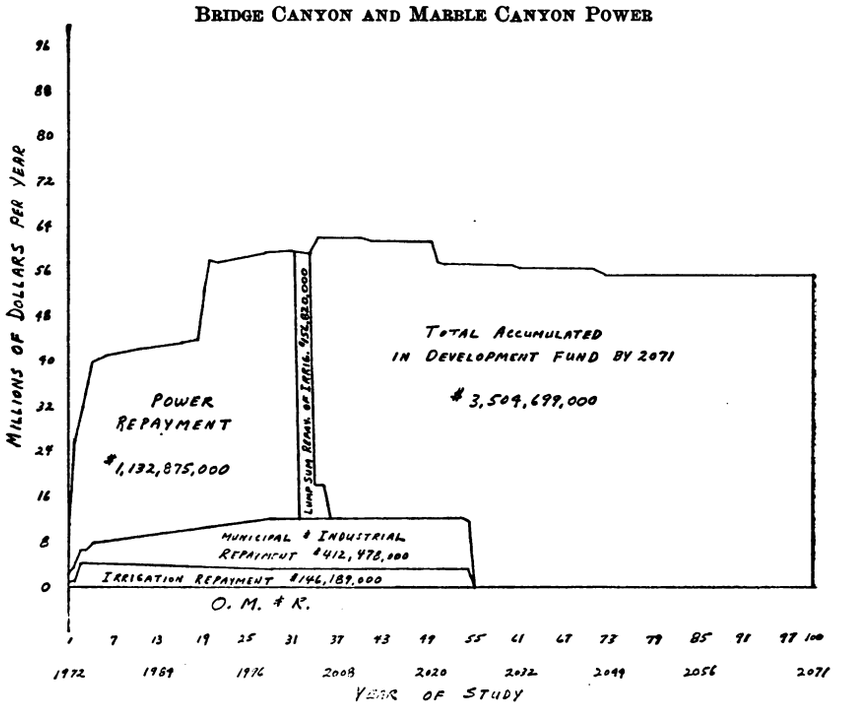
It has also been suggested that in order to maintain the Colorado River at its present state of development, steam generating plants be constructed to provide

power and revenue requirements for the Lower Colorado River Basin project rather than hydroplants. Of course, the end electrical product under each scheme can not be distinguished; however, financial and operational requirements are naturally different.

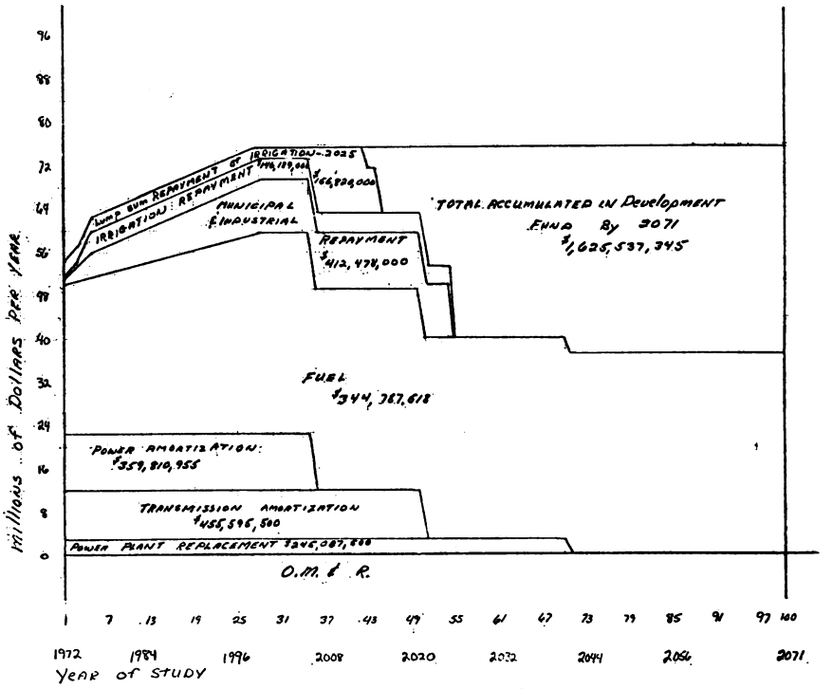
The main question, of course, is the feasibility of the alternate schemes as reflected in the accumulation of surplus revenues in the development fund while substantially meeting the same physical requirements of the project. The construction of Bridge and Marble Canyon Dams to generate the market power not required for pumping purposes has been studied as the hydro scheme most beneficial for the project. A like amount of power can be generated by large high efficiency coal-fired steam generating plants located near the required pumping load on the Colorado River, thus eliminating some transmission requirements while utilizing the benefits of relatively low cost fuel. Such an arrangement, which is undoubtedly the most feasible steamplant scheme, has been studied, assuming Federal construction and the same repayment requirements as for the hydro plan.

A comparison of these alternates indicates that more than twice the amount of surplus revenues can be accumulated in the Lower Colorado River Basin fund by construction of Bridge and Marble Canyon Dams than would result from construction of such a steam generation plant.

BRIDGE CANYON AND MARBLE CANYON POWER



STEAM POWER EQUIVALENT OF BRIDGE CANYON AND MARBLE CANYON POWER



JANUARY 25, 1965.

Mr. ANTHONY WAYNE SMITH,
President and General Counsel, National Parks Association,
Washington, D.C.

DEAR MR. SMITH: Our letter of December 4, 1964, reported to you that the material on the Pacific Southwest water plan, submitted by you on November 4, 1964, would be studied and a meeting arranged at an early date. Our staff has completed its review of the Raushenbush memorandum report, and we would like to comment on the following items of major importance.

WATER SUPPLY

The memoradum report assumes that 7.5 million acre-feet of Colorado River water will be available for consumptive use in the lower basin throughout the repayment period of the Central Arizona Project. The memorandum report further assumes that 2.8 million acre-feet will be available for consumptive use in Arizona throughout the repayment period.

This assumption is contrary to the facts on water supply presented in the Pacific Southwest water plan. The water supply studies of the plan clearly show that, although 7.5 million acre-feet will be available in the lower Colorado River for consumptive use by the Lower Basin States for the next 20 years or so, this assured quantity will decline below 7.5 million acre-feet in a progressively increasing amount as water use increases in the upper basin. In fact, one of the basic purposes of the Pacific Southwest water plan is to guarantee that the equivalent of 7.5 million acre-feet of water will be available in the lower basin for consumptive use by direct diversion or exchange throughout the repayment period of the works proposed in the water plan. It is apparent then that the memorandum report assumes the diversion of a quantity of water which, according to the Pacific Southwest water plan, will not be available in the river during the period of study.

PROJECT COST

The memorandum report presents a financial analysis purported to show how a project of about $1 bililon in cost could be modified and paid out in a 50-year period. This is on the assumption noted above that 7.5 million acre-feet of water would be available throughout that period for use in the lower basin. The Pacific Southwest water plan provides for the construction of water supply works which are necessary to make available and distribute the 7.5 million acre-feet of Colorado River water to the States of Arizona, Nevada, and California. The financial analysis presented in the memorandum report provides for repayment of approximately $732 million over a 50-year period, whereas the actual works, including those necessary to make the water available, cost approximately $3.1 billion.

WATER DISTRIBUTION

The memorandum report presents an analysis for repayment of costs of a project designed to deliver approximately 1.6 million acre-feet of Colorado River water to central Arizona over a 50-year repayment period. The memorandum report not only assumes that the 1.6 million acre-feet of water will be available continuously without additional cost, but goes on further to assume that all increased future municipal and industrial water supply demands in central Arizona will be supplied by Colorado River water.

This latter assumption is not consistent with the pattern of water service that will accompany municipal and industrial growth. The major population growth in central Arizona has occurred within areas that are now irrigated and for which an irrigation water supply is now available from the Salt River project and other existing installations. Consistent with Arizona State law, the irrigation water supply, which is appurtenant to the land, is transferred for municipal and industrial use at the present low cost when the use of the land is converted to municipal and industrial development. The Pacific Southwest water plan has assumed that so long as growth occurs within irrigated areas, the presently available irrigation water supplies will be used for municipal and industrial purposes. The basic concept of the plan is that only those areas that are not now irrigated and which do not now have a sufficient local water supply will need Colorado River water. It is estimated that about 70 percent of the future population growth will be on lands now irrigated and having an adequate water supply. Thus, the major market for water on which Mr. Raushenbush relies for his repayment analysis will not, in fact, develop.

There are other points in the analysis which involve differences in opinion and philosophy which we will not discuss in this letter. We will be happy to meet with you or Mr. Raushenbush at your convenience for any further discussion. Do not hesitate to call us to arrange for a meeting if you so desire.

Sincerely yours,

(S) KENNETH HOLUM,
Assistant Secretary of the Interior.

The CHAIRMAN. Thank you very much. We are in recess until tomorrow at 9:45.

(Whereupon, at 11:45 a.m., the subcommittee recessed, to reconvene at 9:45 a.m., Tuesday, August 31, 1965.)

H.R. 4671 AND SIMILAR BILLS TO AUTHORIZE THE CONSTRUCTION, OPERATION, AND MAINTENANCE OF THE LOWER COLORADO RIVER BASIN PROJECT, AND FOR OTHER PURPOSES

TUESDAY, AUGUST 31, 1965

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 9:45 a.m., in room 1324, Longworth House Office Building, the Honorable Walter Rogers (chairman of the subcommittee) presiding.

Mr. ROGERS. The Subcommittee on Irrigation and Reclamation will come to order. We are ready for consideration of pending business.

Mr. Smith, I believe you were on the witness stand. If you will come forward and take the stand again, we shall proceed with questioning.

Mr. HOSMER. Mr. Chairman, before Mr. Smith resumes, I have here a list of resolutions and letters from cities, counties, and districts in California in support of the pending legislation. I would ask unanimous consent that this material be placed in the file and that the sources be listed in the record.

Mr. ROGERS. Is there objection?

The Chair hears none. The material will be included in the file, with proper reference to be made to it in the body of the record.

(The information referred to shall be found in the subcommittee files and the sources are listed herewith:)

RESOLUTIONS AND LETTERS IN SUPPORT OF H.R. 4671

City of Alhambra
City of Anaheim
City of Arcadia
City of Baldwin Park
City of Bell
City of Buena Park
City of Burbank
City of Carlsbad
City of Chula Vista
City of Commerce
City of Compton
City of Costa Mesa
City of Covina
City of Culver City
City of Cypress
City of Dairy Valley
City of Duarte
City of El Monte
City of El Segundo
City of Fontana
City of Fountain Valley
City of Fullerton
City of Gardena
City of Garden Grove
City of Hawaiian Gardens
City of Hermosa Beach
City of Huntington Beach
City of Huntington Park
City of Industry
City of Inglewood
City of Lakewood
City of La Verne
City of Lawndale
City of Lynwood

52-850—65——48

City of Manhattan Beach
City of Monrovia
City of Newport Beach
City of Norwalk
City of Oceanside
City of Ontario
City of Orange
City of Pasadena
City of Pomona
City of Redondo Beach
City of San Clemente
City of San Diego
City of San Gabriel
City of San Marino
City of Santa Fe Springs
City of Santa Monica
City of Signal Hill
City of South Gate
City of South Pasadena
City of Stanton
City of Torrance
City of Upland
City of Vista
City of Westminster
China Basin Municipal Water District
County of Orange Board of Supervisors
Orange County Municipal Water District
Orange County Water District
San Diego County Water Authority
West Basin Municipal Water District

Mr. ROGERS. Mr. Smith, you have a supplemental statement. Did you want to read that?

STATEMENT OF ANTHONY WAYNE SMITH, PRESIDENT AND GENERAL COUNSEL, NATIONAL PARKS ASSOCIATION—Resumed

Mr. SMITH. The statement was in the nature of a reply to a question put to me yesterday by Congressman Udall, so I would like to. It will take just a moment.

I wanted to answer two questions, very briefly, that Congressman Udall made.

The first question was: Would I advocate that the dam at Jackson Lake and Teton Park be torn down. My answer, of course, was "No," but I wanted to comment further that that lake, which looked so beautiful in the picture that was shown here yesterday, is like that, at the time the picture was taken. But during a great deal of the summer and autumn visitor and recreation season, that lake is deeply drawn down and is not all attractive. Nobody is proposing that it be eliminated. Mr. John D. Rockefeller, Jr., assembled most of the land in Grand Teton Park and contributed it to the Government. The lake was there and the reservoir was there at the time. Naturally, it was accepted, but that is a different case from the one before us.

The other question related to did we intend to advocate that providing water for Arizona be held up indefinitely while atomic energy was developed. I am glad that the Congressman is here and I would read this statement:

Supplementing my statement of yesterday, in view of the question put to me at the end of the session, the immediate problem before all of us is to help Arizona get the water it needs right away.

This is a question of aqueducts and pumps and the electric power to do the pumping.

This electric power can be produced by coal-fired thermal plants at from 3 to 4 mills or less, according to Commissioner Dominy.

Hydroelectric power for pumping purposes will be more expensive; 4.2 mills for Marble Canyon.

One coal-fired thermal plant, capacity 600,000 kilowatts, the prime power capacity of Marble Canyon, will do the entire pumping job.

Why should we choose the more expensive method when a cheaper one is available. In this case the cultural values also favor the cheaper method.

Why should we embark on a course involving a multitude of bitter conflicts and protracted delays, when a better course is available which everyone would support?

The interests of the people of Arizona dictate that there be no further delay in getting water into Arizona; the prompt way to get water into Arizona, the cheapest way, and the way which will have the least opposition, is to use coal.

I would make this practical suggestion to the subcommittee: authorize the construction of the pumps and aqueducts at once; authorize the construction or licensing of a 600,000 kilowatt coal-fired thermal powerplant to do the pumping at 3 to 4 mills delivered cost at once; put the money the water will earn into a development account for research and development in fission, fusion, and solar energy and in water production for southern California and Arizona, looking toward the use of the Gulf of California and the Pacific Ocean.

There could be a very broad consensus on this approach. I do not know who would oppose this approach. There is no apparent reason why the authorizing legislation could not be passed at the next session of Congress.

Mr. ROGERS. Thank you, Mr. Smith.

Mr. SMITH. Mr. Chairman, I have a question of personal privilege.

Mr. ASPINALL. Mr. Chairman, there is no question of personal privilege in this committee.

Mr. ROGERS. That is right.

Mr. Smith, I do not know what you are directing your question at, but there is no such procedure.

You will be questioned by the members of the subcommittee. The Chairman will recognize Mr. Skubitz, I believe, as the first one.

Mr. SKUBITZ. I have no questions.

Mr. ROGERS. Mr. Burton of California is not present.

Mr. Wyatt?

Mr. WYATT. I have no questions, Mr. Smith. I appreciate your statement and I understand your position.

Mr. ROGERS. Mr. Reinecke.

Did you have any questions, Mr. Haley? Had you been recognized?

Mr. HALEY. I had not. I was not here yesterday, Mr. Chairman to hear the previous statement. This statement this morning apparently is in response to questions asked by some member of the subcommittee.

Mr. Smith, everybody realizes that there is a tremendous shortage of water in southern California and Arizona. I think something should be done about it. We talk about this thing, but where are you going to get this water? That is the thing that is disturbing me. You have not got it in the upper or lower basin to supply Arizona and California; then you must take it from somewhere else. Is that correct?

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.

Mr. HALEY. Do you have a process now that will make it possible to use the water from the Pacific Ocean for domestic water and irrigation?

Mr. SMITH. The Office of Science and Technology has indicated that the fission process will make this feasible in the next 10 or 15 years.

Mr. HALEY. But these people need water now, according to their statement?

Mr. SMITH. Well, the present water is coming out of the Colorado River. The water is there. The present problem is to get it over the mountains into southern Arizona.

Mr. Chairman, may I file a letter with the chairman of the committee stating my professional background?

Mr. ROGERS. Yes, you may file a letter, Mr. Smith, and it will be received under the rules of the committee, subject to approval by the chairman of the subcommittee and the ranking member of the minority side and if acceptable, it will be included in the record; if not, it will be made a part of the file.

Mr. SMITH. This is based on Mr. Hosmer's objections to my testifying yesterday.

Mr. ROGERS. Did you have any further questions?

Mr. HALEY. Mr. Smith, about this energy that can be produced by a coal plant, do you have sufficient coal that is available out there to make this possible?

Mr. SMITH. Yes.

Mr. HALEY. Where?

Mr. SMITH. All over the Colorado Basin, near the surface, available for strip mining. It is going on now. It will be done in the Four Corners area. It will be done shortly near Lake Powell, immense quantities of coal in the public domain. The Government can also control the manner in which it is mined, require the replacement of the overburden so that there will be no permanent defacement.

Mr. ROGERS. Mr. Reinecke?

Mr. REINECKE. No questions, Mr. Chairman.

Mr. ROGERS. Thank you very much, Mr. Smith, for your presentation.

(Mr. Smith's letter of qualification as an expert witness follows:)

SEPTEMBER 14, 1965.

Re qualifications of Anthony Smith as an expert witness.

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs,
U.S. House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: During the recent hearings on the central Arizona project, the chairman of the Subcommittee on Irrigation and Reclamation kindly granted me permission to submit a letter amplifying my statement of qualifications as a witness on the matters I dealt with.

If, pursuant to the procedures of the committee, it sees fit to do so, I would request the inclusion of this letter in the record of the hearings.

I identified myself as a specialist in river basin planning and natural resources management; I forbore to use the term "expert," but if the question is asked, the reply is that I am an expert in these fields.

Being an expert in river basin or other regional planning, or in natural resources management related to regional or nationwide planning, requires that one must have specialized at one time or another in a wide variety of subjects; such specialization must have led to a measure of expert knowledge of the field; in addition, there must have been a particular specialization, to the point of expert knowledge, in the relationship between the special field and the general regional planning field; in addition, finally, there must have been expert specialization in the integration or coordination of the special disciplines within the general subject.

As I recall the questions put to me in regard to my qualifications as an expert, all the special disciplines mentioned have at one or another time during the past 35 years been the subject of specialized training and practice on my part;

in particular, I have been concerned with their relationships to comprehensive planning; my speciality, as I indicated, is the comprehensive planning process itself.

The best way to lay the essential facts before the committee is to recount my training and practice in a number of the special fields in question, and generally, as follows:

BACKGROUND

I hold the degrees of A.B. from the University of Pittsburgh, 1926, and LL.B. from the Yale School of Law, 1934, member of the board of editors, Yale Law Journal. I am admitted to practice in the courts of the State of New York and the District of Columbia, and all appellate courts, including the Supreme Court of the United States. I am a member of the Association of the Bar of the City of New York and the Bar Association of the District of Columbia.

My specialities at Yale School of Law included constitutional, administrative, and international law; details later.

I was associated as a clerk and lawyer from 1934 to 1937 with Donovan, Leisure, Newton & Irvine (then Lumbard), 2 Wall Street, New York, N.Y. The head of the firm, Gen. William J. Donovan, became Director of the Office of Strategic Services during World War II.

This practice was mainly commercial, including bankruptcy, securities, and antitrust, involving groups of large corporations.

During the period of practice with General Donovan, I participated in the preparation of the first drafts of the National Labor Relations Act and the Fair Labor Standards Act; and with the general in labor-criminal and railway mediation cases.

I served as assistant general counsel or attorney to the former Congress of Industrial Organization (CIO) from 1937 to 1956, when the merger with the AFL took place; from 1956 to 1958, I was on the staff of the Committee on Political Education (COPE) of the AFL.

My labor law practice included specialization in the National Labor Relations Act, but cut across the entire field.

I was executive secretary of the CIO Committee on Housing in or about 1937–38 and 1941–42; this work involved a practice related to urban, community, and regional planning.

I was legislative representative of the CIO on river basin planning and later executive secretary to the CIO Committee on regional Development and Conservation during the period 1945–55. This work involved successive specialization in various conservation fields; details later.

I was legislative representative and consultant to the CIO in the field of atomic energy from 1945 to 1955; details later.

From 1941 to 1956. I was assistant director of the State, county, and city central organizations of the CIO. There were at one time about 40 State and 750 local organizations. Part of my responsibility was the elimination of a large number of Communist infiltrators in the administrative structures of these organizations.

For all practical purposes I was actually the administrative head of this department of the CIO during the period mentioned, and thus gained a broad experience in the operation of a nationwide organization having millions of members; it was comparable to that of an executive of a large corporation or public agency; I can appraise the quality of the work of agencies like the Bureau of Reclamation and the Army Engineers without too much difficulty.

My undergraduate work included special training in economics. Most of my professional legal work, being related primarily to public law, has required systematic self-training in economics. I was the principal theorist of the various industrial production plans developed by the CIO and component unions, collectively known as the industry council plan, sponsored mainly by Mr. Philip Murray, president of the CIO, involving issues, among others, such as a proper labor and public concern with the size and location of industrial plants; regional economic planning and resources management were essential components of this work.

In November of 1952, on behalf of the CIO, I organized a combination of farm, labor, and conservation organizations concerned with the protection of the civil service in the Government land-management agencies; we met with President Eisenhower and were successful within reason in accomplishing our purposes.

Thereafter, in or about 1954, acting in my personal and individual capacity, I participated in the establishment of the Citizens Committee on National Re-

sources, with which I have continued my association, always in a personal and individual capacity.

In or about 1939, I was assistant secretary of the CIO Committee on Latin America and participated in the establishment of a Department of Labor and Social Information in the Pan-American Union; in this capacity I was obliged to study a wide variety of social and economic problems, including natural resources management, throughout the hemisphere.

Thereafter, I served from time to time as an advisor to Mr. Philip Murray, president of the CIO, on foreign policy matters and the international organizations of the labor movement; I served as observer for Mr. Walter P. Reuther, subsequent president of the CIO, at the United Nations in New York in 1954–55; this latter work was concerned mainly with international economic problems involving the various U.N. economic aid programs.

I have been an attorney to the United Mine Workers of America in respect to National Labor Relations Board matters, and in the course of this work and otherwise, I have had a broad practical experience with the various methods of mining coal, including strip mining.

I became the executive officer of the National Parks Association in 1958 and eventually president and general counsel. A general description of the National Parks Association was given in my testimony.

PUBLIC UTILITIES AND VALLEY AUTHORITIES

At Yale School of Law I specialized, among other things, in the law of public utility rate regulation, capital structure, finance, and condemnation.

I was associated with Gifford Pinchot as his secretary during his second term as Governor of Pennsylvania, 1931–35. In that capacity I participated in the exposure of corruption in the Pennsylvania Public Service Commission, and its reorganization; likewise, in proceedings involving the fixing of telephone rates and charges.

At the request of Mr. Philip Murray, then president of the CIO, I drafted a reemployment program in 1944 intended to help forestall a depression after World War II. This program included an endorsement of the Tennessee Valley Authority; in the preparation of this program and its execution thereafter, I was obliged to specialize in and acquire an expert knowledge of the law, administration, financing, and operation of the TVA, including a detailed knowledge of most of the structures. This involved not only familiarity with published materials, but inspections of dams, reservoirs, transmission lines, etc., on the ground, and field consultation with responsible officials.

In the middle 1940's a movement arose under the leadership of the late Senator James E. Murray, of Montana, for the establishment of a Missouri Valley Authority, patterned on TVA. Supporters of the Missouri Valley Authority were critical of the Pick-Sloan plan for the Missouri. I represented the CIO in the technical and legislative aspects of this work.

The responsibility required the acquisition of professional competence in the particular subject matter including familiarity with published materials, a special knowledge of many of the particular structures, and considerable acquaintance with the situation in the field throughout the basin.

The essence of the problem we sought to solve was the development of a harmonious relationship between the engineering structures and the surrounding social and natural environment. The engineers of the Bureau of Reclamation and the Army may have been professionally qualified as engineers; but they had no adequate background or training in the economic, sociological, or ecological problems of the region.

During the same period, the CIO supported the proposal for the establishment of a Columbia Valley Authority, and I was again the technical consultant and legislative representative of the CIO. During the course of this work, I paid many visits to the Columbia Valley and acquainted myself at first hand with the existing structures, conferring at length with operating officials.

The program for a CVA was preferred over the review report of the Army Engineers; it was hoped that a better balance would be achieved between hydroelectric power development and the protection of the salmon industry on the Columbia.

The expert acquaintance with the subject matter acquired at that time has been maintained in the course of work in conservation concerned with the survival of the valuable salmon runs, and a measure of wilderness and wild rivers in the basin.

During recent years, I have undertaken a continuing technical analysis of modern alternatives to the Army Engineers' program for the Potomac River Basin, which I consider to be outmoded. These alternatives turn around the use of the fresh-water estuary for emergency water-main supplies in the metropolitan area, the complete elimination of all pollution throughout the basin by methods other than dilution, provision for flood control and good outdoor recreation by the Small Watersheds Act system, and the protection of natural beauty and further provision for outdoor recreation by State programs aided by the land and water conservation fund; the large-inundation, mass-eviction, deep-drawdown reservoirs proposed by the Army Engineers would be eliminated. This approach has received more and more favorable attention from a technical point of view, and seems likely to become the official program eventually; it has been concurred in by the widest coalition of farm, labor, conservation, and citizens organizations ever brought together in the history of conservation in the United States.

ATOMIC ENERGY

My undergraduate education included excellent training in both physics and chemistry. I have had a lifelong avocational interest in astronomy, and in 1943–44 was engaged in an intensive review of the subject, including new developments in nuclear energy in relation to the internal processes in the stars and the sun; as a consequence, I was technically prepared for the appearance of the atomic bomb and its military and civilian implications.

Against this background, and in part on the basis of the Smyth report, with the assistance of Mrs. Francis M. Shea, then an attorney in the Federal Communications Commission, and associates of Mr. David E. Lilienthal, Chairman of the Tennessee Valley Authority, I initiated conferences which led to the introduction and passage of the Atomic Energy Act. I served during this period, and for some years thereafter, as consultant and representative of the CIO on atomic energy.

At about the same time, or shortly thereafter, I was consulted by Mr. Lilienthal and Dr. Robert Oppenheimer on programs for the international control of atomic energy, and made recommendations along lines eventually embodied in the Acheson-Lilienthal report; it will doubtless be remembered that Mr. Bernard Baruch accepted the recommendations of the Acheson-Lilienthal report for submission to the United Nations, adding a proposal for dropping the veto in the Security Council; the Baruch plan was rejected by the Russians.

I have maintained a working acquaintance with the technology of atomic energy, in both peaceful and military uses, since that time; in terms of environmental protection I have been disturbed by the problem of disposition of radioactive wastes as mentioned in my testimony; however, the development of nuclear energy for electric power production appears to me to be inevitable.

COLORADO RIVER

I have an extensive acquaintance with the Colorado River Basin. In or about 1950, I conducted negotiations on behalf of the CIO with Interior Secretaries Krug and Chapman which resulted in recommendations by the Department against dams in Dinosaur National Monument; I organized the alliance between the National Farmers Union and the CIO against the dams, on which these negotiations were based. Somewhat later, the conservation organizations became interested in this subject.

At or about the same time, or perhaps somewhat earlier, I represented the CIO in opposition to the original proposals for Bridge Canyon Dam; this opposition was supported by the American Public Power Association on the ground that, as the project was then planned, electric power rates would be burdened by irrigation costs.

I have maintained and developed my technical acquaintance with the various Grand Canyon hydropower projects since that time; in this work I have always had the benefit of the advice of specialists, but have felt it incumbent on me to master their special knowledge as far as possible and coordinate it into sound policy recommendations.

In 1962, I directed litigation by conservation organizations against the Secretary of the Interior, seeking to enjoin the closing of the gates of Glen Canyon Dam until protection had been provided for Rainbow Bridge.

Also in 1962, I directed the intervention of conservationists in proceedings before the Federal Power Commission wherein Arizona sought a license to con-

struct Marble Canyon Dam, and California proposed the substitution of the Kanab Creek project; we recommended against Kanab Creek, but were denied intervention as to Marble Canyon on procedural grounds.

Many of the issues in respect to Grand Canyon protection before the committee at present were involved in those two cases; it was essential that I acquire a specialized professional knowledge of the facts.

MISCELLANEOUS

In or about 1950, representing the CIO, I organized a coalition of national farm and labor organizations to further the Soil Conservation Service small-reservoir approach to flood control in the Blue River Valley in Kansas and Nebraska, involving Kansas City, as against the big-dam approach of the Army Engineers; we unseated the then incumbent Member of Congress from that district on that issue.

This work involved an intensive professional study of soil conservation and small watersheds management. I participated, on behalf of the CIO, in efforts which resulted in the passage of the Small Watersheds Act. I participated in the establishment of the National Watershed Congress. I am thoroughly conversant with the theory and practice of the system of headwater impoundments for flood control, siltation control, recreation, and local water supply.

In 1944, in cooperation with Mr. Worth Lowery, then president of the International Woodworkers of America, CIO, and with the assent of Mr. Philip Murray, president of the CIO, I presented to the national convention of the CIO the first labor program in forestry, which was adopted; thereafter I represented the CIO and served as a consultant in forestry; for this purpose I enlisted the volunteer services of qualified foresters, including Gifford Pinchot. I have done much work in this field over many years, but the details are somewhat irrelevant to the present discussion.

During the spring of 1953, I made a field survey of the C. & O. Canal from Cumberland to Washington to explore the possibilities of recreational development of the area by side-road access, as contrasted with a longitudinal highway as then proposed. The folowing year I participated with Mr. Justice William O. Douglas of the U.S. Supreme Court in the famous hike from Cumberland to Washington which resulted in the establishment of the C. & O. Canal Association and the defeat of the big-road proposal. Thereafter the side-road system was accepted by the National Park Service as the basis for its plans for the development of the area. The problem for the C. & O. Canal since that time has been the danger of inundation by Army Engineers' reservoirs.

I served in 1950–51 as consultant to the Secretary of the Interior on labor relations, and later as technical consultant, in regard to hydroelectric power, commercial fisheries, and nonferrous metal-ore mining.

I had an excellent undergraduate training in genetics; I have maintained a lifelong interest in population problems. I have been a fellow of the Population Reference Bureau for many years. The population explosion has an obvious and fundamental bearing on programs of natural resources development and conservation; population forecasts must necessarily be constructed on the basis of assumptions, which can be influenced by subjective factors, and one must be able to interpret them realistically.

I have been a commercial dairyman in Franklin County, Pa., for 12 years, shipping 600,000 pounds of milk into the Philadelphia metropolitan market every year. In this connection I am a member of all the national and regional farm organizations and have had a practical business experience with agricultural economics and governmental assistance to and controls over agriculture. I have a reasonably good understanding of the problems of farmers and ranchers, including irrigators and cattlemen, in relation to river basin planning and other governmental actiivty. I have become, of stern necessity, something of an agricultural economist.

My work as president and general counsel of the National Parks Association centers on the national park system and comparable natural areas. In recent years it has required intensive analyses of diverse programs for the management of the water resources of the Potomac River Basin, central and southern Florida, and the Colorado River, among other areas. I am assisted by highly competent engineering, economic, and ecological consultants in these matters, but must of necessity master the technical information myself and shape it into the final conclusions and recommendations.

We undertake to conduct this work in the spirit of the scientific method, with emphasis on the biological and social sciences, and to report our conclusions in an unbiased and objective manner. We endeavor at the same time to conduct educational work, through National Parks magazine, our Washington Conservation Education Center, and otherwise, in accordance with the highest educational traditions of scientific objectivity.

Finally, with respect to the social sciences, I have in the past undertaken systematic postgraduate classroom, lecture, and seminar work in psychology, psychiatry, social psychology, sociology, and cultural anthropology, under such instructors as Sullivan, Fromm, Fromm-Reichmann, Thompson, Benedict, and Mead. This wide versatility in the social sciences, or something which approximates it, is in my opinion, essential to any claim of expert competence in the river basin or regional planning field; or, indeed, in governmental science generally.

The sciences mentioned are essential because it is they which make the greatest contribution to the solution of the teleological problems involved; that is, to the questions of purposes and destinations which are crucial for human welfare. Moreover, the specialist in any discipline, if he has concentrated completely on his specialty, can contribute very little where the problem is the interrelationship of specialties; he should at least have concentrated on the relationship of his own specialty to the entirety, if his advice is to be relied on. This is particularly true of the operating specialist, including the engineer or economist who is concerned exclusively with efficiency or productivity, without asking why the work should be done or considering its effect on the quality of life as a whole.

These are some of the reasons why I see merit in the proposal of the Bureau of the Budget for a Water Resources Commission; the Nation is sovereign, and Congress, representing the people, makes the policy decisions, subject to its responsibility to the people; but the Congress, and its committees, are entitled to have proposals laid before them which are the work of qualified policy minds, utilizing the efforts of specialists and operators, but adding the essential element of integration and synthesis which relates them to human purpose.

This letter summarizes only the highlights of my practice in regional planning and resources management over the years; I have omitted many items which have a less direct bearing on my testimony before this committee, to lighten the burden on the record. I wish to express my appreciation again for the opportunity to submit this supplemental statement.

Sincerely yours,

ANTHONY WAYNE SMITH.

Mr. Aspinall?

Mr. ASPINALL. I have a unanimous-consent request, which is that the witnesses Charles H. Callison and David Brower be allowed 1 hour each for presentation of their statements, and questioning—not over 1 hour for presentation and questioning; that the witnesses Joseph Penfold and S. M. Brandborg be allowed 30 minutes each for presentation and questioning, and that the remaining time of today and tomorrow be divided equally among the remaining witnesses that are on the witness list we have before each one of us.

Mr. ROGERS. You have heard the unanimous-consent request of the gentleman from Colorado. Is there objection?

Mr. HALEY. I reserve the right to object.

Mr. ROGERS. The gentleman from Florida reserves the right to object.

Mr. HALEY. May I inquire of the distinguished chairman of the full committee, is this going to have the effect of cutting off witnesses that might be able to bring us some valuable information in this rather complex problem?

Mr. ASPINALL. This will give to the witnesses who are here representing national organizations, give to them sufficient time, and I have talked to one of them and he says that this is all right with him. It will give to the rest of them who are here on a provincial or sectional level the remainder of the time, whatever it may be. We shall have no time after tomorrow's session for additional hearings at this time.

Mr. HALEY. May I inquire of the chairman of the subcommittee, will there be additional hearings during this session of the Congress on this particular project?

Mr. ROGERS. There will be no additional hearings during this session of Congress.

Mr. HALEY. May I inquire if there will be additional hearings in the next session?

Mr. ASPINALL. If hearings are necessary in the next session of Congress, before we take up the markup of the bill, we will have hearings, of course.

Mr. HALEY. I withdraw my objection.

Mr. ROGERS. You have heard the unanimous request. There is no objection and it is so ordered; the subcommittee will proceed in that order.

The Chair will recognize Mr. Charles H. Callison, assistant to the president, the National Audubon Society.

Mr. Callison, I think the Chair ought to advise you that you do not need to take the full hour.

STATEMENT OF CHARLES H. CALLISON, ASSISTANT TO THE PRESIDENT, NATIONAL AUDUBON SOCIETY

Mr. CALLISON. Off the record.

(Discussion off the record.)

Mr. CALLISON. Mr. Chairman, my name is Charles H. Callison. I am assistant to the president of the National Audubon Society, which has its headquarters in New York City.

The National Audubon Society, which was organized in 1904 and 1905 as the National Association of Audubon Societies, is one of this Nation's oldest and largest citizen's organizations concerned with the conservation of natural resources. A number of State Audubon Societies were active in the 1890's, and even before the National Association was formed the leaders of the movement developed an active interest in areas possessing unusual scientific and scenic values. It was at the instance of those leaders that President Theodore Roosevelt set aside the first Federal bird reservations on the public lands, reservations that were the forerunners of the present national wildlife refuge system.

Quite early in its history the National Audubon Society developed a strong and positive policy in support of the national parks system, which we regard as the foremost example of the determination of the American people that the outstanding scenic wildlife, and wilderness treasures of their land shall not be destroyed by shortsighted commercialism or acquisitiveness, but shall be conserved for the benefit of future generations. This is part of what we Americans call our conservation policy. "Conservation" is a word invented in America. The concept of a national park for the use and benefit of the general public also is an American invention, and it has been developed as a principle of Government policy by the Congress of the United States. Speaking in behalf of the National Audubon Society and of our 264 local branch and affiliate societies, I pay tribute to the primary role played by House Committee on Interior and Insular Affairs in the creation and development of that policy.

I like to think of conservation as a particularly advanced application of the Christian ethic. It is the Golden Rule applied in fourth dimension. It proves that in our Nation, and under our system of government, we the people and our elected representatives are not concerned merely for the welfare of their neighbors of the day. We are concerned also with the quality of life to be lived, and the opportunities to be enjoyed, by our neighbors in time—the people we refer to as the future generations.

We thank you, Mr. Chairman, for this opportunity to express our society's strong opposition to the construction of the proposed Marble Canyon and Bridge Canyon Dams in the Grand Canyon of the Colorado River. We are opposed to both impoundments, whether authorized or constructed singly, or in combination.

Either dam would adversely affect the inestimable, irreplaceable scientific and scenic values of the Grand Canyon which, in the words, of Dr. Ira Gabrielson, the dean of American conservationists, is the "most beautiful, most revealing exhibit of the earth's geological history."

The Bridge Canyon impoundment would constitute an outright invasion of a national monument and a national park. It would constitute a violation of the national park principle, a kind of violation which Congress has never agreed to since it adopted the National Parks Act in 1916.

Marble Canyon Dam would alter and diminish the flowing river which is an essential part of the national park. The flowing river is the living force that created the Grand Canyon. Moreover, although upstream and outside of the present boundaries of the national park, Marble Gorge (where so-called Marble Canyon Dam would be constructed) is an integral part of the Grand Canyon of the Colorado. It should be a part of the National Park. After it is decided that Marble Canyon shall not be built, which we trust will be the outcome of these hearings, we hope this committee will consider legislation that would extend the Grand Canyon National Park upstream to encompass the spectacular Marble Gorge.

Of course, there are no absolutes in the application of conservation policy. The greater welfare of the people and the security of our Nation are the ultimate criteria. If a dam in the Grand Canyon were necessary for the purpose of providing water or power for industry essential to national defense, or for irrigation to keep Americans from going hungry, then the Grand Canyon would have to be sacrificed. But neither condition prevails, nor is likely to prevail. Electric power can be produced more economically in the same region by utilizing abundant fossil fuels now owned by the people through their Federal Government on the public lands.

These dams, either or both, would not add to the water that is available for irrigation or industry. To the contrary, they would cause a net loss of water through evaporation and leakage.

If it is determined that the central Arizona irrigation project is essential to the economy of Arizona and the welfare of the Nation, then let's have the courage to subsidize it directly from the general tax revenues, or let's subsidize it through coal-burning generators that can produce power at competitive costs and thereby provide greater returns on the public investment.

The objection is raised that for the Government to build coal-burning generating plants in the Southwest, as it has already done in the Tennessee Valley, would be an extension of socialism. So indeed, it would be. But, I respectfully suggest, let's keep our thinking straight about this. The construction and operation of any new hydroelectric project by the Government is also an extension of socialism.

Need we rule out private enterprise? May it not be worthwhile to consider a lease of Government-owned coal or petroleum deposits to the private power industry at rates that would yield the revenues needed to subsidize the central Arizona project? Would not this be more economic, and more in the public interest, than a double or triple subsidy that entails a loss of critical water supplies, construction of an uneconomic hydroelectric project, and multilation of the Grand Canyon?

Mr. Chairman, we recommend against authorization of either a Bridge Canyon or a Marble Canyon Dam. I thank you for this opportunity to present our views.

And Mr. Chairman, may I request that an editorial that appeared in the May–June 1965 issue of Audubon magazine, written by Mr. Carl W. Buchheister, president of the National Audubon Society, entitled "Grand Canyon Dams" be entered in the record of the hearing? It is this long, sir.

Mr. ROGERS. What is that out of?

Mr. CALLISON. Out of Audubon magazine.

Mr. ROGERS. That can be received for the file, but under the rules, it cannot be received for the record.

Mr. CALLISON. Thank you.

Mr. ROGERS. Without objection, it will be received for the files.

(The article will be found in the files of the subcommittee.)

Mr. ROGERS. The Chair recognizes the gentleman from Colorado, Mr. Aspinall.

Mr. ASPINALL. Of course, I want to welcome Mr. Callison before the subcommittee. He serves the organization which he represents very well.

Mr. Callison, what is there about the building of a reservoir in a national park area that offends some conservationists? I have used the word "some" conservationists, because there is no definition of conservation. You say it is an American term. I would almost say it is an individual American term, because to you, conservation means one thing; to me, it may mean another. I have for many years now, to some people's surprise, given not only lipservice but real service to tenets of conservationism as set forth by Governor Pinchot and former President Theodore Roosevelt, and other people who are somewhat averse to my position use it for their position.

Now, what is it, as far as you are concerned?

Mr. CALLISON. Mr. Aspinall, there are two reasons why I, from my point of view as a conservationist, and our organization object to the construction of a reservoir in a national park. One is that it is a violation of the principle for which a national park is established, and that is to preserve the scenery—the landscape, if you will—and the natural features of interest of that park in their native condition; in their natural, unspoiled condition. A reservoir is a major alteration of a

landscape and ecology of the area and this is contrary to the purposes for which a national park is established. Now, that is the principle that is involved.

In this particular park, we think the question boiled down to its essence makes a reservoir objectionable because it alters one of the grandest areas of scenic beauty on the face of the earth. And even if there were no national park there, if the Grand Canyon National Park and the Grand Canyon National Monuments had not yet been established, we should object to reservoirs in this area.

Mr. ASPINALL. Why did you not forcefully object to the Curecanti? I happen to know both of these areas. To me, the Curecanti is perhaps a more pleasing sight than the Grand Canyon, although I like the Grand Canyon.

Mr. CALLISON. Perhaps we should have objected forcefully. We have not always been as alert as we should with respect to conservation values.

Mr. ASPINALL. I think you have done pretty well. I congratulate you. Now, if there were a reservoir within a national park area, would you object to harnessing the reservoir so it could produce power?

Mr. CALLISON. A reservoir?

Mr. ASPINALL. If there were a reservoir within a national park area, would you object to the harnessing of the waterpower so that there could be located a hydroelectric generating plant there?

Mr. CALLISON. That would depend, sir, if the harnessing would do further violation to the natural scene and to the values of the park. If the reservoir were already there, an artificial reservoir—not a natural one, sir.

Mr. ASPINALL. Well, a natural one I was talking about.

Mr. CALLISON. If you are talking about a natural one, I think we should not so alter it.

Mr. ASPINALL. On page 3, you have this statement: "To the contrary, they would cause a net loss of water through evaporation and leakage."

Were you here the other day when I propounded the question to the engineers whether or not the installation of Marble Canyon Reservoir and Bridge Canyon Reservoir would cause any more evaporation than permitting the water to go down to Lake Mead and evaporate because of additional water surface? Were you here?

Mr. CALLISON. No, sir; I was not here.

Mr. ASPINALL. Well, the engineers said the evaporation losses would be practically the same.

I think that is all I have.

Mr. ROGERS. Mr. Hosmer is recognized for 5 minutes.

Mr. HOSMER. Mr. Callison, have you been on this stretch of the river below Grand Canyon?

Mr. CALLISON. No, I have not, sir. I have been in Grand Canyon National Park, but I have not been down the river in a boat.

Mr. HOSMER. Have you been down in the canyon?

Mr. CALLISON. I have been down in the canyon part way; yes, sir.

Mr. HOSMER. Have you been up at Marble Canyon?

Mr. CALLISON. I have been at Marble Canyon, viewed it; again, not down at the water.

Mr. HOSMER. Where did you view it from?

Mr. CALLISON. I viewed it from the rim, sir. There is a bridge nearby that crosses Marble Canyon.

Mr. HOSMER. Yes.

Mr. CALLISON. This has been some years ago, and my memory of the exact location is a little hazy.

Mr. HOSMER. Now, that bridge at Marble Canyon disturbs the natural state of the canyon, does it not?

Mr. CALLISON. Well, in a minor way, but very little.

Mr. HOSMER. But it did offer you the opportunity because of the highway connected therewith to take a look at that canyon, did it not?

Mr. CALLISON. That is right.

Mr. HOSMER. You would not recommend removal of that bridge, would you?

Mr. CALLISON. No.

Mr. HOSMER. No. Now, you talk about the preservation of features in their natural condition, with specific reference to the lake behind the Bridge Canyon Dam. That is not going to alter the features, is it?

Mr. CALLISON. No; but it will alter the canyon in its natural ecology in a very material, very substantial way, sir. It will not be a minor alteration; it will be a major alteration.

Mr. HOSMER. Let's take where the lake is 13 feet deep. All the rest of those vast, high canyon walls will still be there, will they not, unchanged?

Mr. CALLISON. No; I cannot say they will be unchanged.

Mr. HOSMER. They will be unchanged above the lake level, will they not?

Mr. CALLISON. The ecology of the area will be unchanged. But perhaps the physical structure of the water will not.

Mr. HOSMER. I am talking about the physical walls of the canyon above the level of the water and I am asking you whether in any way, the physical condition of those walls will be unchanged, altered, or amended?

Mr. CALLISON. In a physical way above the surface of the water, insofar as the immediate effect, short-term effect is concerned, I would agree with you that there would not be a physical change.

Mr. HOSMER. But at the same time, there will be a surface upon which many thousands of Americans can and will have the opportunity to lay their eyes and view those canyon walls; is that correct?

Mr. CALLISON. Unquestionably, more people would enter the canyon by way of the reservoir if the reservoir were there.

Mr. HOSMER. Now, is it not the objective of the conservationists to make it possible not for the few but for the many Americans of our generation and the future generations to enjoy the natural waters of our land?

Mr. CALLISON. Yes, sir, Mr. Hosmer. The key word in your statement, if I may comment, was "natural." When you put a reservoir in there, they are no longer looking at a natural Grand Canyon. This is the point, sir. We need to preserve some of these great wilderness wonders in their natural state for all Americans to see in the future if they desire to, and any of them can get there.

Mr. HOSMER. You must equate the difference in the value between not seeing these at all and an opportunity to see them with a lake at their bottom. That is just exactly what we come down to, is it not?

Mr. CALLISON. Mr. Hosmer, about a week ago, my daughter went to the bottom of Grand Canyon by muleback on that trip that is famous in Grand Canyon National Park. I have never made that trip. Chances are I never will make it. But I am extremely happy that she has had that oportunity to do so, and even though I may never see the bottom of that canyon, I should like to think that my grandchildren will have that opportunity, whether they take advantage of it or not, sir.

Mr. HOSMER. Now, where did your daughter go? She did not go down in this area where you claim that the canyon is going to be flooded, did she?

Mr. CALLISON. No, but I should like my grandchildren to have the opportunity to see that canyon floor unflooded.

Mr. HOSMER. I would like to have the opportunity for many Americans every year to see that canyon right now, as much of it as possible.

Let me ask you this further question. You object to Marble Canyon Dam because you say this would change the flow of the river. You did not object to Glen Canyon Dam, you did not object to every one of these dams up the river which do the same thing. And you did not specify what, in any way, shape, or form, would be the change in the flow of the river, whether or not it would even be detectable to the human eye. It would not be detectable, would it?

Mr. CALLISON. We did object to Glen Canyon Dam, but there again, we did not object vigorously enough.

Mr. ROGERS. The time of the gentleman has expired.

The gentleman from Arizona, Mr. Udall.

Mr. UDALL. Thank you, Mr. Chairman.

Mr. Callison, I wanted to welcome you here and particluarly to thank your organization for giving me an opportunity in its annual convention in my hometown to speak out on this project. There has been a great deal of discussion and confusion here, and your organization was fair enough to let me come before your annual convention and give the other side of the coin and I am grateful for it.

I would take it the primary objective of your organization is to preserve birdlife and cause greater appreciation and preservation of the species of birds we have and this sort of thing. Would this be correct?

Mr. CALLISON. No, that is not correct, sir. The primary purpose of our organization is not merely to preserve birdlife. It is to preserve the wildlife, the plantlife, the soil, and the water resources of our country in its wilderness and scenic resources and a total environment for the benefit of man.

Mr. UDALL. But you do not claim, then, that any bird species would be eliminated or affected by the construction of this dam?

Mr. CALLISON. Yes, if you want to talk about birds, some habitat, some habitat that is peculiar to the river's edge, would be eliminated, where you will find herons and certain other species of wildlife. The habitat would no longer be there, so these birds would not be there.

Mr. UDALL. In the national park, the river's level would simply be moved up a maximum of 90 feet. You would have the same conditions, would you not, only 90 feet higher?

Mr. CALLISON. No, you do not have the same ecology that you have on the banks and the edge and shallows of the running river. The ecology is changed.

Mr. UDALL. But you would still have a hundred miles of natural river, would you not, if both these dams are built?

Mr. CALISON. No, I do not think you would have any natural river.

Mr. UDALL. You do not have it now, with Lake Powell, do you?

Mr. CALLISON. No, the naturalness of it has been reduced, that is true.

Mr. UDALL. I want to get at one thing that has come out over and over again at these hearings. You make the statement on page 2 that the Bridge Canyon would constitute an outright invasion of a national monument and national park, it would constitute a violation of the national park principle, a kind of violation which Congress has never agreed to since it adopted the National Parks Act in 1916. We in Arizona think that in 1919 we got a commitment from the Congress to permit this dam and I went into this yesterday and I want to repeat it again. Now, I did show Mr. Smith yesterday a picture of the Jackson Dam, the Bureau of Reclamation dam in the Grand Teton National Park, and I would ask you the same kind of question I asked him.

Does this picture I have here today outrage your sense of beauty as pictured here? I wish I had it in color.

Mr. CALLISON. Mr. Udall, I have seen very beautiful photographs of the underside of the elevated subway tracks of New York City.

Mr. UDALL. I did not ask you that. I asked you if this picture outrages your sense of beauty?

Mr. CALLISON. No, it does not.

Mr. UDALL. Mr. Chairman, for the record, in the light of the statement the witness has made, I ask unanimous consent to place in the record at this point a short statement of precedents for dams in national parks. There are at least four, I think, maybe five of them. They are stated here very briefly.

Mr. ROGERS. Is there an objection to the request of the gentleman from Arizona?

The Chair hears none. It is so ordered.

(The documents referred to follow:)

PRECEDENT FOR MANMADE RESERVOIRS IN SCENIC AREAS

Jackson Lake Dam is within Grand Teton National Park. It stores water for the Minidoka reclamation project, providing irrigation for 1,162,000 acres in southern Idaho. Few lakes in the West have been more acclaimed for scenic splendor than Jackson Lake. Although the park was created after the dam was built, this is recognition by Congress that a reclamation reservoir and a national park can live together.

The reclamation reservoir behind Sherburne Dam is almost entirely within Glacier National Park. In this instance the park was created first by the Congress. The water that is stored in Lake Sherburne is used to irrigate 120,000 acres of the Milk River project around Havre, Mont.

Another reservoir in Glacier National Park was built to enhance the economic development of the Black Feet Indian Tribe. The Bureau of Reclamation is rebuilding this dam, known as the Lower Two Medicine Dam, since it was severely damaged during the 1964 floods.

Most similar to the reservoir that would be created behind Bridge Canyon Dam is Fontana Lake in the Great Smoky Mountains National Park. This lake extends some 30 miles along the boundary of the park and provides 248

miles of shoreline. It is a part of TVA and provides power generation and flood control as well as recreational benefits.

No one has asserted that Grand Teton, Glacier, or Great Smoky Mountains are less majestic because of these dams. An argument can be made that their beauty and usefulness have been enhanced.

Mr. ROGERS. The time of the gentleman has expired.

Mr. CALLISON. May I make a comment to the gentleman from Arizona, Mr. Udall?

I want to say, Mr. Udall, that our organization was very grateful to you for coming before our national convention in Tucson. It was a wonderful speech you made. We were inspired on the whole field of conservation. Even though we were not convinced that Bridge Canyon or Marble Canyon Dam should be constructed.

Mr. UDALL. I thank you.

Mr. ROGERS. Mr. Skubitz?

Mr. SKUBITZ. I ask unanimous consent to yield my time to Mr. Hosmer.

Mr. ROGERS. Without objection, it is so ordered.

Mr. Hosmer is recognized.

Mr. HOSMER. Mr. Callison, what is the budget of the Audubon Society for fighting this project?

Mr. CALLISON. We have no budget for fighting this project.

Mr. HOSMER. Do you take it out of your general funds?

Mr. CALLISON. It is an incidental activity that we carry on. We try to advise our members about these big conservation issues. I am very pleased that I sometimes have the occasion to represent our organization in the legislative process by appearing at such a hearing as this. We are very grateful for this privilege.

Mr. HOSMER. Do you advise your members to do anything about the situation you foresee?

Mr. CALLISON. No; we do not. We try to give them the facts and let them use their judgment.

The editorial which we submitted for the file is a typical example of our effort to present our point of view, true, the point of view of the administration and the board of directors and of the society as a whole, to our members.

Mr. HOSMER. Do not the historical bulletins and things suggest that letters be written to the Congressmen and Senators?

Mr. CALLISON. No; we are very careful about that, being a tax-exempt organization.

Mr. HOSMER. How about yourself? Did you contact any Congressman individually in connection with this project?

Mr. CALLISON. No; I have not in connection with this. I write a regular column in the Audubon magazine and in the course of gathering information for that column, I directly contact members of Congress, another one of my privileges. There, I am acting as a reporter, as a journalist.

Mr. HOSMER. But as an employee of the society, carrying out its policies?

Mr. CALLISON. Yes; carrying out its work, its activities.

Mr. HOSMER. And in the contact, do you have any suggestions to the Congressman you contact as to the value or nonvalue of projects of this nature?

Mr. CALLISON. I do not presume to think that my suggestions are of such great value that I would offer them, but I sometimes am very flattered by Members of Congress by their asking me for some material or information. I may say I think this proves they are good politicians when they ask me.

Mr. HOSMER. And in this activity, do you regard yourself as subject to the Lobbying Act?

Mr. CALLISON. No.

Mr. HOSMER. You are not registered under the Lobbying Act?

Mr. CALLISON. No; we are not.

Mr. HOSMER. Thank you very much.

Mr. ROGERS. In view of the fact that some of the members have come in late, the Chair wants to be fair about dividing the time. We shall divide the rest of the time so each member will receive 4 minutes.

Mr. White, you are recognized for 4 minutes.

Mr. WHITE of Idaho. Thank you, Mr. Chairman.

Mr. Callison, I think we have met before, with particular reference to wilderness legislation.

Mr. CALLISON. Yes, sir; we have.

Mr. WHITE of Idaho. I had the opportunity at that time to travel over a good part of the western part of the United States to listen to people testify as to the relative values of wilderness as such, and the reasons or needs for the creation of wilderness areas. I would like you again to state for me the purposes of your organization as you stated them just a moment ago for Mr. Udall.

Mr. CALLISON. Mr. White, I wish I had been thoughtful enough to bring along a copy of our articles of incorporation, our charter, which states our purposes. But in brief, our purpose is to promote public understanding and public education of the value of the wise management and conservation of our soils, waters, plantlife, and wild animal life, and their interrelationships, all considered with respect to human progress. Now, those words happen to appear in our charter, our constitution. We relate these to human progress. They are valuable only because they are valuable to people.

Mr. WHITE of Idaho. Well, I would think then that our basic philosophies are very similar. At least, if I were to state my philosophies, I would state them very similar to the way you stated them.

Mr. CALLISON. I am sure there is a great agreement in America about what conservation is about.

Mr. WHITE of Idaho. But when it came to the application of these principles, we might follow different courses, because so many people are attributing to conservation today not the true meaning of the word "conservation" and this means proper use. This includes wilderness. This includes all of the things we are talking about, and the ticklish task we have here is to try to equate these particular principles to come up with what is best for the American people. We are going to have to listen to both sides of these questions and figure out what is the best for the total development of all the parts of the United States. Then we are faced here immediately with the question of what is the best for the total development of the Colorado River Basin and all of the Pacific Southwest, and even now, I am in this in the Pacific Northwest. I can sit and say, well, we are not going to take any water out of the Columbia River, we are going to keep it intact as it is, we are not going to pipe any of the waters from the Columbia over into

Colorado and to California. That may be the way I want it. But I am going to have to sit down and figure out the correct way. I think you are going to have to do the same. However, you are going to have to decide what you are particularly advocating and what your organization is advocating.

All I want to say is this idea of conservation is not just conservation of a particular aspect of a certain area—it goes beyond that. It goes to the proper use of that area and the higher use for the most people—it might be in opposition to what you believe in. This is the part I am going ultimately to have to analyze and that is the position I am ultimately going to have to take.

I thank you very much for restating your position and for the manner in which you presented your position here today.

Thank you, Mr. Chairman.

Mr. ROGERS. Mr. Burton?

Mr. BURTON of Utah. Mr. Chairman, I would like to join my colleagues in thanking Mr. Callison for his presentation. I also want to let him know and let my colleagues on the committee know that one of my qualifications for high elective office, although not known, is that I am the founder and first president of the Lorin Farr Elementary School Audubon Society. With that identification, I want further to comment on this term "conservationist," I think if you transferred it to the political spectrum, I could define it in the following way. Some of my friends say I am a conservative. I like to think I am a moderate. Some of the rightwing kooks say I am a liberal. Some of the liberals say I am a rightwing kook.

I want to say that in terms of my definition, the chairman of the full committee is not a "spoiler" and as a matter of fact, I think he is one of the greatest conservationists that the country has. I use the term "conservationist" in the same way that the gentleman from Idaho does, in the same way that the greatest conservationist America ever had, Mr. Pinchot, used it, and that is proper use.

The chairman of the full committee just last year was presented an award which identified him as the Conservationist of the Year by the National Wildlife Federation, a group that I also belong to. Part of the reason that he got this award, the nature of Congress being such as it is, is that bills just do not come out of committee unless the chairman blesses them, and one of the great things that he has done and other members of this committee have done toward conservation has been to establish a wilderness preservation system, to establish a land and water conservation fund, to establish an Outdoor Recreation Bureau, to enact a Water Resources Planning Act, Water Resources Research Act, and establish a Public Land Law Review Commission. We have made, in the two and a half years I have been a member of this committee, major additions to the national park system, including a great one in my own State, Canyonlands. In addition to that, Cape Cod National Recreation area, another at Point Reyes, and another at Padre Island and, Mr. Callison, there are others coming down the pike that within a year are going to contribute to our great park system.

I do not want you or any of the other people we are going to hear from today to look upon any of the members of this subcommittee or

the full committee as "spoilers." I think we have to sit as judges and in our own ways, we are conservationists. Although our definitions might not agree in all instances with yours, I want to put in a word in defense of us.

Now, in your statement, you said this would constitute a violation of the national park principle. Now, I disagree with you on that and I am going to give you a chance to respond. But I do not understand why you say the national park "principle," because the proposed Marble Canyon Dam is not in a national park. You say it should be, but it is not. So technically, it does not violate a national park "principle."

Now the Bridge Canyon Dam is in a national monument. I see nothing in the National Monuments Act, which prohibits some multiple use. In creating Canyonlands, we provided for a 10-year phase-out on grazing. We have mining in the Death Valley Monument. We have a hydroplant in Yosemite, Calif.

Why should you say that this bill violates a particular national park "principle"?

Mr. CALLISON. Mr. Burton—Mr. Chairman, I hope I can take just a little time to answer.

Mr. ROGERS. Mr. Callison, you have 1 minute to answer that question.

Mr. CALLISON. Well, this is a long question.

I will begin by saying I am not at all surprised that Mr. Burton is in Congress and on this committee, considering his Audubon background. I thank him for the kind things he said.

I further say that I for one, and I do not think any of my colleagues consider the chairman of this committee or the committee as a whole as a "spoiler" committee. As a matter of fact, we are grateful that this question comes before this committee. We have seen its record on conservation matters. To use the words of the famous Casey Stengel, the record of this committee in turning out conservation legislation in the last Congress was nothing short of amazing, like the amazing Mets. We see another such record in the making here. It takes a while to crank up and consider all these measures.

We consider the proposed Bridge Canyon Dam and the reservoir which would put water into the national monument and into the national park an invasion because it is a sheer physical alteration of the natural scenery and natural ecology of that area. This is contrary to the purpose of a national park. It is as simple as that.

Mr. ROGERS. The time of the gentleman has expired.

The Chair must recognize the gentleman from California, Mr. Tunney.

Mr. ASPINALL. Will the gentleman from California yield?

Mr. TUNNEY. Yes.

Mr. ASPINALL. I would ask unanimous consent that Mr. Callison be given the opportunity to answer this question propounded by Mr. Burton and have his answer placed in the record at this point. This answer deserves and should have considered judgment on his part.

Mr. ROGERS. Is there objection?

The Chair hears none and you may prepare your answer, Mr. Callison, and submit it to the clerk and it will be placed in the record.

Mr. CALLISON. Thank you, Mr. Chairman. I appreciate that opportunity.

(The information requested follows:)

SUPPLEMENTARY STATEMENT BY CHARLES H. CALLISON FOR THE NATIONAL AUDUBON SOCIETY, STATING REASONS WHY CONSTRUCTION OF MARBLE CANYON AND BRIDGE CANYON DAMS WOULD CONSTITUTE A VIOLATION OF NATIONAL PARK AND MONUMENT PRINCIPLES (AS REQUESTED FOR THE RECORD)

NATIONAL PARKS AND MONUMENTS

National Parks and Monuments are established to preserve natural features and scenery which are of national significance. As such, each of these areas is unique and irreplaceable.

Protection of the national parks and monuments is based upon esthetic and scientific values, and upon those forms of recreation directly related to the unaltered natural conditions. Only those facilities which are essential to visitor enjoyment and which are consistent with the fundamental purpose of protecting the parks and monuments are permitted. Man-made attractions, such as artificial reservoirs, are not appropriate within these areas. The national parks and monuments are not resorts in the sense of being amusement centers for mass recreation; rather, they are irreplaceable and increasingly valuable areas of original America to be enjoyed by all those who value natural beauty and wilderness experiences free from the usual sights and sounds of civilization found in such abundance everywhere else in the country. As with museums, art galleries, and concert halls, the national parks and monuments are a special and priceless form of land use.

DAMS AND RESERVOIRS

Dams and their reservoirs are commercial in nature for one or more of the following purposes: Power generation, water storage and irrigation, flood control, and recreation.

In the case of Bridge Canyon and Marble Canyon Dams, power generation for revenue is the purpose. Therefore, the Grand Canyon National Park and Monument are threatened with invasion contrary to the fundamental purpose for which they were established, in order to help finance the central Arizona project. Such a commercial use of these areas is clearly not appropriate.

RECREATION

Bridge Canyon and Marble Canyon dams, it is argued, would afford the opportunity to thousands of people to take part in mass recreation—speedboating, water skiing, etc. Yet, such activities, which are appropriately available on Lake Mead and other reservoirs on the Colorado River and elsewhere, would be contrary to the purpose of Grand Canyon National Park and Monument. They offer no justification whatsoever for invasion of the park and monument by a commercial project.

ACCESS

Bridge Canyon and Marble Canyon Dams, another argument states, would enable thousands of visitors access to a part of the Grand Canyon now open to only a few hikers and river trips. Again, it is not national park and monument policy to make over the natural scenery in order to bring in more people. The basic point is to protect the natural conditions for which the park or monument was established to preserve so that visitors may see and enjoy the unique scenery and features never altered by man. The Bridge Canyon Reservoir would not leave the scenery unaltered.

GRAND CANYON NATIONAL PARK ENABLING ACT

It has been argued that the specific language of the Grand Canyon National Park Act took into account the future possibility of the need for reclamation facilities in Grand Canyon, and that therefore this national park constitutes an exception to the general national park policy of protection against commercial intrusions.

Section 7 of the Grand Canyon National Park Act (16 U.S.C., section 227) states that "whenever consistent with the primary purposes of said park, the Secretary of the Interior is authorized to permit the utilization of areas therein which may be necessary for the development and maintenance of a Government reclamation project."

The National Park Act for Grand Canyon emphasizes consistency with primary national park purposes. The National Audubon Society is primarily opposed to both Bridge Canyon and Marble Canyon Dams because their reservoirs would not be consistent with the primary purposes of the park. Important elements of Grand Canyon National Park would be drastically altered:

Marble Canyon Dam would closely regulate the flow of the remaining unflooded miles of the Colorado River in Grand Canyon, and would bring an end to the natural "flushing" action of the river which prevents rock and log dams and jams from building up, principally where tributaries enter the river. Because some damage has already been done to the natural flow of the river by Glen Canyon Dam, the existence of this degree of regulation is not an acceptable justification of increased damage through construction of Marble Canyon Dam. The flowing river would cease to exist for all intents and purposes. As one of the primary features of that greatest of canyons and the creator of the canyon erosion to its present depth, it cannot be said that Marble Canyon Dam just upstream from the national park would be consistent with the primary purposes of the park. Furthermore, it has long been known that the construction of Marble Canyon Dam would be a major step toward the Kanab diversion project which would divert 90 percent of the river flow around the national park portion of Grand Canyon.

Bridge Canyon Dam, downstream from the national park and national monument, would back water upstream for nearly 100 miles of the Grand Canyon's inner gorge, all the way through the national monument and a dozen miles of the national park. The flowing river would thus be obliterated and converted into a dead-storage reservoir. Natural plants and animal life along the river and dependent upon those special ecological conditions not found elsewhere in that region would be wiped out, along with scenically and scientifically valuable inner gorge landscapes. In no way can this invasion be considered "consistent with the primary purposes of said park."

Furthermore, the language of the Grand Canyon National Park Act speaks of a reclamation project. We believe this is purely a revenue-producing project and there is increasing evidence indicating that there are as good or better alternatives to the two proposed dams in Grand Canyon by which revenue from marketed electricity can be derived—alternatives which will not despoil this world-famous Grand Canyon. The Park Act further speaks of a reclamation project "which may be necessary." Yet, the fact that alternatives do exist proves there is no "necessity" to invade the Grand Canyon.

GRAND CANYON NATIONAL MONUMENT PROCLAMATION

Grand Canyon National Monument was established by Presidential proclamation, December 22, 1932, and says in part that this portion of the canyon "contains much that is most significant and important." There is no language whatsoever in this document providing either express or implied authority for the Bureau of Reclamation to construct dams within or in any way disturb the Grand Canyon National Monument.

Therefore, the National Audubon Society urges the continued protection of Grand Canyon National Park and Monument in conformity with the basic National Park Act of 1916 and the Antiquities Act of 1906. Bridge Canyon and Marble Canyon Dams would in fact constitute an invasion of these units of the national park and monument system, contrary to fundamental policy.

THE NATIONAL PARK AND MONUMENT SYSTEM

There is truth to the argument, furthermore, that backing of an artificial reservoir through a national monument and into a national park, and otherwise altering the flow of a natural river to the extent that boat trips on the unflooded miles would no longer be possible, would by precedent pose a dangerous threat of similar commercial invasions to the entire national park and monument system.

Mr. TUNNEY. I would like to join my colleagues in welcoming the witness to the committee today.

I have just one question before yielding the balance of my time to my colleague from Arizona.

Is it not true in the Grand Canyon Act that it provides that dams can be built within the park if it is felt that these dams are needed for reclamation work?

Mr. CALLISON. Mr. Tunney, of course, the Congress can put a dam in any national park if it decides in the greater national and public interest that dams are needed there. I think that Mr. Smith yesterday gave a very fine analysis or exposition of this so-called reservation in the National Park Act. It is not really a reservation. It says that a dam can be built there. It say if this is not in conflict with purposes of the national park, then this will be considered.

Now, that is a very technical question and it is the kind of technical question that the conservation-minded public of America, I think, is not going to fool around with. They are going to look at this scene and they are going to look at the proposed dam and say this is an invasion of a national park. I think Congress is going to have to decide whether or not to do that without falling back on the very nebulous language that is in that act. This does not open the way to a dam.

Mr. TUNNEY. Of course, at the time Congress established its policy, it did establish also the reservation that these dams could be built if at some future time it was felt they needed it.

I would like to yield the balance of my time to Mr. Udall.

Mr. ROGERS. Mr. Udall, you have a minute left.

Mr. UDALL. Let me correct Mr. Burton. Bridge Canyon Dam is not in the national monument. It is 57 miles below the national monument.

Secondly, the trail your daughter went down is an invasion of the natural park and a change in the ecology and scenery. It is quite a wide trail.

Third, at the bottom of the canyon, your daughter was at least 50 river miles and 30 air miles from the nearest point of Bridge Canyon Lake.

The fourth point, there is not a public place or trail or viewpoint on either side of the Grand Canyon that is within an area where this lake could be seen. It would be completely out of sight and from the north rim, the hotel and all the trails and viewpoints on the north rim, it is at least 30 air miles and 50 river miles from the nearest point of that lake.

So when we talk about the million and a half people a year who go to Grand Canyon and see it from the rim, either north or south or from any of those points on the roads or viewpoints, there is not even one of that million and a half people who would even know the lake is there. I think this is one of the most misleading points that has been made in all the propaganda and publicity, that we are flooding out the Grand Canyon and destroying the view. The truth is no one would even know this lake is there from either rim of the canyon. I think it is important that we nail down these points.

Finally, I would say the picture I have shown you is from the Great Smoky National Park and is a TVA dam. I think anyone would have difficulty convincing a reasonable man that this dam spoils the area. Actually, it augments it. I wish I had time to tell you about other dams that are in national parks; I think in each case, they add beauty to the area.

Mr. ROGERS. The time of the gentleman from Arizona has expired.

Mr. Wyatt?

Mr. WYATT. Mr. Callison, I welcome you here and I have an interest in your society.

I would like to associate myself with the remarks of the gentleman from Utah, Mr. Burton, both with respect to the remarks about the committee of 2 years ago, before I was in Congress, and also with his remarks concerning the chairman of the full committee. I have sat here for nearly a year now and have observed firsthand what can be done. It is my view that the duty of this committee is a well-rounded duty and that we must permit the best use of our great natural resources which are consistent with the maintenance of the natural state and natural beauty of these resources. I will be very interested in your written answer as to in what way specifically the building of either of these dams will be a change in our policy on national parks or an invasion or interruption and an alteration in the natural beauty of the Grand Canyon National Park or the Grand Canyon National Monument.

Mr. Chairman, I would ask unanimous consent to yield the balance of my time to Mr. Burton.

Mr. ROGERS. Without objection, Mr. Burton, you have 2 minutes.

Mr. BURTON of Utah. Mr. Callison, have you ever been in Glen Canyon area prior to the building of the dam and since?

Mr. CALLISON. No; I was not. I have been in that general area, sir, but I have never explored the canyon.

Mr. BURTON of Utah. That is an area that I represent and I have been in the area before the dam was built. The dam itself backs up water 186 miles through the canyon. It is an area that is very similar to the Grand Canyon area. It is a little prettier country, but I can testify as one who is interested in scenery that this dam has enhanced that tremendously. Whereas, before the dam was built, you could get a relative handful of people through that canyon country; there will be hundreds of thousands visiting it this year and in the immediate future, there will be millions. If we carried your definition of a violation of the national park principle to completion, you would not be able to drive through Yellowstone, you would not have camps, your daughter would not have been able to go down that trail or stay at Phantom Ranch, where they have a swimming pool.

As showing pictures seems to be in vogue, I would like to show one prettier than the one the gentleman from Arizona produced.

I asked a member of the staff to pull this picture taken on Lake Powell in the Grand Canyon area, off the office wall. There is excellent fishing. I visited it with some members of this committee last November. It is beautiful, magnificent. Far from detracting from the area, it has enhanced it, made it; has not spoiled anything. It has really added to the beauty and excellence. Do you want to comment on that in my remaining 15 seconds?

Mr. CALLISON. I will say, Mr. Burton, that is a beautiful photograph. I have also seen some absolutely stupendous photographs taken at Glen Canyon before the reservoir was there.

Mr. HOSMER. The point is people can now see that. Before the dam was in there, there was only some one-thousandth of 1 percent of the population that had an opportunity to go there, let alone take advantage of the opportunity.

Mr. CALLISON. Mr. Chairman, may I respond to that?

Mr. ROGERS. Yes; you have about 45 seconds.

Mr. CALLISON. I am not speaking with specific reference now to Glen Canyon reservoir or Lake Powell, but there is a place for reservoirs and

reservoir recreation. We all recognize this and there is a vast and growing amount of reservoir opportunity, reservoir and recreation opportunity throughout the United States of America. There are getting to be so many reservoirs that one of these days, they are going to be old hat.

I came from the State of Missouri. This is where I grew up and got into conservation work. There are so many reservoirs now in the Ozarks that people are seeking out the unspoiled streams to do their fishing. They no longer come to Missouri for reservoirs. There are reservoirs all over the country. And I think that we will find that the places where we preserve some of these unspoiled rivers in the natural canyons are going to be the select place for people to see in the future. We had better save some of them.

Mr. HOSMER. This 13 miles, is that important?

Mr. CALLISON. Yes; it is important for the national park.

Mr. HOSMER. And there are 154 other miles there.

Mr. ROGERS. The gentleman's time has expired.

The gentleman from California, Mr. Burton?

Mr. BURTON of California.

I yield my time to the gentleman from Arizona, Mr. Udall.

Mr. ROGERS. Mr. Udall?

Mr. UDALL. I thank my colleague. I do not quite know how to use this gift of time, I have so many things to cover here.

I would like to have a real exchange with the witness, but I do not have the time. I am afraid maybe I had better make another speech here and bring out some more facts that we consider important in Arizona.

Mr. ASPINALL. Will my colleague yield?

Mr. UDALL. Yes.

Mr. ASPINALL. I would suggest that neither one of you will convert the other.

Mr. UDALL. The chairman is undoubtedly right. I am more interested in converting some of my colleagues on this committee who have received so much mail on this subject.

Natural beauty is relative. I was showing the chairman a moment ago some pictures of Pinal County which happens to be in my district, with wells dry and houses abandoned and farms drying up and blowing away. I do not think pictures like this add too much to beauty. Look at the caption on this first picture. This was to be a home. After filing bankruptcy, the owner hung himself from a rafter in the unfinished roof section; $3,000 would have completed the job, but no one had any money.

Now, we have to choose. We are either going to let Arizona dry up and blow away and destroy the civilization there, or we are going to build some dams that in my judgment do no violence to conservation or the principles I believe in. I think my credentials as a conservationist are pretty good. I do not want to belabor the committee with them.

Let me take the 2 minutes I have left.

Mr. ROGERS. The gentleman has only 1 minute.

Mr. UDALL. I shall try to put this thing in focus. If this room, and I made some measurements, were the Grand Canyon, the height of the water at the deepest point of those 13 miles would come about 4 inches off the floor, which is not even that first help step back there. That is what we are talking about, the little half step where you come up

here. That is the relative depth of the water in the Grand Canyon. The rest of it remains. This 13 miles in this room would go from where the wall juts out there below the chandelier over to this point, and then you can imagine the river meandering through all the way back over to the corner through this room. The extent of that water coming out from this wall would be less than 3 inches in that 13-mile strip.

So when you get letters talking about destroying the Grand Canyon or mutilating it, you have to remember that water will cover less than 2 percent of the total Grand Canyon National Park, could not even be seen from any point on the trail, as I pointed out. I think the members ought to review this correspondence and the wild charges in this focus. When you put it against the welfare of an entire area and the great things we can do——

Mr. ROGERS. The time of the gentleman from Arizona has expired.

The Chair recognizes Mr. Reinecke.

Mr. REINECKE. Mr. Callison, your low-pressure testimony is gratifying. You are not against delivering water to central Arizona; is this right?

Mr. CALLISON. Not at all. My statement is let's subsidize it another way. I would like to make clear that the National Audubon Society does not consider itself an authority on opposing the rise of economic policy. I just wanted to make clear that while we heard some objection to the idea of the Government operating steam-generating plants as socialism, it is no more socialism than building a dam and operating it for hydroelectric power.

Mr. REINECKE. Your objection really is based on the fact that No. 1, you hold these principles of preserving as well as conserving natural beauty?

Mr. CALLISON. That is right. The best use of some areas for public benefit is to preserve them. Mr. Aspinall thinks some of us are preservationists but we are also conservationists and users.

Mr. REINECKE. Your idea in accomplishing this is to recognize that there may be alternate sources for generating the power which is proposed to be generated by these two dams?

Mr. CALLISON. Yes, indeed.

Mr. REINECKE. That they be done in a competitive or lower price and with the involvement of private funds rather than public funds; is that right?

Mr. CALLISON. Right.

Mr. REINECKE. One question I was not able to ask before is regarding the accessibility of this hundred or so miles of river that is left. It is my understanding that there will be no access below Marble Canyon Dam to the river. Do you happen to know whether that is true or not?

Mr. CALLISON. You mean should Marble Canyon be built, there will be access——

Mr. REINECKE. If Marble is built, the argument has been made that there will still be 100 miles of river for the white water people. I am of the opinion that there will be no access to the river below the Marble Canyon Dam—that is, until you get clear down to the bridge or the Hualapai Reservation.

Mr. CALLISON. Mr. Reinecke, there are witnesses on the left who have made that trip and can answer.

Mr. REINECKE. I mean as a construction feature of the dam. I think this is something that should be pointed out.

One final comment, if I may, Mr. Chairman. There apparently has been a misunderstanding between the chairman of the full committee and myself in testimony that has gone before. Mr. Dominy indicated the other day that there would be approximately 100,000 acre-feet of evaporation per year from the two reservoirs and on the subsequent questioning where others indicated the evaporation would not be changing, I think they referred to the general figure of 800,000 feet, which would be the combined system. I am not under the impression that the construction of the two lakes would cause no further evaporation. I am sure that it would.

As a matter of fact, I pointed out that this evaporation was equal to the amount of water which a private contractor was requesting for the construction of a 5-million-kilowatt plant.

Mr. ROGERS. The time of the gentleman has expired.

Thank you, Mr. Callison, very much for your statement and your answers.

Mr. David Brower, executive director of the Sierra Club, and Mr. Zimmerman, trustees for conservation.

Gentlemen, I presume that you wanted to appear together?

Mr. BROWER. Mr. Nash and I wanted to appear together for the Sierra Club. Mr. Zimmerman is appearing for another organization.

Mr. ROGERS. Mr. Zimmerman, did you want to appear in this group?

Mr. ZIMMERMAN. No, I have filed with the committee a statement. It is up to the committee whether I testify or you merely introduce the statement as part of the record. I am here to answer questions for you.

Mr. ROGERS. Mr. Brower and Mr. Nash will be recorded as the witnesses of the Sierra Club.

Mr. Brower, do you have a statement?

STATEMENT OF DAVID BROWER, EXECUTIVE DIRECTOR, SIERRA CLUB; ACCOMPANIED BY HUGH NASH

Mr. BROWER. Yes, sir, Mr. Chairman.

Mr. Chairman, my name is David Brower and I appear here with Hugh Nash, author and compiler of the statement of the Sierra Club, a national conservation organization with headquarters in San Francisco and a membership of more than 32,000. The purpose of the club, founded in 1892 by John Muir, is to explore, enjoy, and protect the Nation's scenic resources, of which none is more precious than the Grand Canyon, now threatened by dams and appurtenant structures that the Bureau of Reclamation has claimed are a necessary part of water development in the Southwest, including the central Arizona project, and which we believe are not necessary for this purpose. We appear here to aid as well as we can the national effort to protect Grand Canyon and the national park system, which itself is threatened by what the Bureau of Reclamation proposed to do.

We do not believe that the American public would tolerate such an invasion of Grand Canyon and the national park system if the public really knew what is being proposed and what the alternatives are.

In an effort to let the public know, we have published two books, "The Place No One Knew: Glen Canyon on the Colorado" and "Time and the River Flowing: Grand Canyon," which I would like at this time to submit for the committee file, and to provide copies of, as well, for all members of the full committee who would wish them.

Mr. ROGERS. That is the large book there?

Mr. BROWER. Yes, two large books.

Mr. ROGERS. Without objection, they will be received for the file and the proper reference to them made in the record.

(The documents referred to shall be found in the committee files.)

Mr. BROWER. We have also just released a half-hour sound and color film, "Glen Canyon," relevant to the controversy, which we should like to show to the members of the committee whenever a showing can be arranged. A further film on Grand Canyon itself, showing what the proposed Grand Canyon dams would destroy, is in preparation and will probably be the next best thing to a trip down the living river itself. We hope the members will have an opportunity to see that film, too, before undertaking to pass judgment. We should have it in showable form in time for field hearings, should the committee decide to hold them, which we hope you will.

I should like to submit for inclusion in the record of these hearings, because that record is going to be the chief reference book for the most important conservation battle of the decade (that's what this is, in our opinion), the following:

Mr. Nash's statement, as if it had been read, with the understanding that the illustrations would not be part of the record.

The relevant part of the article by Senator Clinton P. Anderson before a Sierra Club conference on Southwest wilderness held in Santa Fe, the article having subsequently been published in the December 1964 Sierra Club bulletin.

The articles by Messrs. Condliffe and Leopold in the June Sierra Club bulletin, depicting some of the hazards and fallacies in feasibility studies such as the committee is now contending with.

I would like also, at this time, to associate the Sierra Club with the remarks in the statement of Prof. Richard C. Bradley, of Colorado Springs, which he was unable to stay to present and which he has asked me to give you, for inclusion in the record as if he had read it. I have read it myself, support it, and will try to answer or find answers for any questions you have about it.

With your permission, Mr. Nash will summarize his own statement and we will stand by for questions if there are any. Thank you for this opportunity to appear before you.

Mr. ROGERS. Thank you, Mr. Brower.

Let the Chair say that as far as the statement of Mr. Nash is concerned, the committee can receive it for inclusion in the record the same as if read in full and Mr. Nash may summarize it.

However, the other matters to which you referred are not within the rules but can be received for the file, to be referred to in the record.

The statement by Dr. Bradley, Dr. Richard C. Bradley, can be received by the committee for inclusion in the record if it meets the requirements. Of course, you understand that all that is received subject to approval by the Chair and ranking minority members.

Without objections, those inclusions will be made in the record and in the file as indicated.

(Dr. Bradley's statement follows:)

STATEMENT OF RICHARD C. BRADLEY, PH. D.

Mr. Chairman and gentlemen of the committee, my name is Richard C. Bradley. I am an associate professor of physics at Colorado College, Colorado Springs, Colo.

I am appearing before you today on behalf of myself, my family, and two local Rocky Mountain conservation organizations dedicated to preserving beauty and parklands in our surroundings—the Springs Area Beautiful Association and Denver Beautiful, Inc., each having a membership of about 200 people.

We wish to register our opposition to the two dams proposed for the Grand Canyon, the so-called Bridge Canyon and Marble Gorge units of the central Arizona project and the Pacific Southwest water plan. At the same time we do not oppose the overall objective of the water plan to bring new water to thirsty regions in the arid Southwest. It seems to us that if this objective can be achieved at all (that is, if there is enough uncommitted water available for it in the first place) it can be achieved without the Grand Canyon dams. It further seems to us that the loss of irreplaceable values of national significance, if these dams were built, outweighs the benefits to be derived from their construction. This summarizes our position.

WATER WITHOUT GRAND CANYON DAMS

A look at the map of the Colorado River shows that along its lower reaches it is almost, but not quite, completely harnessed by dams. If we start at its mouth in the Gulf of California and work upstream along the main stem, we pass in succession Morelos Dam, Imperial Dam, Palo Verde diversion dam, Headgate Rock diversion dam, Parker Dam, Davis Dam, Hoover Dam, and Glen Canyon Dam.[1] From the upper end of Lake Powell (the reservoir created by Glen Canyon Dam) in south central Utah, all the way down to the ocean—a distance of about 1,000 miles—there is just one important section of the original wild and beautiful Colorado River remaining, and that is in Grand Canyon. This is the site of the two proposed dams. It is also America's best known scenic resource, unmatched anywhere in the world.

Water is the sine qua non in the desert Southwest, and most of the dams listed above provide direct hydrologic benefits to the communities that have sprung up there. But the Grand Canyon dams will provide no such benefits. They will control no floods, bring no water to anybody, nor irrigate 1 acre of farmland.[2] On the contrary, the water they will lose by evaporation each year (100,000 acre-feet)[3] might otherwise irrigate 150 to 200 farms,[4] supply all the needs of a city of half a million people,[5] or furnish all the cooling necessary to generate 5,000 megawatts of electricity in a modern steamplant[6]—the equivalent capacity of all the power dams on the Colorado River put together, including the two proposed ones.[7] The only benefits these dams will provide are pumping energy to lift water from the existing Lake Havesu to central Arizona,[8] peaking power for the Southwest power grid,[9] and dollars from the sale of power for the lower basin development fund.[10] These are not hydrologic benefits. They can all be realized without these dams. The choice is not between water and an unspoiled Grand Canyon.

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[1] "Location Map" in "Pacific Southwest Water Plan," January 1964.
[2] H.R. 4706, p. 6.
[3] PSWP table 13, p. IV-2.
[4] Two hundred 160-acre farms have 32,000 acres; 3 acre-feet of water per acre per year—the amount needed in the upper basin. Total about 100,000 acre-feet.
[5] Denver uses about 200 gallons per person per day; this is the same as 100 acre-feet per year for one-half million people.
[6] The recent proposed Kaiparowits installation would generate 5,000 megawatts and would use 100,000 acre-feet of Lake Powell water per year.
[7] See the following:

	Thousand megawatts
Upper basin dams	1.2
Lower basin dams	1.7
Proposed dams	2.1
Total	5.0

[8] PSWP p. VI-2. (See also "Location Map.")
[9] PSWP p. V-5.
[10] Same as reference 8.

RECREATION WITHOUT GRAND CANYON DAMS

The Bureau of Reclamation also claims a recreation benefit for the two proposed dams,[11] and is circulating a million dodgers and a slick color brochure to prove it.[12] According to its authors, dams would improve Grand Canyon by making all its wonders available for the first time to the millions who wish to see them. This, allegedly, is what Lake Powell has already done for Glen Canyon.

We do not wish here to decry the recreation opportunities that exist at Lake Powell, but we do assert that the brochure tells only part of the story. The lake may indeed be as beautiful as the Bureau says, but the beauty is mainly in the setting, and that was there before. Glen Canyon may, as they claim, be more accessible to some than it used to be, but this is due more to the roads and marinas that have been put in than to the dam itself. There was certainly no difficulty about seeing it before. In fact there was more to see and the cost was much less.[13] We do not deny the lake has created a mecca for water skiers, but it has also destroyed another for those who like to paddle a wilderness river. The brochure shows people camping on barren treeless banks of hard-pan; formerly they had sandy beaches and the shade of cottonwood trees for their campsites. The brochure shows lovely tapestried sandstone formations and shores that have never known a flood. They will not look so pretty next time they are out.

So while we will agree that Lake Powell provides many attractions, it has at the same time destroyed many others—and the same will be no less true at Grand Canyon. Whether the gains would outweigh the losses at Grand Canyon is a matter of opinion, and not all the agencies within the Interior Department share the Bureau's. The Park Service has said that a Bridge Canyon Dam "would inevitably result in loss of park values of national significance * * *." The Bureau of Outdoor Recreation has said flatly: "No additional recreation benefits can be claimed for the proposed Bridge Canyon Dam because of the unusual existing recreation values of the proposed reservoir area and the adverse effects the dam and reservoir would have on these values."[14] Is there indeed any section of river in all the land that is grander, wilder, more charged with adventure and history, more deserving of inclusion in the proposed National Wild River System, than this one? Is there another textbook anywhere in the world whose pages read back over 2 billion years? We would like to see the entire Grand Canyon of the Colorado—from Lees Ferry to Lake Mead—given complete and permanent protection for the geological, ecological, and scenic marvel that it is.

The recreation opportunities envisaged by the Bureau[15] already exist on many other reservoirs in the same general vicinity. Lake Powell alone, with its 1,860 miles of shoreline,[16] will not become overcrowded for a long time—if ever. But the recreation that an unspoiled, unharnessed Grand Canyon can continue to provide is vanishing from the American scene. Nothing but our own self restraint will save it. Let us use this restraint. Let us keep some diversity in our land for those who come after. Let us not try to reduce every last of American recreation to the same standard, packaged, bland, monotonous, prescribed level? Water skiing, motor boating, and lake fishing are fine, but who wants to do them all the time? Sometimes people prefer and even need the adventure of climbing a difficult peak, or of sailing a small boat across open water, or of testing their skill with a paddle on a galloping river—with all the rewards and hazards and penalties these things entail. Let us leave some of these experiences and challenge for the youngsters of tomorrow. Let us leave for them some of the chances that we all have had to feel the exhilaration of doing something great, of surmounting a difficult obstacle—here, in America, not 10,000 miles away in some undeveloped country. The boat trip through Grand Canyon provides

REVENUES WITHOUT GRAND CANYON DAMS

As noted earlier, the three principal benefits the Grand Canyon Dams will provide are pumping energy, peaking power, and revenues. Physically, there

[11] PSWP p. VII–5; also table 21.
[12] "Lake Powell—Jewel of the Colorado." (U.S. Department of the Interior.)
[13] The Wasatch Mountain Club used to sponsor 10-day trips running about $30 per person (not including food). It now costs $25 per day to rent a boat.
[14] See, for example, National Parks magazine, April 1964, p. 6.
[15] PSWP, p. VII–5.
[16] "Lake Powell—Jewel of the Colorado," p. 15.

this kind of excitement. We think it is a form of recreation worth keeping, even though in all likelihood most of us will never take advantage of it.
is not the slightest reason these benefits cannot be realized in other ways. The difficulty seems to be a legal one. As Secretary Udall put it in a Tucson press conference last December: "Water salvage in the west is tied historically to hydropower. Anything else would require a whole new type of reclamation program." He suggested that such a new program, if it succeeded in Congress at all, would be disastrously costly in time.[17]

In other words, the Bureau must go into business on the side and sell power to pay for irrigation works, but is limited in the power it can sell to that which can be generated by moving water. Thus, whenever it plans a new broad irrigation program, such as the upper basin or the central Arizona projects, it must include some power dams to serve as cash registers.

But the law has not always read this way; it has evolved. The Federal reclamation service was established in 1902, but power did not become one of its major concerns until the Boulder Canyon Act of 1928, and power revenues were not directly linked to the reclamation fund until the Haydon-O'Mahoney amendment of 1939.[18] The present policy, then, is less than 30 years old.

Should it now be further revised to obviate the need for dams in Grand Canyon? We feel it should. We feel the law should be changed rather than Grand Canyon.

The change, it seems to us, need not be a sweeping one; it might apply only to those situations in which dedicated areas would otherwise be adversely affected. For instance, we would have no objection to seeing the central Arizona project financed by direct taxation. In that case the people would be subsidizing irrigation with their dollars rather than their parklands.

Nor would the burden be excessive. The average cash income from the Bridge Canyon and Marble Gorge units would only be about $27 million per year for the first 78 years.[19] Arizona residents could raise this themselves by paying an annual $15 tax.[20] Or the people of the entire Southwest (the direct beneficiaries of the plan) could do it by a $4 tax.[21] Considering the real value of water in this area, such a tax would not seem to us to be excessive. However, since Grand Canyon has national significance, its preservation should probably be paid for by everybody. In that case it would amount to little more than a dime a head.[22]

There are also other ways to raise this money. Stephen Raushenbush has suggested one—a different division of water between farm and city users.[23] The idea is that city dwellers consume only a fraction of a percent as much water as irrigation farmers, and therefore, they can pay higher prices for it.

Alexander Hildebrand suggested another way[24]—authorize the Bureau to generate power by steam. This would surely bring a storm of protest from certain quarters, so I personally would favor direct taxation.

A third way would be to take the $800 million capital cost of the two dams and simply invest it in Government bonds. The return on the investment at 4-percent interest would be $32 million a year. Part of this could go into the development fund and part into the U.S. Treasury.

POWER WITHOUT GRAND CANYON DAMS

If the legal and financial difficulties can be resolved, the physical problems will not be insurmountable. The power that the Grand Canyon Dams would generate, and sell for 5.3 mills for kilowatt-hour, can certainly be generated economically in other ways. The downward trend in the cost of steam generation is well known. Ten years ago steamplants were selling power for over 7 mills[25] per

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[17] As reported in Arizona Daily Star, Dec. 14, 1964, in article: "Secretary Udall Says Dispute Over Dam May Hurt CAP."
[18] Reclamation in the United States, A. G. Golze (Caxton Printers, Ltd.), pp. 102–107; 292, 293.
[19] PSWP, table No. 24, p. VII–12.
[20] 1.7 million people times $15 is $25,500,000.
[21] Assumes 6,500,000 people.
[22] Assumes 200,000,000 people.
[23] National Parks magazine, April 1964, pp. 5–8.
[24] Time and the River Flowing (Sierra Club),: Appendix.
[25] Figure consistently used during congressional hearings on Upper Colorado Basin storage project.

kilowatt-hour. Now a modern plant at Shiprock is selling it for less than 6.[26] Senator Anderson recently spoke of 4-mill power that will shortly be coming to the Four Corner area.[27] The national power survey predicts a 27-percent reduction in the average retail cost of electricity in the next 15 years.[28] The Office of Science and Technology forecasts that by 1975 large seaboard nuclear plants will be capable of producing electricity for 2–3 mills and fresh water in considerable quantities besides (800,000 acre-feet per years per plant).[29] In the meantime nuclear and coal fired thermal plants are already under construction in the east which within 3 years are expected to deliver power at 3.6 mills per kilowatt-hour.[30]

If the above trend in steam and nuclear power generation holds even reasonably true, then long before the Grand Canyon Dams can be built and paid for, their 5.3 mill power will be the most costly in the Southwest. And if the Bureau cannot sell its power at a profit it can neither pay for the dams nor the irrigation works. The Nation will have to try to forget about Grand Canyon and pick up the bill for a regrettable mistake.

PEAKING POWER WITHOUT GRAND CANYON DAMS

The Bureau acknowledges these trends, of course, but argues that its dams will still be needed for peaking purposes.[31] It is certainly true that hydroplants can follow load changes faster and more efficiently than conventional steamplants, and this makes them well suited for meeting peaks.

But even so is this extra efficiency worth the impairment of Grand Canyon? The Southwest could meet its peaks with older less efficient generators. Washington, D.C., does.[32] So does Pittsburgh.[33] So, in part, does Chicago.[34]

Or, it could, and no doubt will import peaking power from the hydroplants in the northwest in exchange for southwest offpeak thermal energy to firm up northwest hydro capacity.[35] This is one benefit to be expected from the Northwest-Southwest intertie. Many cities, such as New York [36] and Chicago [34] are already meeting some of their peaks by power interchanges with neighboring utilities.

Or the Southwest could use the existing Parker, Davis, Hoover, and Glen Canyon Dams strictly for peaking, while relying on steam generation for base load. Boston does this sort of thing.[37] Its large hydroplants which once supplied base power are now relegated to peaking service.

The Southwest could also invest in other kinds of peaking plants, such as pumpback storage. That is what St. Louis does at its Taum Sauk plant.[38] The fact that only one such development exists in the Colorado Basin [39] suggests that the problem of obtaining relatively inexpensive peaking power is not particularly acute there. At least three other underdeveloped sites are known to exist in the area—one quite close to Phoenix.[40] Admittedly, these plants would not have as much capacity as the Grand Canyon Dam, but they could be supplemented by new machines designed specifically for peaking, such as, for example, gas turbines and special steam units.[41]

Then, too, the time may come when nuclear plants can be used for this purpose. According to Mr. Giambusso (Assistant Director for Civilian Power of the AEC): "From a technical point of view, nuclear reactors would be quite satisfactory to meet peaking demands. A great deal of operative experience has demonstrated that nuclear plants of the type in commercial use today have excel-

[26] Editorial, Denver Post, Sept. 9, 1964.
[27] Sierra Club Bulletin, December 1964, pp. 37–42.
[28] "National Power Survey" (FPC, 1964), pt. I, p. 288.
[29] "Large Nuclear-Powered Sea Water Distillation Plants," OST, March 1964. Opening letter by Roger Revelle.
[30] Editorial in Science, Nov. 6, 1964.
[31] PSWP p. V–5.
[32] Letter from J. S. Greco (Public Service Commission) to R. C. Bradley, Apr. 19, 1965.
[33] Letter from W. G. Deupler (Duquesne Light Co.) to R. C. Bradley, Apr. 27, 1965.
[34] Letter from L. F. Lischer (Commonwealth Edison) to R. C. Bradley, Apr. 30, 1965.
[35] "National Power Survey," vol. I (FPC, 1964), p. 263.
[36] Letter from W. O. Farley (Con Edison), Apr. 28, 1965.
[37] Letter from Stanley W. Ellis (Department of Public Utilities) to R. C. Bradley, Apr. 22, 1965.
[38] "National Power Survey," vol. I (FPC, 1964), p. 122.
[39] Ibid.; fig. 72, p. 126.
[40] Letter from N. B. Bennett, Jr. (Assistant Commissioner, Bureau of Recreation) to R. C. Bradley, Mar. 29, 1965.
[41] "National Power Survey," vol. I (FPC, 1964), ch. 7.

lent load-following characteristics—they can respond quickly and smoothly to pronounced fluctuations in load." They are not yet economically attractive, he said, because of their high capital cost (a disadvantage shared by the Grand Canyon dams) and because of the cost of nuclear fuel.[42] Considering the rapid advances being made in nuclear technology in general, we might reasonably expect these particular economic disadvantages to become less important with time.

In any case it is perfectly clear that from a physical point of view, the Southwest can take care of its power needs and meet its peaks without any dams in Grand Canyon.

SUMMARY OF SUGGESTIONS

We respectfully suggest that the following modifications be made in the Pacific Southwest water plan and the lower basin project:

(1) Delete Bridge Canyon and Marble Gorge Dams.

(2) Let the water salvage program be paid for either by direct taxation or by any other plan that seems fair.

(3) Let the pumping energy for the Lake Havesu water lift come from a steamplant.

(4) Let the Southwest meet its peaks by any or all of the various alternative methods that exist.

Thank you very much for this opportunity to appear.

U.S. DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
Washington, D.C., September 9, 1965.

HON. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs,
House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: In commenting, at your request, on the statement of Dr. Richard C. Bradley, which was introduced for the record on August 31, 1965, at the hearings before your committee on H.R. 4671 and companion bills, we would like to comment, first, on matters of fact and conclusions drawn therefrom and, second, on matters of policy.

On page 6 under "Power without Grand Canyon dams," power costs are compared rather indiscriminately as there is no clarifying indication as to whether the power costs are at site of generation or at load. It appears that for most cases cited, the thermal and nuclear costs are at site, neglecting transmission costs. As with hydroelectric generation sources, mine-mouth, fossil-fired thermal plants are located remote from load because of fuel and water requirements and there is substantial transmission cost that must be added to at-site generation costs. The costs of the Marble Canyon and Bridge Canyon power facilities were developed with transmission costs included as a component along with other costs allocated to power. Depending on the location of the powerplants with respect to loads, the costs of transmission can range upward in excess of 1 mill per kilowatt-hour.

Also, it is not possible to compare one powerplant with another, even if of the same type, unless they operate to meet the same load characteristics. The comparison is only valid if the plants are of the same capacity and operate the same number of hours per year; i.e., operate at comparable plant factors. The Bridge Canyon and Marble Canyon facilities would operate at annual plant factors of about 35 to 37 percent, corresponding to about 3,200 hours per year, while thermal or nuclear plants referred to by Dr. Bradley geneally operate almost continuously, or at 80- to 90-percent plant factors, to be economical and produce at-site power at the costs given. Both types of operation are essential in any power system, but they are not the same thing and the costs are not directly comparable.

The anticipated downward trend in the cost of power from nuclear plants is eagerly awaited by all segments of the electric utility industry and when dependable low-cost power from these sources does become a reality, nuclear plants may supply as much as 19 percent of the total national power requirement by 1980. However, the same national power survey referred to by Dr. Bradley indicates that between now and 1980 as much new hydroelectric capacity

[42] Letter by A. Giambusso (Assistant Director for Civilian Power, Division of Reactor Development and Technology, AEC) to C. E. Graves, Apr. 26, 1965.

will be installed in the country as has heretofore been developed. To accomplish anywhere near this objective would require that every favorable hydroelectric site be given full consideration.

The argument that the Southwest could meet all of its peaking requirement from old, less efficient steam-electric generators, by importing peaking power from the Northwest over the intertie, by constructing pumped-storage facilities, or by exchange with neighboring utilities is only partially correct. Even by doing all of these things, there would still be a 5- to 7-million kilowatt deficit in meeting peak load requirements by 1980 in the Colorado River Basin, including southern California. This assumes that 8 million kilowatts of new thermal capacity in the basin will be developed as now contemplated by the utilities in the area.

As to the use of existing Colorado River hydroelectric powerplants for peaking purposes, we should like to point out that to a large extent Hoover is already being operated in that manner. In time it is expected that some of the other plants could be operated at lower plant factors, but the extent of this shift will be limited by the need to maintain the present balanced regimen of the river insofar as possible.

As to the use of nuclear powerplant substitutes for the Bridge Canyon and Marble Canyon facilities, the Atomic Energy Commission found through comparative studies that 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 resulting costs are comparable.

The foregoing demonstrates that while nuclear plants may have the ability to follow rapid load changes, it is only possible because the boilers are kept hot at all times using nuclear fuel, regardless of the load demands on the generators. This can be done with conventional fossil-fired thermal plants too, but in both cases it costs money to keep hot boilers on the line during the periods of low-load demands. Hence the higher costs as noted.

In respect to policy, Dr. Bradley recognizes that Lake Powell provides many recreation attractions and that the same would be true for the potential Bridge Canyon and Marble Canyon projects. He points out that such structures also destroy many other recreation attractions. He states that whether the gains would outweigh the losses at Grand Canyon is a matter of opinion. This obviously is true.

Proceeding from his own conclusion that it is in the national interest to preserve the Grand Canyon in its natural state, he suggests four alternatives to the Bridge Canyon and Marble Canyon projects as possible means of securing financial assistance to support water supply programs.

The first suggestion is to support the programs by direct taxation. This, in effect, would be to make project costs not recaptured by project revenues nonreimbursable. While this could be done if the Congress so desired, it would represent a drastic change in reclamation law and policy as laid down by the Congress over many years. We believe this should be considered only as a last step and only in the event that other, more conventional methods of providing financial assistance might prove inadequate.

The second suggestion is that more of the central Arizona unit water be sold for municipal and industrial purposes, thus obtaining more revenue than if the water were used for irrigation purposes. Our studies do give priority to use of water for municipal and industrial purposes and, in effect, provide for irrigation uses only with residual water supplies. Should actual experience indicate that a greater percentage of central Arizona unit water could be used for municipal and industrial purposes, greater revenues would accrue. However, associated costs would also be greater, for costs allocated to municipal and industrial water supply must be returned with interest and for the planning of this project, the cost associated with pumping municipal and industrial water is much higher than for pumping irrigation water. Net revenues, therefore, would not be significant nor would there be a significantly greater contribution of excess revenues to the development fund.

The third suggestion is that the Bureau of Reclamation be authorized to construct and operate steam-electric plants. While this undoubtedly could furnish a financial solution, it would involve a major, controversial innovation of reclamation policy. This suggestion is a matter for the Congress to consider.

The fourth suggestion is that the $800 million capital cost of the Bridge Canyon and Marble Canyon projects be invested in Government bonds and the interest thereon go, in part, into the development fund. We cannot differentiate this suggestion, in essence, from the first suggestion that financial support be obtained through general taxation.

In summary, only the first and third suggestion appear workable, if, in fact, they could be implemented. Both would require wide departure from past reclamation law and policy. The Congress should decide their merits.

Sincerely yours,

N. B. BENNETT, Jr.,
Acting Commissioner.

U.S. HOUSE OF REPRESENTATIVES,
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C., September 21, 1965.

Mr. N. B. BENNETT, Jr.,
Acting Commissioner, Bureau of Reclamation,
Department of the Interior, Washington, D.C.

DEAR MR. BENNETT: Reference is made to your letter of September 9, commenting at my request on the statement of Dr. Richard C. Bradley, which was placed in the record of hearings on H.R. 4671 and companion bills.

In next to the last paragraph on page 3 of that letter, you indicate that the construction and operation of steam-electric plans by the Bureau of Reclamation, though involving a major controversial innovation of reclamation policy, could furnish a financial solution to development in the Lower Colorado River Basin. The inference in this paragraph is that construction of steam-electric plants would provide the same financial assistance to lower basin development as construction of hydroelectric plants. Congressman Udall has placed in the record of hearings a memorandum which indicates this is not the case and that steam-electric plants of equivalent size to the proposed hydroplants would produce less than half the revenue that would be available from the hydroplants to assist development.

I will appreciate having your comments in order to clarify the record in this matter.

Sincerely yours,

WAYNE N. ASPINALL, *Chairman.*

U.S. DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
Washington, D.C., September 24, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs,
House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: Your letter of September 21 asks that we supplement our letter of September 9 in regard to the possible construction of steam-electric plants in lieu of Bridge and Marble Canyon Dams. The suggestion made by Dr. Bradley which is commented upon in our September 9 letter was simply to the effect that the Bureau of Reclamation be authorized to construct and operate steam-electric plants. The suggestion was made without regard to sizes of steamplants. Our response to this suggestion, on page 3 of our letter, "* * * while this undoubtedly could furnish a financial solution * * *," was also without specific reference to size or number of plants. Both Dr. Bradley's suggestion and our response must, of course, be taken in the context that any such substitute would accomplish the same overall financial purpose as would Bridge and Marble. This would necessarily be so in regard to maintenance of the required development fund which is the key to water development of the lower Colorado River.

Publicly financed steamplants located at the mine mouth and designed to provide the same load characteristics as would Bridge Canyon and Marble Canyon, i.e., to operate at annual plant factors of about 35 to 38 percent, would produce such power at an average annual cost of about 6.8 mills per kilowatt-hour. This compares with the average annual cost of Bridge and Marble of about 6.0 mills per kilowatt-hour. More important in the present case, however, is the relationship to the development fund. Our studies indicate that Bridge and Marble,

after payout of the power costs, would contribute $31.3 million per year to the development fund. In order to contribute this same annual amount of dollars to the development fund at the same point in time, namely year 2030, and selling the peaking capacity at an average return of 6.8 mills per kilowatt-hour, would require peaking thermal capacity installations about 1½ times as large as the hydrocapacity. This is so because the continuing fuel costs and the more rapid wearing out of the components of the thermal plant result in higher average operation, maintenance, and replacement costs. The energy production of the thermal units could be held constant as compared to the diminishing energy production of Bridge and Marble as upstream depletions take place. Despite this fact and the fact that the gross revenue of the thermal plants would be higher, the proportionately greater annual cost of the thermal plant reduces the ability to place net revenues into the development fund. This also confirms Mr. Udall's position that steamplants equivalent in size to the proposed hydroplants would produce less revenue in the development fund.

We hope that this added information will be helpful to the committee in understanding this overall aspect.

Sincerely yours,

N. B. BENNETT, Jr., *Acting Commissioner.*

Mr. ROGERS. Mr. Nash, you may proceed to summarize your statement.

Mr. NASH. Thank you, Mr. Chairman.

My name is Hugh Nash. For the past year I have been a resident of Sausalito, Calif., and editor of the Sierra Club bulletin. For nearly 20 years before that I lived and worked in New York. It is as a recently transplanted New Yorker that I feel most keenly the need to beat off such threats to our national park system as the proposed dams in Grand Canyon. Westerners may cherish their great parks, but judging by my own experience, it is the city dweller in the congested East that needs them most. I have visited the Grand Canyon 8 or 10 times. Twice, without premeditation or preparation, I walked from the rim to the river and back. Some day, the Bureau of Reclamation permitting, I hope to traverse the canyon by boat. It is this kind of experience that makes it possible for some of us to maintain reasonable equilibrium in urbanized 20th-century America.

I helped prepare the paper that David Brower has presented to the committee and wish to associate myself with everything said in it. There are a few points I should like to emphasize.

I would not regard this as a summary, actually, but just a few of the points that I am particularly anxious to have an opportunity to emphasize here.

First, an absolute prohibition against dams in Grand Canyon would not preclude the importation of water into central Arizona as contemplated by the proposed legislation, and the Sierra Club's opposition to Bridge Canyon and Marble Gorge Dams does not imply any hostility toward the water-importation features of the central Arizona project.

Second, the bill before the committee declares itself to be consistent with the act of 1919 establishing Grand Canyon National Park, but in fact, is not consistent with it. The present bill would, in effect, repeal provisions of the act of 1919 requiring that reclamation projects affecting the park be necessary and that they be consistent with the primary purposes of the park. If Congress wishes to repeal the protection accorded by existing law, I believe it should acknowledge to itself and to the country that this is what it intends to do.

Third, Marble Gorge Dam would conflict as seriously as Bridge Canyon Dam with the primary purposes of Grand Canyon National

Park. Many of the canyon's scenic gems can only be visited by boat, and Marble Gorge Dam would make boat trips through the park virtually impossible. Assuming that means could and would be provided to get boats down to the river below Marble Gorge Dam, there would be no assurance of enough water to float them. The Bureau of Reclamation says that it "anticipates" a flow of at least 1,000 cubic feet per second through Marble. This is not enough; without firm assurance of at least 10 times that much flow, given well in advance, boat trips could not be scheduled. Marble Gorge Dam would render many of the best parts of Grand Canyon National Park as inaccessible as though they were under water, or on the moon. Such spots might be "unimpaired" in a physical sense, but in violation of existing law and policy, they would no longer remain "unimpaired for the enjoyment of future generations."

That quote is from the National Park Act.

Mr. Chairman, the September issue of the Sierra Club bulletin will contain an editorial on the harm Marble Gorge Dam would do. I hoped to have copies available for the committee today, but they have not arrived. With your permission, I should like to have the editorial of less than 1,000 words included in the record of these hearings as if read.

Mr. ROGERS. You cannot include them.

Is it your work?

Mr. NASH. Yes, sir.

Mr. ROGERS. If you want to make that a part of your statement, you may include it as part of your statement as a witness before this subcommittee, but you cannot include it otherwise.

Mr. NASH. Thank you, Mr. Chairman.

Mr. ROGERS. Without objection, it will be included as part of your statement.

(The document referred to will be included as part of Mr. Nash's statement, which appears on p. 800.)

Mr. NASH. The Sierra Club's prepared statement cites many indications that by the time Bridge and Marble powerplants could become operative, alternate sources will be selling power at lower cost. The statement fails, however, to stress the much lower initial cost of alternate power sources. Marble Gorge Dam would cost $398 per kilowatt of installed capacity, and the cost of Bridge and Marble combined would be $357 per kilowatt. These figures compare with $123 per kilowatt for a coal-fired steamplant of 3 million kilowatts capacity that the Southern California Edison Co. plans to complete by 1969. This plant, by the way, is right across the lake from the intake of the proposed Arizona aqueduct. In September 1964, the General Electric Co. announced a price list for 22 sizes of atomic powerplants complete with nuclear fuel. The price per kilowatt of installed capacity ranged from $300—well under the dams' cost—down to $100 per kilowatt for a plant of 1 million kilowatts capacity.

One of the implications of these cost comparisons, it seems to me, is that Bridge and Marble powerplants would not be as suitable for the generation of peaking power as the Bureau of Reclamation would have us believe. High capital costs can be recovered by operating as near capacity as possible as much of the time as possible, but peaking power cannot be produced in this manner. Despite their somewhat

lower efficiency, plants that cost enough less will be more economical. Engineering efficiency can be bought at too high a price.

I would like to add one comment that is not in my statement as circulated. That has to do with the question of whether the dams are necessary or not. I find it hard to reconcile the statement made about the absolute necessity of Bridge Canyon Dam as part of this project—I could provide quite a few statements of this kind that are on the record—with the fact that as soon as the Bureau of the Budget recommended that this dam be deferred, all of a sudden it appears that proponents of the plan do not consider Bridge Canyon Dam to have been necessary at all. I find this very difficult to understand in view of the fact that Bridge Canyon Dam and Marble Gorge Dam together would have generated 2,100,000 kilowatts—500 of this would have been needed to pump water from Lake Havasu to central Arizona and 1,600,000 of those kilowatts were to have been for sale to help finance the total project.

Now, if the project were to proceed without Bridge Canyon Dam, presumably Marble Gorge Dam could furnish the 500,000 kilowatts of pumping power needed. But there would only be 100,000 kilowatts surplus for sale, which is one-sixteenth the amount that the two dams combined were to have had available for sale. If the project is still financially feasible, why were we ever told that Bridge Canyon Dam was a necessity?

Moreover, at one time, there was an alternate considered for the high Bridge Canyon Dam which would have been enough lower so that it would not have backed water up into the national park. The Interior Department recommended against this alternative and chose the higher dam on this basis, to quote Secretary Udall:

We have weighed the considerations which bear on the question of whether a high or a low dam should be built at Bridge Canyon and have concluded that the high dam should be selected. The factors we have considered are the following:

1. Our studies show that on a 50-year project repayment basis, the financial feasibility of the proposed regional plan would be marginal without the added revenues provided by the high dam at Bridge Canyon.

Secretary Udall went on to say that the lower dam would generate only 80 percent as much power revenue as the higher dam. So what this appears to say, to me, is that the project was of marginal feasibility if they had only 80 percent as much revenue as would be gained from a high dam at Bridge Canyon.

But after Bridge Canyon was recommended against by the Bureau of the Budget, the plan was still said to be feasible without Bridge Canyon at all.

The Sierra Club believes that Marble Canyon is not needed any more than Bridge Canyon was, that other sources of power and other sources of money are available.

Thank you, Mr. Chairman.

(Mr. Nash's prepared statement follows:)

DAMS IN GRAND CANYON—A NECESSARY EVIL?

One of the world's greatest natural wonders is threatened by proposals now before Congress to build Bridge Canyon and Marble Gorge Dams within Grand Canyon. (The Bureau of the Budget has recommended that Bridge Canyon Dam be deferred for later consideration, but since there are indications that an attempt may be made to override this recommendation, both dams will be

considered here.) It is the opinion of the Sierra Club, supported by documentation in this paper, that either or both of the proposed dams would—

Destroy natural conditions within Grand Canyon;

Damage Grand Canyon National Park and National Monument, creating a dangerous precedent threatening the National Park System itself;

Violate existing laws that established Grand Canyon National Park and the National Park Service;

Aggravate a situation that has embittered relations between the States of the upper and lower basins of the Colorado River, and relations between the United States and Mexico;

Waste water in a water-deficient region, and impair the quality of water remaining for downstream users;

Burden taxpayers with an uneconomical solution to a problem when better alternative solutions are available.

A longstanding tradition that national parks shall not be impaired, and a new concern for natural beauty expressed by the administration and echoed throughout the country, would seem to doom such destructive proposals. And so they would unless the dams were purported to be an absolute necessity. That is exactly how they have been represented—as a necessity that all good citizens should reconcile themselves to, however reluctantly. But the dams are not necessary. They are not needed for flood control, not needed to store water or divert it for irrigation. The dams' sole function would be to generate electricity, part of which would be used to pump water (from Lake Havasu, an already existing reservoir) into central Arizona. The rest of the electricity would be sold to help finance aqueducts and other waterworks functionally necessary to the central Arizona propect. Granted that bringing Colorado River water to central Arizona is a worthy aim, the fact remains that Bridge Canyon and Marble Gorge Dams are not necessary elements of such a project. Better sources of power, and for money, are available.

The richest country the world has ever known could surely afford to pay a premium, if necessary, to keep Grand Canyon intact. But there is no need to pay a premium. On the contrary. Building dams in Grand Canyon would be the expensive way to bring water to central Arizona. The following pages document the conclusion that, on economical as well as other grounds, the national interest requires the preservation of Grand Canyon.

ARE RESERVOIRS IN GRAND CANYON NATIONAL PARK PERMITTED BY EXISTING LAW?

Proponents of the dams—notably the Bureau of Reclamation, which would build them—argue that dams affecting Grand Canyon National Park and National Monument were foreseen and provided for when they were established. Their arguments generally leave a good deal unsaid. For example, take this statement by a Regional Director of the Bureau of Reclamation: "When the Congress created Grand Canyon National Park in 1919 * * * it recognized that there should be a balance between water development and park preservation values and accordingly gave the Secretary of the Interior the authority to permit the construction of reclamation projects within the park's boundaries."[1] This is a considerable oversimplification, as we shall presently see.

Commissioner of Reclamation Floyd Dominy declares that to "fence out" dams from Grand Canyon "* * * would be breaking faith with the pledges made when Grand Canyon National Park was authorized in 1919 and Grand Canyon National Monument was proclaimed in 1932. In both cases, there is a definite reservation in specific language for further anticipated reclamation development which the 'status quo' group is seeking to ignore."[2]

Robert W. Jasperson, executive secretary and general counsel of the Conservation Law Society of America, states that President Hoover's proclamation establishing Grand Canyon National Monument "makes no provision express or implied for any authority in the Bureau of Reclamation to utilize any area within the monument for reservoirs for reclamation or power purposes."[3]

So far as the monument is concerned, advocates of the dams must rest their case on a letter from a former Director of the National Park Service, who wrote:

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[1] "A Look at the Pacific Southwest and Its Water Problems," remarks by A. B. West, Regional Director, Bureau of Reclamation's region 3, before the Western Conference of Operating Engineers, Jan. 15, 1965.

[2] Speech by Commissioner of Reclamation Floyd E. Dominy before the Southern California Water Conference, Dec. 14, 1964.

[3] "Grand Canyon and the Law," by Robert W. Jasperson, in an appendix to "Time and the River Flowing: Grand Canyon," by Francois Leydet.

"As I see it, the Bridge Canyon project is in no way affected by the Grand Canyon National Monument proclamation. * * * 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." [4]

That National Park Service personnel had the Bridge Canyon project in mind when formulating plans for Grand Canyon National Monument makes it all the more significant that the proclamation as issued by President Hoover contained no provision for reclamation projects affecting the monument.

Is there "a definite reservation in specific language" in the Grand Canyon National Park Act of 1919? The act nowhere refers to any specific dam or reservoir site, but does provide as follows: "That, *whenever consistent with the primary purposes of said park*, the Secretary of the Interior is authorized to permit the utilization of areas therein which may be *necessary* for the development and maintenance of a Government reclamation project." [Emphasis added.] The primary purpose of the park is defined in the act of 1916 establishing the National Park Service: "to conserve the scenery and the natural and historic objects ad the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." As will be shown later, either or both dams would impair the scenery, the natural and historic objects, and the wildlife within Grand Canyon National Park; the dams are therefore inconsistent with the primary purpose of the park, and are not permissible under existing laws.

The qualifying phrase, "whenever consistent with the primary purposes of said park," was not casually or thoughtlessly adopted; it was inserted on the recommendation of Franklin K. Lane, Secretary of the Interior, to limit his own and his successors' authority to develop reclamation projects affecting the park. Similar restrictions were not applied in the case of Rocky Mountain and Grand Teton National Parks, for example, demonstrating that Congress was particularly anxious to protect Grand Canyon National Park against reclamation projects that would be detrimental to its primary purposes.

Would dams really be reclamation projects?

Are Bridge Canyon and Marble Gorge power dams reclamation projects within the meaning of the Grand Canyon National Park Act? The purpose of reclamation is to conserve water and make it available for irrigation. The dams would waste water, not conserve it, and apart from the provision of pumping power which is readily obtainable from other sources, they would have no engineering relationship to the irrigation project of which they are allegedly a part. To insist that the dams are reclamation projects at all stretches the facts; to insist that they are necessary reclamation projects is to stretch facts beyond the breaking point.

Bridge Canyon and Marble Gorge Dams do not meet the test of legitimacy under existing laws requiring that they be necessary reclamation projects consistent with the primary purposes of Grand Canyon National Park. The law can be changed, of course, if Congress wills it. But let us have an end to pretense that the dams are sanctioned by laws that are already on the books.

WHAT HARM WOULD IT DO TO BUILD DAMS IN GRAND CANYON?

Understandably on the defensive concerning the impact of dams on Grand Canyon National Park and National Monument, the Bureau of Reclamation stresses the fact that Bridge Canyon Dam would be downstream from the monument and Marble Gorge Dam would be upstream from the park. Bridge Canyon Dam, however, would back water all the way through the monument and 13 miles into the park. This would convert the living river, chief architect and artery of the canyon, into a dead reservoir. It would halt the processes that created the canyon, and turn a living laboratory of stream erosion into a static museum piece. It would flood the habitat of wildlife that through the ages has depended on the living river for its own life. It would make invaluable archeological and geological records inaccessible. It would inundate campsites on beaches and sandbars, and the sheer walls of the new shoreline would offer no substitute. Fluctuations in reservoir level would stain the walls between high and low water. Dam builders' access roads would disfigure the scene, as would transmission lines. And dams in Grand Canyon would extinguish for all time one of the great experiences available to modern man: the boat trip on the living river through

[4] Letter from Horace Albright, then Director of the National Park Service, to Elwood Mead, then Commissioner of Reclamation, dated Jan. 11, 1933.

the whole length of the canyon from Lee's Ferry to Grand Wash Cliffs at the head of Lake Mead.

Marble Gorge Dam is as bad as Bridge Canyon Dam

What about Marble Gorge Dam? The Bureau of Reclamation asserts that "Construction of the Marble Canyon Dam and Reservoir would have no effect on the national park since the dam and reservoir would be upstream from the park boundary." [5]

There is a superficial plausibility to the Bureau's contention. But the flow of water through the park and monument would be metered through valves. Debris floated down tributary canyons and stranded is now flushed out by periodic high-water stages, and regulation of flow could destroy this natural flushing action. "It is anticipated," says the Bureau, "that a minimum flow of at least 1,000 cubic feet per second will be maintained below Marble Canyon Dam through the Grand Canyon." [6] It was "anticipated," too, that the Bureau would protect Rainbow Bridge National Monument from the waters of Lake Powell, rising behind Glen Canyon Dam, as provided by law. But the legally prescribed protection was never provided. In any case, 1,000 cubic feet per second is a pitiful trickle incapable of floating boats down what the Bureau calls "this 104-mile undisturbed stretch of river" between the foot of Marble Gorge Dam and the head of Bridge Canyon Reservoir.

Although it may appear comparatively innocuous, Marble Gorge Dam is as great a potential threat as Bridge Canyon Dam. It would be a long step toward realization of a cherished dream of the Bureau: the Kanab diversion. This is a plan to divert 90 percent of the Colorado's flow from Marble Gorge through a 45-mile tunnel to a hydroelectric plant at Kanab Creek—which, uncoincidentally, is at the head of Bridge Canyon Reservoir. This would reduce to the vanishing point the Colorado's flow through the national park.

In a rather pathetic attempt to offset damage that the dams would inflict, the Bureau claims tremendous recreation values for the proposed reservoirs. The most extreme statement of its case was made by Regional Director A. B. West: "We think the recreational, fish and wildlife values accruing from these developments—aside from their other multipurpose water benefits—are ample justification for their construction." [7]

This extraordinary contention can be most conveniently disposed of by quoting a report of the Bureau of Outdoor Recreation, which, like Reclamation, is an agency of the Interior Department:

"No additional recreation benefits can be claimed for the proposed Bridge Canyon Dam because of the unusual existing recreation values of the proposed reservoir area and the adverse effects the dam and reservoir would have on these values.

"Water-oriented recreation cannot be considered one of the primary purposes for constructing the Bridge Canyon and Marble Canyon Dams because less costly alternatives for expanding recreation facilities in this area are available.

"The types of water-oriented recreation which could be supplied by the reservoirs are available at Lake Mead and Glen Canyon National Recreation Areas. These recreation areas serve the same population centers, and facilities could be added as recreation demand expands." [8]

Flaming Gorge, Navajo, Glen Canyon, Hoover, Davis, Parker and Imperial Dams already furnish 600 miles of reservoir recreation in the Colorado Basin. This is far more than the mileage of recreational swift-running water, and more than enough.

The Bureau of Reclamation is fond of alluding to the dangers of river running and contrasting it with the supposed safety of boating on "placid blue water." But sudden squalls whip up dangerous waves on Lake Powell, behind Glen Canyon Dam, and in most places its sheer walls offer no haven for boats or avenue of escape for boatmen. Reservoirs behind Bridge Canyon and Marble Gorge Dams would expose boatmen to the same hazard in equal or greater degree.

Dam proponents complain that preserving the river for the river-running experience would deny access to millions who could enjoy a reservoir excursion.

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[5] Résumé—Lower Colorado River Basin Project With Particular Reference to the Bridge Canyon and Marble Canyon Units"; an undated release by the Bureau of Reclamation.

[6] "Bridge and Marble Canyon Dams and Their Relationship to Grand Canyon National Park and Monument"; a brochure published by the Bureau of Reclamation, dated 1964.

[7] See note 1.

[8] Report of the Bureau of Outdoor Recreation appended to the Pacific Southwest water plan as modified in January 1964.

It is useless to deny that there is some force in this argument. But it leads logically to the conclusion that any experience, however unique and valuable, should be sacrificed if it stands in the way of another experience that is capable of being more widely enjoyed. Do we really believe this? Is it really worth making a place easier to reach if, in the process, we make getting there less worthwhile? What would happen to a Nation's spirit if this least common denominator, TV-ratings philosophy prevailed; if the boldest found their opportunities for adventure circumscribed by the timidity, laziness, or indifference of the majority; if the only experiences open to anyone were experiences that the majority was capable of appreciating and had learned to appreciate? Quantity is not the only measure of value; quality counts for something too.

Sensitivity to encroachments upon Grand Canyon National Park and National Monument, by defenders and detractors of the dam proposals alike, has tended to obscure the fact that the park and monument contain less than half of Grand Canyon proper (see map). Neither damsite is within the boundaries of the park or monument, but both dams and both reservoirs would be wholly contained within Grand Canyon. Parts of the canyon not within the park and monument are in no way inferior to other parts that are included. The Sierra Club has long advocated national park or equivalent protected status for the entire Grand Canyon from Lee's Ferry to Grand Wash Cliffs.

Whether or not the dams and reservoirs would impair Grand Canyon National Park and Monument is the key legal question. But in broader perspective, the key question is whether the dams would impair the integrity of Grand Canyon as a physical entity and as a priceless national resource. Marble Gorge Dam is at least as offensive as Bridge Canyon Dam in this respect, if not more so, and the Sierra Club is an unalterably opposed to one as it is to the other.

RECLAMATION CANNOT PARCEL OUT WATER THAT DOES NOT EXIST

The Colorado River has about one thirty-third the volume of flow of the Mississippi and one-twelfth that of the Columbia.[9] "There is little doubt," says Representative Craig Hosmer, of California, a supporter of the dams, "that the troubles on the Colorado River stem from the fact the river simply does not contain enough water to satisfy all the uses to which it can be put."[10] Says the Los Angeles Times, "There just isn't enough water in the Colorado River."[11]

The Colorado's limited water is overcommitted

Inadequate as it is, the Colorado's limited supply of water is grossly overcommitted by interestate compact and international treaty. The Colorado River compact allocates 7.5 million acre-feet of water annually to the States of the upper basin (Colorado, New Mexico, Utah, Wyoming), and another 7.5 million acre-feet to the lower basin States (Arizona, California, Nevada). A 1945 treaty guarantees Mexico 1.5 million acre-feet of usable water annually from the Colorado. So commitments total 16.5 million acre-feet per year. These commitments were based on streamflow measurements made during a cycle of abnormally wet years, 1906–20. ("The last previous wet cycle was in the period 1826–40," says James E. Cook of the Arizona Republic. "To find another such cycle, you have to go back into the early 1600's")[12] An annual flow of 16 million acre-feet past Lee's Ferry was assumed on the basis of these measurements, but the average streamflow was only 12.8 million acre-feet from 1914 to 1962. (Note that almost half of the last abnormally wet cycle was included in this period.) The U.S. Geological Survey says that the flow has exceeded 16 million acre-feet only 13 times in the 49-year period—1 year out of 4—and has dropped as low as 4.4 million acre-feet.[13] Interior Secretary Stewart Udall reports that "of today's present total water supply of about 13.2 million acre-feet per year in the Pacific Southwest, the Colorado River furnishes almost 10 million acre-feet."[14]

Trouble between the upper and lower basins

To promise delivery of water that simply isn't there to be delivered is obviously a recipe for trouble. The central Arizona project was blocked for 15 years

[9] "The Colorado Waters Dispute," by Norris Hundley, Jr., in Foreign Affairs, April 1964.
[10] "Castro on the Colorado," extension of remarks of Hon. Craig Hosmer, Congressional Record, May 25, 1964.
[11] Editorial, the Los Angeles Times, Nov. 11, 1964.
[12] The Arizona Republic, Jan. 14, 1965.
[13] See note 12.
[14] Statement of Stewart L. Udall, Secretary of the Interior, before the Subcommittee on Irrigation and Reclamation, Committee on Interior and Insular Affairs, U.S. Senate, on S. 1658; undated.

by California in the courts before a dispute over water allocations was resolved in Arizona's favor by the Supreme Court. Former Governor Edwin C. Johnson, Colorado's representative on the Upper Colorado River Commission, recently urged the commission to bring suit against Interior Secretary Udall in the Supreme Court "to protect the rights of the upper basin States." [15] The anger and anxiety of the upper basin States is understandable; they remember bitterly how Reclamation released water from the upper basin's Glen Canyon Dam in March 1964 in order to keep turbines turning at the lower basin's Hoover Dam. Senator Wallace F. Bennett, of Utah, asked at that time, "If we can't even fill Glen Canyon Dam, how can we begin to discuss the construction of the vital central Utah project, of Bridge and Marble Canyon Dams and of the central Arizona project?" [16]

Upper basin States are painfully aware of the fact that installation of additional generators downstream, as at Marble Gorge and Bridge Canyon, would increase the temptation for the Bureau of Reclamation to keep downstream reservoirs at minimum operating level even at the expense of upstream users. The Bureau, with unendearing naivete, calls its hydroelectric plants "'cash register dams" and hates to see the flow of electricity (and dollars) stopped for lack of an adequate head of water. On the other hand, the lower basin States have legitimate cause for concern too. Interior Secretary Udall warned a Senate subcommittee that "as the upper basin develops new projects to utilize its share of Colorado River water, the amount remaining for use in the lower basin will decrease." [17]

To build additional dams on the over burdened Colorado would obviously exacerbate an already explosive situation in two ways—one, by wasting water (of which the region has none to spare) in order to generate electricity (which can be more economically provided in abundance by fossil-fuel and nuclear technology), and two, by impairing the quality of water available to downstream users.

WATER LOSSES WOULD RESULT FROM DAMS IN GRAND CANYON

"We are losing as much as 7 feet off the top of our reservoirs on the Pacific Southwestern desert each year" says a Bureau of Reclamation source.[18] Evaporation does it. The combined evaporative loss from existing reservoirs behind Hoover and Glen Canyon Dams exceeds the 1.5 million acre-feet per year allocated by treaty to Mexico—and far exceeds the 1.2 million acre-feet that will be imported to central Arizona by the project of which Bridge Canyon and Marble Gorge Dams are unnecessary parts. Advocates of additional dams on an overdammed river argue that water saved by storage, which would otherwise run uselessly by, offsets evaporative losses. Congressman Hosmer, of California, for example, remarks that, "Some people are suggesting instead of hydroelectric plants that thermal-generating plants be installed at other locations to act as cash registers for the Lower Colorado River Basin project. This too is lacking in reason in relation to the purposes and economics of the project. The dams are needed not only to produce power but as well to regulate flow of the river which varies greatly from year to year." [19]

Congressman Hosmer's assertion of the need for storage capacity at Bridge Canyon and Marble Gorge Dams may have embarrassed the Bureau of Reclamation more than a little. If the Bureau itself has made any such claim, it has not come to the attention of the Sierra Club. An Interior Department brochure notes that "Hoover Dam's Reservoir—Lake Mead—stores more than 2 years of average Colorado River flow." [20]

The same brochure gives Lake Mead's storage capacity as 29.8 million acre-feet. If Interior Secretary Udall's estimate of the Colorado's flow is correct—"almost 10 million acre-feet"—then Lake Mead can store 3 years of average flow. Glen Canyon Dam also has the capacity to store about 3 years flow, and other existing dams raise total storage capacity well above the 6 year level. Because reservoirs behind Bridge Canyon and Marble Gorge Dams would be unusually small in volume in relation to their depth, the two dams combined could store only about 5 months average flow.

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[15] United Press International, July 10, 1965.
[16] Frank Hewlett, Tribune Washington Bureau, The Salt Lake Tribune, Mar. 28, 1964.
[17] See note 14.
[18] See note 1.
[19] "Notice to Conservationists—the Grand Canyon Will Not Be Flooded," speech in the House of Representatives by Hon. Craig Hosmer, Congressional Record, May 3, 1965.
[20] "Hoover Dam," a brochure published by the Department of the Interior, dated 1963.

Excess storage capacity increases water losses

Claims concerning storage capacity are an embarrassment to the dambuilders for another reason. While it is true that storage capacity offsets evaporative losses when a river is incompletely regulated, excess storage capacity cannot be used for storage. You can't store something that isn't there. After adequate storage capacity on a river has been attained, say 3 years average flow, building excess capacity simply increases evaporative losses without producing any compensatory gain in storage benefits. Because of their comparatively small surface areas, reservoirs behind Bridge Canyon and Marble Gorge Dams would not lose water through evaporation on the same scale as Lakes Mead and Powell. Estimates are on the order of 100,000 acre-feet, however, and this uncompensated loss is enough to supply the needs of a large city.

Dams lose water not only through evaporation, but through seepage into the floor and walls of their reservoirs. A newspaper reported last January that "with Lake Powell less than quarter full at 6,200,000 acre-feet content, streamflow records indicate an additional 1,600,000 acre-feet to have seeped into the porous lake bottom and sides since Glen Canyon Dam was put into operation." The paper quoted Dallas Cole, chief engineer of the Colorado River Board of California, as saying "About 25 percent of the water being held back of Glen Canyon Dam in Lake Powell seems to be percolating into the porous Navajo Sandstone Basin. This is substantially higher than the 15-percent factor allowed for such 'bank storage' by the Bureau of Reclamation * * *."[21]

Fairminded critics of the Bureau acknowledge that there is no way of telling what the bank storage factor will be when the reservoir fills. The Bureau's estimate might prove correct, or even high. It seems more probable, however, that increased pressure created by a deepening reservoir will increase losses and that rising waters will find new avenues of escape. A more recent newspaper account quoted Regional Director Frank M. Clinton of the Bureau of Reclamation to the effect that Lake Powell was still at the 6,200,000-acre-foot level, but that bank storage had increased to 1,900,000 acre-feet.[22]

Bank storage has its defenders, who point out that it may raise the level of water tables in the surrounding area, is not subject to evaporation, and will seep back into the reservoir if it is ever emptied. But there are few to benefit from higher water tables in the vicinity of Glen Canyon Dam or Bridge Canyon and Marble Gorge Dam sites. And water seeping back into a depleted reservoir would be extremely susceptible to evaporation. In any event, water in bank storage is in dead storage—it is not available for use. The same may be said of water impounded within power dam reservoirs below their minimum operating levels; it is useful only to hold other water on top of it, and for all intents and purposes is in dead storage.

Prof. William C. Bradley, of the University of Colorado Geology Department, gives this appraisal of the Marble Gorge Dam site: "Marble Canyon Dam, which the Bureau proposes to build at mile 39.5 (just above President Harding Rapids), will abut one of the most cavernous limestones in the region, the Redwall Limestone * * *. Marble Canyon Reservoir will have an average level of 3,140 feet and will raise water some 300 feet at its deepest point. The walls of the reservoir will involve the cavernous Redwall Limestone at its lower end, the porous Coconino Sandstone in about the middle section, locally cavernous Kaibab Limestone and the basal Chinle Formation, Moenave Sandstone, Kayenta Formation, and Navajo Sandstone at its upper part—most of which are moderately to very porous * * *."[23]

It would seem from this analysis that Marble Gorge Dam would be likely to lose as much water through underground percolation, relative to its reservoir size, as Glen Canyon Dam has been losing.

SALINITY OF THE COLORADO EMBITTERS MEXICANS

Evaporation not only reduces the quantity of water available, but also reduces the usability of water remaining. It removes pure water, leaving behind the salts and other impurities it once contained. The concentration of salts is thus raised in the water remaining. To use a hypothetical and extreme example: suppose there were a reservoir in the desert Southwest that had vertical sides and

[21] The Boulder City News, Boulder City, Nev., Jan. 14, 1965.
[22] William H. Nelson in the Daily Sentinel, Grand Junction, Colo., Apr. 5, 1965.
[23] Unpublished paper by Prof. William C. Bradley, Geology Department, University of Colorado, July 1965.

a uniform depth of 8 feet, a reservoir that lost no water through underground percolation and was not replenished during the course of a year. As we have seen, the top 7 feet would be lost to evaporation. The remaining foot of water would then contain all of the salts formerly contained by the entire 8 feet. Or to put it another way, the concentration of salts in the reservoir would be increased by a factor of 8.

A deepening crisis in relations with Mexico

Salinity of the lower Colorado has caused a crisis in relations with Mexico. Farmers in the Mexicali Valley have lost one-third of their lands to salt in 3 years. William T. Blackledge, a U.S. businessman living in Mexicali, says that "it is only a matter of a few years, perhaps no more than 5, until the major portion of the lands in the valley irrigated by the waters from the Colorado will be totally out of production due to the accumulation of salts contaminating the waters * * *. We estimate that 400 to 500 small farmers are going out of business each year. It is likely that 200 to 300 more will be ruined before this year is out." [24]

Communists have been quick to exploit the Mexican farmers' grievances. "Unfortunately," says a Mexican Government spokesman, "the Communists are taking the credit as leaders in demanding retribution from the United States simply because they are making the most noise. The people listen to them, but you can't blame them for doing so." A U.S. official declares that "the question of salinity in the Colorado River is one of the most pressing that the United States faces in Latin America." [25]

Delivery of contaminated water to our neighbors near the mouth of the Colorado is a violation of the spirit, if not the letter, of our 1945 treaty with Mexico. It creates more than one kind of internal problem for our Mexican friends and imperils cordial relations between our nations. Of course, reservoir evaporation is not the ony cause of the Colorado's salinity, or even the major cause. (Drainage from irrigated land back into the river is the main offender.) But concentration of impurities by reservoir evaporation aggravates the problem. And in the case of power dams used only to generate electricity that is obtainable more economically from other sources, the increase in salinity attributable to reservoir evaporation is an unredeemed evil.

THE NEED FOR DAMS IN GRAND CANYON—FICTITIOUS OR REAL?

Bridge Canyon and Marble Gorge Dams obviously are not a "necessity" in any absolute sense of the word. The electricity they would generate for pumping power and the dollars they would generate to help finance the central Arizona project are both obtainable from other sources. The real question, then, is not whether the dams are necessary; the question is whether damming the Colorado in Grand Canyon is the most desirable of the various possible means of transporting water from the Colorado to central Arizona.

Presented as a necessity, impairment of Grand Canyon National Park and the setting of a precedent inimical to the whole national park system might possibly be acceptable to Congress and the public. Presented as one of several alternatives, however, the impairment of Grand Canyon would certainly be hard to swallow. It is not surprising, therefore, that proponents of Bridge Canyon and Marble Gorge Dam tend to use the word "necessary" rather loosely.

On the floor of the House of Representatives, Congressman Craig Hosmer told his colleagues that, "Hydroelectric plants will provide the necessary revenues to underwrite the pumping plants, aqueducts, reservoirs, pipes and conduits that make water available. Without these hydroelectric plants, the plan is totally infeasible and impossible of accomplishment." [26]

Rich Johnson, president of the Central Arizona Project Association, contends that, "If successful, the opposition will block an essential water supply development desperately needed by 23 million people in the seven States of the Colorado River Basin." [27]

Commissioner of Reclamation Floyd Dominy writes of "* * * the Lower Colorado River Basin project, of which Bridge Canyon and Marble Canyon Dams

[24] George Natanson, Times staff writer, the Los Angeles Times, Aug. 23, 1964.
[25] See note 24.
[26] See note 19.
[27] "Dams Are for People," by Rich Johnson, Congressional Record, Apr. 27, 1965.

are the key features * * * " and says, "* * * we found * * * that the dams were essential to the overall effectiveness of the total program." [28]

"Arizona Days and Ways," the Sunday magazine section of the Arizona Republic, refers to Bridge Canyon Dam as "the keystone of the central Arizona project." [29]

Suddenly the Bridge Canyon Dam isn't necessary any more

We see that both dams—and Bridge Canyon Dam in particular—were described as "necessary," "essential," "key features," and "the keystone" of the central Arizona project. One would suppose that elimination or postponement of a genuinely necessary feature of a plan would result in cancellation or postponement of the whole plan. But no. The Central Arizona project (including Marble Gorge Dam) is being pushed just as hard as before now that the Bureau of the Budget has recommended that Bridge Canyon Dam be deferred for later consideration.

Bridge Canyon Dam was to have had a generating capacity of 1,500,000 kilowatts, of which 500,000 kilowatts was to be used for pumping and 1 million kilowatts was to be available for sale. Marble Gorge Dam would have a capacity of 600,000 kilowatts. In combination, the dams would have provided 500,000 kilowatts for pumping and 1,600,000 kilowatts for sale. If the project were to proceed without Bridge Canyon Dam, Marble Gorge Dam could furnish the 500,000 kilowatts of pumping power (over transmission lines twice as long), but would have only 100,000 kilowatts surplus for sale—one-sixteenth the amount of the two dams combined. If the project is still financially feasible under these conditions, why were we ever told that Bridge Canyon Dam was a necessity?

At one time, a lower Bridge Canyon Dam that would not back water into Grand Canyon National Park was under consideration as an alternative to the high dam. The low dam was rejected. Why? The answer was given by Interior Secretary Udall:

"We have weighed the considerations which bear on the question of whether a high or a low dam should be built at Bridge Canyon and have concluded that the high dam should be selected. The factors we have considered are the following:

"(1) Our studies show that on a 50-year project repayment basis the financial feasibility of the proposed regional plan would be marginal without the added revenues provided by a high dam at Bridge Canyon * * *." Secretary Udall added that a low Bridge Canyon Dam "would produce only 80 percent of the net power revenues that would be generated by the higher dam." [30]

Are we, or were we, being sold a bill of goods?

We are now being asked to believe that although the financial feasibility of the plan was marginal with revenues from Bridge Canyon Dam cut by 20 percent, it is still perfectly feasible with Bridge Canyon's contribution cut by 100 percent. We were being sold a bill of goods when Bridge Canyon Dam was described as essential, or else we are being sold a bill of goods by people who now claim that the whole project is financially feasible without it. Which? Congress and the country should demand an explanation before further consideration is given to Marble Gorge Dam.

There is precedent for a reclamation project to proceed after an "essential" part of it has been eliminated. Richard C. Bradley, associate professor of physics at Colorado College, cites a parallel case:

"A little over a decade ago this same Bureau came before Congress with a remarkably similar proposal and remarkably similar arguments to back it. Echo Park Dam, a hydropower facility the Bureau wished to put in Dinosaur National Monument, was described as a 'key unit' in a large comprehensive multibillion-dollar water storage project, a unit that could not be eliminated without jeopardizing the whole program, a unit that was especially desirable because of a low evaporation rate, a unit that would not really damage the monument very much and which in any case was authorized by the proclamation establishing the monument. The American people listened to these arguments, but decided to protect their national park system instead, and rejected the Echo Park Dam by an overwhelming mandate. Interestingly enough, the storage project seems to have gotten along very well without it." [31]

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[28] Letter to James G. Cooper, Albuquerque, N. Mex., from Floyd E. Dominy, Commissioner of Reclamation; undated, but containing enclosure dated Apr. 12, 1965.
[29] The Arizona Republic, Nov. 1, 1964.
[30] See note 14.
[31] "Attack on Grand Canyon," by Richard C. Bradley, in The Living Wilderness, winter 1964–65.

Neither dam is, or ever was, really necessary

The Sierra Club is convinced that Bridge Canyon Dam is not, and never was, necessary to the central Arizona project. We are equally convinced that Marble Gorge Dam is not, and never was, necessary to it either. Subsidizing irrigation with power revenues has become a habit with the Bureau of Reclamation and the country, but it certainly isn't the only way of getting water to farmers at prices they can afford. Is it the best way? There is growing doubt. Noting that Bridge Canyon and Marble Gorge Dams would drown "long stretches of some of the finest canyon wildnerness left to the United States, Life magazine said:

"By classic Reclamation criteria, the plan is a good one. At canalside, in Pinal County, a farmer will be able to get an acre-foot of water * * * for only about $10, far less than the cost of getting it there * * *. The catch here is that classic Reclamation policy is wildly, even dangerously out of date. It made good sense in the days when supply cheap water was the only way to open up dry western lands to settlement. But now the problem is not land reclamation but agricultural surpluses, which are encouraged, not controlled, by subsidizing irrigation water. Some Arizona water, for example, would go to irrigate cotton, a price-supported crop." [32]

William Bowen, writing in Fortune, remarked that "Bridge and Marble, in short, would provide not water but water subsidies. Opponents of the central Arizona project, moreover, point out that part of the subsidized water would be used to irrigate cotton, an overproduced and price-supported crop—cotton is the principal crop in Maricopa and Pinal Counties * * *. Even with Senator Hayden steering it, the bill may run into shallows and cataracts in Congress. Since overproduction rather than scarcity is the Nation's agricultural problem, some legislators have come to doubt that building more hydropower dams to subsidize water for irrigation ought to rank high among national priorities." [33]

What are some of the other results that would be achieved at the expense of the greatest canyon in the world? The National Observer reports that "the U.S. Geological Survey estimates that one-third of the water impounded or diverted for irrigation in the 17 Western States is lost to evaporation and seepage before it reaches the farm to be irrigated." [34]

An item in Water Newsletter reveals that "Wasteful irrigation practices were seen as one of the main reasons for an agriculture shortage in Arizona, according to speakers at the annual meeting of the Arizona Association of Soil Conservation District Supervisors. Recent evaluations show that efficiency of water use throughout the State averages no more and 50 percent and is as low as 10 percent in a few cases." [35]

It would seem that the cost of Bridge Canyon and Marble Gorge Dams might be better spent on research and education leading to more efficient utilization of irrigation water in the Southwest. The Sierra Club has no basis under its charter for opposition to irrigation as such, however, whether used to grow price-supported crops or not. The club's opposition is to the dams, based on its commitment to protect scenic and wilderness areas. But as long as proponents insist upon tying the dams into the project, we will have no choice but to oppose the project as a whole. Elimination of hydroelectric dams from the central Arizona project would leave the club no basis for opposition to the water importation and irrigation components of the plan—the components that genuinely possess the characteristics of a true reclamation project.

Under the heading "Billions for Boondoggles," Nation's Business observed that "the Interior Department has shelved—at least temporarily—plans for the Bridge Canyon Dam. Taxpayers may wish that other boondoggles would be accorded the same treatment." [36] Marble Gorge power dam is one of the other boondoggles that should be shelved—permanently.

The tail is wagging the dog

Representative John P. Saylor, of Pennsylvania, charges that the hydropower tail is wagging the Reclamation dog:

"The present officials of the Bureau of Reclamation have become so preoccupied with attempts to develop unnecessary hydroelectric power projects

[32] Life editorial, May 7, 1965.
[33] "The Colorado—America's Nile," by William Bowen, Fortune, April 1965.
[34] Ernest Douglas in the National Observer, Jan. 4, 1965.
[35] Water Newsletter, published by the Water Information Center, Apr. 21, 1964.
[36] "Billions for Boondoggles," Nation's Business, August 1965.

and Federal power transmission grids that their thinking has become as arid and barren as the western lands they were formerly charged with reclaiming." [37]

The Pennsylvania Congressman's tail-wags-dog charge is certainly borne out by the central Arizona project, as proposed by the Bureau. The plan calls for an investment of $750 million in Bridge Canyon and Marble Gorge power dams to help finance functional parts of the project which would cost $499 million. (The Bureau's cost estimate is $527 million, not $499 million, but this includes $28 million for Hooker Dam in New Mexico; according to William Bowen of Fortune, this dam has no engineering connection wtih the project and was included merely to gain political support.) [38] Reclamation's "cash register dams" would cost, by Bureau estimates, $251 million more than the project they are to help finance. No wonder it has been suggested that the way to finance the central Arizona project is not to build either Bridge Canyon or Marble Gorge Dam. The dams would have to pay for themselves before they could begin to pay for the rest of the project, and it is doubtful that they could even do this.

Reclamation power is being undersold by steampower

Senator Clinton P. Anderson of New Mexico reports that Glen Canyon Dam "* * * is generating power at 6 mills per kilowatt-hour. That is almost too high to be competitive. At the new Four Corners plant in this State [New Mexico], with coal to generate steam, power is being generated at 4 mills per kilowatt-hour." [39]

More recently, another report states that "Sales of Glen Canyon power at 6 mills on firm contracts with preference customers, meanwhile, have lagged. If the preference customers do not buy at that price, Senator Clinton Anderson, of New Mexico, thinks the power should be offered at 6 mills to all comers. Leslie M. Alexander of Consumer Power Group and of the Salt River project, asks a price cut to 5.15 mills over the 42-year payout period. Felix Sparks says the project can't pay out if Glen Canyon power price is cut below 5.7 mills. * * *" [40]

It appears that power from barely completed Glen Canyon Dam is already noncompetitive or marginally competitive. With the pronounced downward trend of thermal and nuclear power prices, the prospect of a payout is dim indeed.

The taxpayer is Reclamation's paying partner

Granted for the sake of argument that subsidizing irrigation from power revenues is sound in principle, how has it worked out in practice? Congressman Saylor has presented data showing that power operations of the Missouri River Basin project had accumulated a deficit of $51 million from annual losses going back to 1954; that the Bonneville Power Administration had a total deficit of more than $50 million in a 6-year period ending in 1963 and the deficit was expected to reach nearly $60 million by 1965; that power operations of the Rio Grande project have been losing money in every year since 1951; that power from the Trinity project is being sold to preference customers at the "postage stamp" rate of 4½ mills, a loss of 3 mills or more for each kilowatt-hour sold. Small wonder the Congressman asks: "Is power really Reclamation's paying partner?" [41]

Is it really Reclamation power that is subsidizing irrigation? Or is it the taxpayer who is really subsidizing both Reclamation's irrigation and its power—and subsidizing the latter in competition with private enterprise?

Reclamation enjoys many competitive advantages

If Reclamation is not always able to compete successfully in the power market, it is not for lack of advantages. It pays no taxes on revenue from power sales. It is not required to repay the Government for expenditures on "nonreimbursable benefits" such as flood control and recreation—one of the reasons the dubious recreation values of Bridge and Marble Reservoirs are spoken of in such glowing terms by the Bureau. And the Federal Government, which itself currently pays about 4¼ percent on long-term borrowings, gives the Bureau construction

[37] "A Reclamation Program Is Needed for Reclamation," speech by Congressman John P. Saylor to the National Natural Resources Conference, American Farm Bureau Federation, Mar. 23, 1964.
[38] See note 33.
[39] "Changing Public Opinion—As a Legislator Sees It," by Senator Clinton P. Anderson, Sierra Club Bulletin, December 1964.
[40] Colorado River Association Newsletter, July 1965.
[41] "Is Power Really Reclamation's Paying Partner? Or Hominy Dominy Sat on the Wall," speech by Hon. John P. Saylor, Congressional Record, Feb. 16, 1965.

capital at an unrealistically low 3 percent. William Bowen observes in Fortune that "among other consequences, a low interest rate loads calculations in favor of public hydropower (big capital investment, but no fuel costs) ase against private steam-electric power (fuel costs, but smaller capital investment). The lower the interest rate used in the calculations, the better a big-dam project looks." [42]

A special panel of consultants to the Bureau of the Budget recommended in 1961 that the interest rate to be used in economic analysis should be in the area of 4 to 5 percent, but Reclamation's feasibility studies are still based on 3 percents.[43] If Reclamation were required to compete on anything like equal terms, it is extremely unlikely that it could ever again make a convincing case for a power project. Favoritism enjoyed by Reclamation is a massive subsidy in disguise. "If we really want to provide financial assistance to irrigation," urges Congressman Saylor, "let us do it in an aboveboard fashion." [44]

The issue is not public versus private power

Again, it should be emphasized that the Sierra Club's charter does not provide a basis for taking sides in the public power versus private power controversy. The club's objection is not to public power per se, but to public (or private) power projects that needlessly destroy scenic and wilderness resources. We have opposed just as strenuously the attempt of private utility companies to preempt potential park land—Pacific Gas & Electric's abandoned proposal for a nuclear powerplant at Bodega Head on the California coast, for example, and Consolidated Edison's proposed pump-storage project at Storm King Mountain in the Hudson Highlands of New York.

Nor is the Sierra Club the victim of a Pavlovian conditioned reflex that impels it to react violently against any and all proposals to build a dam. It has often been neutral, when scenic resources were not involved, and has advocated dams on occasion. The club's executive director wrote "A Case for a Dam" [45] in 1957, for example, supporting the construction of Paradise Dam in Montana as the best of available alternatives. When Reclamation proposes to develop a site lacking in scenic and wilderness values, the club has no basis for opposition. But when Reclamation insists upon locating power dams at sites of unparalleled scenic splendor, the club is obligated by its charter to point out that other powerplants at other locations could produce power at less cost to users and the pubic.

The need for Bridge Canyon and Marble Gorge Dams is fictitious, not real.

ARE DAMS IN GRAND CANYON REQUIRED BY PARKINSON'S LAW?

Dams in Grand Canyon are not necessary to the central Arizona project, but they probably are "necessary" in another sense. They are necessary to the Bureau of Reclamation, which is running out of damsites and, in obedience to Parkinson's law, is unwilling to watch its dam-building empire dwindle. Senator Clinton P. Anderson says that "most of the possible damsites now remaining are inaccessible—or at best, quite difficult to reach—and the power they would yield would therefore be so costly that it could not compare favorably with other sources. Hence, new proposals for dams may be rejected by the Congress because the sale of power will not pay them out * * *." [46]

This dearth of damsites is confirmed by a Department of the Interior release which describes Bridge Canyon and Marble Gorge as "the only remaining powersites of major significance below the Bureau of Reclamation's Glen Canyon Dam." [47] Rather plaintively, Commissioner Floyd Dominy confesses the Bureau of Reclamation's dependence on power dams (and damsites):

"It has never been clear to me what these non-Federal-power-only advocates would have us do. If they ever managed to persuade Congress to take our cash register away from us there would be only two alternatives left for Reclamation: our future water conservation projects would have to be subsidized in large part or reclamation development would simply grind to a halt." [48]

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[42] See note 33.
[43] See note 41.
[44] See note 41.
[45] "A Case for a Dam," by David Brower, Sierra Club Bulletin, February 1957.
[46] See note 39.
[47] "Interior Supports Legislation To Preserve Jurisdiction of Congress Over Hydroelectric Project Sites on Lower Colorado River," Department of the Interior release dated May 23, 1964.
[48] Reclamation News, published by the National Reclamation Association, January 1965.

As though Reclamation's water and power projects were not "subsidized in large part" already.

To keep its large corps of dam designing engineers gainfully employed the Bureau must exploit every suitable, semi-suitable and quasi-suitable damsite that it can lay hands on. It would be most convenient if the Bureau could breach the tradition of inviolability protecting national parks and monuments, where many of the best remaining damsites are located. Anthony Wayne Smith, executive secretary and general counsel of the National Parks Association, writes that "construction at Marble Canyon will afford no protection against—and indeed may well facilitate—similar dams down through the canyon within the park itself. * * * The Federal Power Commission staff has identified four such possible projects inside the park: Mineral Canyon, Ruby Canyon, Specter Chasm, and Havasu Dams; together they constitute the so-called multiple dam plan." [49]

A breach of national parks policy at Grand Canyon would unquestionably expose Dinosaur National Monument to renewed attack. Echo Park damsite has not been forgotten . Senator Frank E. Moss, of Utah, said, according to a press report, that "he wouldn't be surprised if a determined effort were made to keep Bridge Canyon Dam in the legislation. He said deletion of the project would hurt Utah's chances of ever getting Congress to amend the Colorado Storage Act and include the proposed Echo Park project as one of the storage projects of the upper basis program." [50]

The first violation of a national park or monument will serve as justification for further violations. And what better way to weaken resistance than to imply that the tradition of inviolability has been breached already? This is what Commissioner of Reclamation Floyd Dominy has done. "Contrary to general knowledge," said he, "there are presently functioning Reclamation reservoirs in other national parks." [51] This half truth is wholly misleading. There have been only two invasions of the national park system by major dams nad reservoirs, and neither one set any legal precedent. One was Hetch Hetchy Dam in Yosemite, which was built prior to the act of 1916 establishing the National Park Service. The other encroachment is at Rainbow Bridge National Monument, where there is nothing to prevent the waters of Lake Powell from invading the monument. This is not a legal precedent; it is a plain violation of the law. Legislation authorizing the upper Colorado River storage project provides 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. * * * It is the intention of Congress that no dam or reservoir constructed under the authority of this chapter shall be within any national park or monument." [52]

In his "Time and the River Flowing: Grand Canyon," Francois Leydet shows how important and far-reaching the consequences would be if the Bureau of Reclamation succeeded in setting a legal precedent for park violation:

"If the Grand Canyon is not considered too sacred for such uses Dinosaur will not be. And what then would stand in the way of other water and power developments by the Bureau of Reclamation or Army Corps of Engineers that would adversely affect Glacier National Park (the Glacier View dam, Belly River, and Waterton Lake diversions), Yellowstone National Park (a dam on Yellowstone Lake, the Bechler Basin project), Grand Teton National Park (Buffalo River Dam), Yosemite National Park (the Wawona project), Kings Canyon National Park, dams proposed at Cedar Grove, Tehipite Valley, Paradise Valley, Sentinel, Simpson Meadow, not to mention 15 power and storage structures in Kings River High Sierra), Mammoth Caves National Park (Mining City Dam), Big Bend National Park (dams proposed on the Rio Grande within the park), or Arches National Monument (the Moab Dam, in the Bureau's inventory)." [53]

If a legal precedent is ever set for park violation in order to build up the Bureau of Reclamation's depleted inventory of reservoir sites, what justification will there be to continue excluding private utility companies, lumbering, mining, and other forms of commercial exploitation? Rather than sacrifice our

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[49] "Campaign for the Grand Canyon," by Anthony Wayne Smith, in National Parks magazine, April 1962.
[50] Frank Hewlett, Tribune Washington bureau, the Salt Lake Tribune, May 11, 1965.
[51] See note 2.
[52] See note 3.
[53] "Time and the River Flowing: Grand Canyon," by Francois Leydet.

world-renowned national parks to the Bureau of Reclamation, wouldn't it be better to find constructive work for the Bureau to do?

HAS RECLAMATION ACTUALLY EXPLORED AVAILABLE ALTERNATIVES

The Bureau of Reclamation claims to have made exhaustive studies of alternatives, as indeed it should before recommending that Bridge Canyon and Marble Gorge Dams be built in Grand Canyon with three-quarters of a billion dollars of taxpayers' money. "There has been many studies of alternative plans to provide the needed water and power supplies and accompanying revenues that are required to make the adopted plan financially feasible," says an Acting Assistant Commissioner.[54] But so far as we know, comparative studies have not been released to the public for independent and impartial analysis. In view of the Bureau's obsession with what it lovingly calls its cash registers, one may be forgiven for wondering whether the Bureau actually studied any alternatives that would not fit within the framework of its power-is-Reclamation's-paying-partner concept. If the Bureau did study such alternatives, and its figures showed its own plan to be superior, it could strengthen its case immeasurably by making its comparative studies public.

The Sierra Club does not have the resources to develop the kind of economic and engineering analyses that should be available when consideration is given to the authorization of Bridge Canyon or Marble Gorge Dam. But we have collected a considerable amount of published data about alternative power sources, some of which follows.

Fossil-fuel steam generating plants

Power dams are water wasters, but steam generating plants need water too. How does the water consumption of the two systems compare? J. K. Horton, president of Southern California Edison, says of steamplants that "it takes about 30,000 acre-feet of water per year for a 750,000 kilowatt plant."[55] This works out to 0.04 acre-feet per kilowatt of installed capacity. Hoover Dam, with an installed capacity of about 1,350,000 kilowatts, loses about 850,000 acre-feet per year to evaporation. This loss is 0.63 acre-feet per kilowatt—almost 16 times the loss of a steamplant of the same capacity.

True, Bridge and Marble Reservoirs would have comparatively small surface areas and would not waste water on the scale that Lake Mead does. Regional Director A. B. West, of the Bureau, states that "as for evaporation losses, our studies indicate that the increase in evaporation resulting from construction of Bridge and Marble Canyon Dams would be relatively insignificant in relation to the total water suply, in the order of 100,000 acre-feet annually, which amount is not too much more than would be required for the operation of thermal electric powerplants of equal capacity * * *."[56]

Mr. West's statement indicates that even by the Bureau's calculations, the dams would consume more water than steamplants of equal capacity. The question is, How much is "not too much more?" If the combined capacity of Bridge and Marble powerplants would be 2,100,000 kilowatts, and if evaporation loss would be 100,000 acre-feet per year, then the evaporation from the reservoirs would be 0.048 acre-feet per year per kilowatt of installed capacity. This compares with the 0.040 acre-feet consumed by steamplants according to Mr. Horton's figures. The ratio of water loss is thus 1.2 (hydro) to 1 (steam). Or to put it another way, reservoir evaporation would consume about 20 percent more water than steamplants of the same capacity.

There is reason to think that the disparity between hydroelectric and steamplant water losses is greater than these figures suggest. Engineers of the Pacific Gas & Electric Co. inform us that the gross water requirements of steamplants in the San Francisco Bay area are about 0.85 acre-feet per year per kilowatt of installed capacity. But nearly all of this water is recovered, very little is permanently lost. William Bowen writes in Fortune that "in the generation of steam-electric power, for example, huge quantities of water are utilized, but less than 1 percent evaporates; the rest is available for reuse."[57] Of the 0.85 acre-feet per kilowatt per year used by steamplants in the bay area, therefore, a maximum of 0.0085 acre-feet is permanently lost. As we have seen, Bridge and

[54] Letter to William L. Spicer, San Francisco, from Acting Assistant Commissioner G. G. Stamm; undated, but received in April 1964.
[55] Ben Avery, Republic staff writer, the Arizona Republic, Sept. 23, 1964.
[56] Remarks by A. B. West before the Colorado River Wildlife Council, Apr. 6, 1965.
[57] "Water Shortage Is a Frame of Mind," by William Bowen, Fortune, April 1965.

Marble Reservoirs would lose about 0.048 acre-feet per kilowatt per year—between five and six times as much.

We recognize that comparisons such as these can only yield approximations. But it appears that the Bureau's claim of "not too much more" water loss should be viewed with skepticism. In any event, isn't "not too much more" a strangely imprecise measure of water loss for the Bureau to use in a parched land? "In the desert Southwest water is the most basic need of people; more important than electricity," says Rich Johnson, president of the Central Arizona Project Association and a stanch supporter of the dams.[58] A truer word was never spoken. though it seems a curious argument to use in support of water-wasting electricity producers in Grand Canyon.

What about the comparative costs of hydroelectric and steam-generated power? "The Bureau's Grand Canyon power will sell at a composite figure of 5.3 mills per kilowatt-hour," says Prof. Richard Bradley, "whereas private plants at Shiprock, N. Mex. (within 200 miles of Marble Gorge damsite), are now selling it for 5.8 mills. And if the steamplants had the same low interest tax-fee benefits the Federal dams enjoy, they could sell power today for somewhat less than 5.3 mills." Professor Bradley continues:

"But how about the trends in power generation? Will the 5.3-mills power continue to be competitive for the next 60 years while the dams are being built and amortized? We cannot answer this with certainty, but we do know that advancing technology is bringing down the costs of thermal power without materially changing that of hydropower. A decade ago steamplants were selling power for over 7 mills per kilowatt-hour. Now it is below 6 mills.

"Assistant Commissioner Bennett, of the Reclamation Bureau, predicted a year ago that thermal power would soon be delivered in the Colorado River Basin at less than 5 mills. Senator Anderson, of New Mexico, said last fall that the Four Corners area (within 200 miles of Marble Gorge) will shortly be getting it for 4 mills." [59]

As its own customer, without the need to show a profit, surely the Bureau could furnish its own pumping power at lower cost than an outside supplier? It's by no means certain that it could. "According to our calculations," says the National Parks Association, "any 50-year average cost below 4.2 mills would make it more economic for the project to purchase pumping energy than to construct Marble Canyon." [60] Remember two things in this connection: that coal-fired steam generating plants are selling 4-mills power within 200 miles of Marble Gorge, and that the selling price of steam-electric power has declined in a little more than a decade from 7 mills to 4 mills while the selling price of hydroelectric power has remained about the same. Is the average cost of power competitive with the Bureau's likely to remain higher, over the next half century, than the cost of power available today? And if the Bureau can't even generate power for its own use as cheaply as it can buy it from thermal plants, how much chance is there that it could find enough market for its high-cost power to pay off a billion-dollar investment in 50 years?

Fossil fuels for steamplants are abundantly available in the area and will last for longer than hydropower reservoirs will remain unclogged by silt. "Southwestern Utah (within several hundred miles of Marble Gorge) is one of the largest undeveloped coal-bearing regions in the United States," says the Guidebook to the Geology of Southwestern Utah. "Estimated bituminous coal reserves of 7,200 million short tons occur in Iron, Kane, Garfield, and Wayne Counties. Four large coal fields are situated within the Colorado Plateau province, and one small field is situated in the eastern part of the Basin and Range province. More than 2,500 square miles are underlain by coal beds at depths that are generally less than 2,000 feet." [61]

Coal is not the only fossil fuel in plentiful supply in the vicinity of Four Corners (where Arizona, Colorado, New Mexico, and Utah's boundaries meet, not far from Marble Gorge). The Denver Post says that "A new element may soon come into economic prominence in the oil industry—development of the oil shale resources of Colorado, Wyoming, and Utah. The federally owned shale lands. richest of which are in western Colorado, are estimated to contain more than 1

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[58] See note 27.
[59] See note 31.
[60] "The Bridge Canyon and the Marble Canyon Components of the Pacific Southwest Water Plan—A Memorandum Prepared by the National Parks Association," Oct. 20, 1954.
[61] "Coal Resources of Southwestern Utah," in Guidebook to the Geology of Southwestern Utah, published by the Intermountain Association of Petroleum Geologists.

trillion barrels of oil. There are additional sizable tracts in private ownership." [62]

Private power apparently does not worry about its ability to compete in Reclamation's backyard. Western Water News reports that "The Southern California Edison Co. will build a $370 million, 3 million kilowatt coal-fired, steam-electric generating plant on the Colorado River in Nevada below Davis Dam, if it receives Nevada, California, and Federal regulatory approvals. Work on the first 750,000-kilowatt unit could start late in 1965 and be completed in 1969. Coal would be delivered to the plant over a 30-mile rail spur from Needles, or by pipeline." [63] Notice that this steamplant will generate five times as much power as Marble Gorge would, and will be located within a few miles of the intake of the central Arizona project aqueduct whereas Marble Gorge is some 200 miles distant. We have no information about the selling price of the steamplant's power, but it should be low. Southern California Edison says it will probably be the largest facility of its kind in the United States.[64]

Another massive electric development has been organized in Reclamation territory—the seven States of the Colorado River Basin plus contiguous areas of Idaho and Texas. "In September 1964," writes Paul Averitt in Economic Geology, "10 of the largest electric utilities in the Southwestern United States announced the formation of a cooperative, the Western Energy Supply and Transmission Associates (WEST Associates) through which they plan to increase generating capacity and to improve the transmission of electricity throughout a nine-State area.[65] Ben Avery of the Arizona Republic reports that "The first development under WEST will be a huge new coal-fuel power generating facility in the Four Corners area. * * * It is scheduled for completion of its first 750,000 kilowatt unit by late 1969, and eventually will consist of two such units * * *. It will be a completely separate facility from Arizona Public Service's present Four Corners plant which already totals 575,000 kilowatts of installed capacity. The present APS plant eventually is planned to exceed a million kilowatts." The two plants mentioned by Avery will ultimately have a capacity of 2.5 million kilowatts—400,000 kilowatts more than Bridge and Marble combined, and more than four times the capacity of Marble alone. Again, we have no data on the selling price of WEST's power. But Avery reports that "WEST will coordinate operations in the nine-State area so the most economical power generating facilities can be used at all times to meet load requirements * * *. These results will effect many economies in power transmission and generation and these savings will flow to the consumer * * *." [66]

If coal-fired steam plants were the only form of competition the Bureau had to consider, they would give it plenty to think about. "We suggest," says the National Parks Association mildly, "that the public and private utilities in the region be questioned on their expectations of long-term costs for pumping power before Marble Gorge is considered further for that purpose." [67] This seems an eminently sane idea. The "cash register" concept is obsolete if the Bureau can buy power not only cheaper than it can produce and sell it at a profit, but cheaper than it can generate power to operate its own pumps.

Nuclear powerplants

It takes a lot of water falling a long way to generate as much power as a few atoms of fissionable material are capable of releasing. And atomic reactors may soon be generating electricity at lower cost than the coal-fired plants that are now underselling Reclamation's Government-subsidized hydropower. An editorial in the New York Times states that "Already there is evidence that either coal-fired or atomic plants would be at least competitive with hydropower and probably less costly in the long run. As an indication of the diminishing cost of atomic power Dr. Glenn T. Seaborg, Chairman of the Atomic Energy Commission, predicts that within 35 years all new private powerplants will be operating on nuclear energy * * *.

"The Marble Gorge Dam should follow Bridge Canyon Dam into limbo—if not oblivion. It is time to follow Theodore Roosevelt's admonition about the Grand

[62] The Denver Post, Feb. 23, 1964.
[63] Western Water News, February 1965.
[64] Associated Press dispatch, Dec. 13, 1964.
[65] "The Future of Coal Production in the Rocky Mountain Region," by Paul Averitt, Economic Geology, vol. 60, 1965.
[66] See note 55.
[67] See note 60.

Canyon: 'Leave it as it is * * *. The ages have been at work on it, and man can only mar it.' " [68]

Last year, the financial section of the Times carried a story about an atomic plant at Oyster Creek, N.J., that will have 600,000 kilowatts capacity and cost $68 million. (Marble Gorge Dam would have the same capacity but, according to Bureau estimates, would cost $239 million—3½ times as much.) Cost of the Oyster Creek plant's power, according to the Times, will be 3.9 mills—1.4 mills less than the cost of Bridge-Marble power.[69] Oyster Creek's power will be cheaper still according to Philip Abelson in Science: 3.66 mills per kilowatt-hour.[70] If a nuclear plant with Marble's capacity is now being built at less than one-third the cost, and will sell its power almost one-third cheaper, why build Marble? Are we so determined to desecrate Grand Canyon?

Even cheaper nuclear power will not be long in coming according to the Christian Science Monitor:

"California is talking about what may be the peaceful atom's biggest breakthrough. By 1971, if all goes well, the State will be making electricity with a new design of nuclear reactor. It may be 50 times more efficient than any now in use in its conversion of nuclear energy * * *.

"The power will be used to pump water from the Feather River over the Tehachapi Mountains into southern California. [This is a far greater lift than will be required to get water from Lake Havasu to central Arizona.] By using an advanced reactor of a seed-blanket type, the cost will not exceed 3.5 mills per kilowatt hour." [71]

But the end is not yet. In its study of nuclear powered desalinization plants, the President's Office of Science and Technology estimated that the delivered cost of atomic power would be as low as 3.2 mills in 1970, as low as 2.7 mills in 1975, and as low as 2.1 mills in 1980.[72] Bridge and Marble Dams would hardly have begun to pay for themselves by 1980—and their chance of paying out after 1980 is not discernible to the naked eye. "My own belief," says Alvin M. Weinberg, Director of Oak Ridge National Laboratory, "is that very large, publicly owned atomic powerplants will eventually generate electricity at costs of no more than 1.5 mills per kilowatt-hour. I think therefore we ought to turn some of our attention to the question: 'What would we do with unlimited 1.5-mills power?' " [73]

Uranium to fuel reactors serving the Central Arizona project is locally available. According to a report on energy resources published by the Committee on Natural Resources of the National Academy of Sciences and the National Research Council, rich uranium ores totaling 500,000 to 2 million metric tons underlie northern Arizona, eastern Utah, and western Colorado and New Mexico—the Four Corners area within several hundred miles of Marble Gorge.[74]

The question is, How long will it be after coal-fired plants have obsoleted hydropower before nuclear power makes both obsolete? It begins to look as though the two events might occur almost simultaneously.

Nuclear powered desalinization plants

Atomic plants that simply generate electricity may very soon look old fashioned. Plants that produce huge quantities of electricity as an incidental byproduct of the desalinization of water are not far off. A recent newspaper report states that:

"Sea water could be transformed into fresh water by atomic power at about one-fifth of current costs, the latest federally sponsored engineering study indicates.

"That would put the cost—a minimum of 22 cents a thousand gallons—close to what southern California expects to be paying for natural fresh water from inland sources within the next 5 years. The rate would be favorable for other water-scarce sections of the country as well.

"This prospectus was given today in a report by the Bechtel Corp., one of the Nation's largest engineering firms, to the Department of the Interior, the Atomic

[68] Editorial, the New York Times, May 17, 1965.
[69] The New York Times, June 14, 1964.
[70] "Conventional Versus Nuclear Power," by Philip H. Abelson, Science, Nov. 6, 1964.
[71] Christian Science Monitor, Apr. 13, 1965.
[72] "An Assessment of Large Nuclear Powered Sea Water Distillation Plants," Office of Science and Technology, March 1964.
[73] "The Research Frontier," by Alvin M. Weinberg, Saturday Review, Feb. 6, 1965.
[74] "Energy Resources," a report to the Committee on Natural Resources of the National Academy of Sciences-National Research Council, by M. King Hubbert, publication 1000-D, 1962.

Energy Commission, and the Metropolitan Water District of Southern California * * *.

"The plant would produce 150 million gallons of water a day, enough for a city of 750,000 people * * *.

"The power output would be 1,800 megawatts, enough for a city of 2 million people—bigger than Hoover Dam's capacity of 1,300 megawatts * * *.

"The economic estimates were premised on the sale of power at 4 mills per kilowatt-hour, which would be competitive with current prices." [75]

Lower cost power will soon be forthcoming from desalinization plants according to another report in the New York Times:

"Congress was told last summer that a task force has found that by 1975 this country should have large dual-purpose desalting and power generating plants that would turn out fresh water at a cost of 20 to 25 cents a thousand gallons along with 1,000 to 1,500 megawatts of electricity that could sell for from 2.3 to 2.5 mills a kilowatt-hour. The plants would produce 500 to 800 million gallons of fresh water a day." [76]

Senator Clinton Anderson has predicted that "we will in time develop nuclear electrical energy at a cost of 1½ or 2 mills per kilowatt-hour and water at a cost of about 15 cents per 1,000 gallons * * *." [77]

Writing in the Nation, David E. Pesonen says that "it is conceivable that eventually all additions to electrical generation capacity in the Pacific Southwest will be 'surplus' from desalinization plants." [78]

Dr. R. Philip Hammond, Director of the Nuclear Desalinization Program of Oak Ridge National Laboratory, says "nuclear sea water conversion can deliver the same amount of water to the same places and at approximately the same cost as the Department of the Interior's elaborate Pacific Southwest water plan. (Later called the Lower Colorado River Basin Project, of which the central Arizona project is a part.) Nuclear water might even sell cheaper—if the nuclear plants get a good price for the electricity they'll generate as a by-product." [79]

When it comes to a choice between dams that waste water in order to generate high-cost power and plants that generate low-cost electricity as a byproduct of the production of fresh water, the choice shouldn't be difficult. By the time they could be completed, Bridge Canyon and Marble Gorge Dams would be expensive anachronisms. Coal-fired, oil-fired, or nuclear powerplants could be built at less cost, could be put into operation sooner, and would produce electricity at considerably lower cost.

PEAKING POWER: THE BUREAU OF RECLAMATION'S LAST TRUMP

The Bureau of Reclamation is realistic enough to know that it is being priced out of the market for firm, base-load power. Says Commissioner Floyd Dominy:

"Prophecy is a hazardous business but some aspects of the future role of hydroelectric power seem reasonably certain. First, it seems quite likely that the declining role of hydroelectric power in meeting the base-load requirements for power and energy supplied by electric systems in the United States will continue.

"Thirty years ago, hydroelectric plants provided about 30 percent of the generating capacity and 40 percent of the energy supplied by electric systems in the United States. At present, hydroelectirc plants provide only 19 percent of the capacity. The Federal Power Commission forecasts that by 1980 conventional hydroelectric projects will supply about 15 percent of the capacity and 13 percent of the energy * * *.

"The fact that public utilities the country over are turning more and more to hydropower for peaking capacity and to thermal generation for load factor power indicates to me that the traditional competition between thermal and hydropower is at an end."

If you can't lick 'em, join 'em. Priced out of the market for base-load power. Reclamation looks toward peaking power for its salvation. Peaking power, i.e., reserve power to meet temporary demand over and above the steady base-load demand, commands a higher price because it requires standby equipment that cannot be utilized all the time. Premium-priced peaking power is the last

[75] Dispatch from the New York Times news service, the Tulsa Tribune, July 8, 1965.
[76] The New York Times, Dec. 27, 1964.
[77] "Scientific Advice for Congress," by Senator Clinton Anderson, Science, Apr. 3, 1964.
[78] "The Politics of Fresh Water," by David E. Pesonen, the Nation, Jan. 18, 1965.
[79] Virgil Meibert in the Oakland Tribune, Oct. 25, 1964.

trump in the Bureau's hand and the Bureau is playing it to the hilt. Dominy continues: "From our standpoint the gradual shift from base to peak load operations and market is advocated for the following reasons:

"First, the financial integrity of existing plants may be in jeopardy in future years because of the competitive inroads of thermal power."

Future years? Before it had filled more than one-fourth of its reservoir, as we have seen, Glen Canyon was already having difficulty marketing its power. Existing plants? The Commissioner might have noted that the financial integrity of unbuilt plants that he is now urging upon Congress and the country is in even greater jeopardy. The plants would cost more than existing ones, and existing ones are deeper in trouble than they are in water.

"Second, against this competition new hydroelectric projects, which inevitably will be more costly, may not be financially feasible unless power and energy are sold primarily for peaking purposes."

We should have said "will not" rather than "may not" be financially feasible. Notice the Commissioner's assumption that it is absolutely essential to find some way to keep Reclamation in the power-dam-building game. We have no doubt the Commissioner feels that way about it, but why should he expect anyone outside his Bureau to share his sentiments? Having sidled into power generation through the side door, as an adjunct to its assigned task of reclaiming arid western lands by irrigation, why shouldn't the Bureau sidle out again when its hydroelectric activity no longer makes the sense it once seemed to make?

"Third, as time passes, fewer and fewer of our hydroelectric installations will have sufficient water for total load factor operations to supply current and future needs. This, of course, will result from increased upstream consumptive water usage and is taken into consideration in our payout schedules but it does not help in fulfilling the power needs of the West." [80]

As time passes? Reclamation has never able to fill Lakes Powell and Mead full enough to operate the Glen Canyon and Hoover powerplants at rated capacity simultaneously. It has never come close. Powell has been lowered to provide a minimum operating head at Hoover, and Hoover has been kept below rated capacity in an attempt to raise Powell's level. Meanwhile, Reclamation fills its power contracts by paying millions of dollars for supplementary electricity from outside suppliers. If "fewer and fewer of our hydroelectric installations will have sufficient water." what kind of reasoning is it to insist upon more dams on a river that cannot fill the dams it has got? Why does Commissioner Dominy speak of "fulfilling the power needs of the West"? Fulfilling the West's power needs is not Reclamation's job, and the utilities who make it their business to fill these needs can do so very nicely.

Peak power is required in parts of the country where hydroelectric power is not available, and there are other means of providing it. Richard C. Bradley writes that Commissioner Dominy "* * * is certainly correct that it is easier to draw down a reservoir when power demands suddenly go up than it is to fire up another boiler. But there are several other good ways of producing peak power besides steam and hydro. Diesel-electric peaking plants, for example, are now being built that can be turned on in a matter of seconds. Such plants can be installed when and where they are needed in much less time and at much less cost per installed kilowatt than the Bureau's dams, and although they require fuel (which is not in short supply) they do not evaporate water (which is). Thus, even if we grant the need for peaking plants, there is still no need to put them in Grand Canyon." [81]

Other ways of generating peaking power

Gas turbines turning generators are another possible source of power with quick start-stop capability and no water consumption. Older, less efficient thermal plants are maintained on a standby basis to provide peaking power in many electric networks. And what about atomic powerplants? In reply to a query by C. Edward Graves of Carmel, Calif., an answer was given by A. Giambusso, Assistant Director for Civilian Power of the Atomic Energy Commission's Division of Reactor Development and Technology:

"From a technical point of view, nuclear power reactors would be quite satisfactory to meet peaking demands. A great deal of operating experience has

[80] Talk by Commissioner of Reclamation Floyd E. Dominy, U.S. Department of the Interior, before the Rocky Mountain Coal Mining Institute at Estes Park, Colo., June 29, 1965.

[81] See note 31.

demonstrated that nuclear plants of the type in commercial use today have excellent load-following characteristics—they can respond quickly and smoothly to pronounced fluctuations in load." [82]

Mr. Giambusso goes on to say that the difficulty with using nuclear reactors for peaking power is their high capital cost: "It would be preferable to operate a high-capital-cost plant to the fullest extent practicable in order to spread the capital carrying charges over a large number of kilowatt-hours produced * * *." But as we have seen, the capital cost of hydroelectric installations is higher than that of fossil-fuel or nuclear plants of equivalent capacity; this argument against nuclear peaking power applies with even greater force to hydro peaking power. And as we have also seen, nuclear desalinization plants will soon be generating so much byproduct electricity that we may have difficulty finding ways to put it all to good use. Meeting peak power requirements may be the best way to utilize existing Reclamation hydropower, but we do not believe it provides economic justification for the building of additional high-capital-cost hydroelectric plants.

Will peaking power stay costly enough?

As we understand it, the Bureau hopes to sell Bridge-Marble power at an average price of 5.3 mills, of which the peak power component would be 6 mills. With experts predicting drastic reductions in the price of steam and nuclear base-load power, is it likely that the price commanded by peak-load power will remain high enough over the next half century to make the Bureau's Bridge-Barble proposal financially feasible? Surely the price of peaking power bears some necessary relationship to the cost of base-load power, and must drop in response to reductions in base-load prices. "A decade ago," says Prof. Richard Bradley, "steam plants were selling power for over 7 mills per kilowatt-hour. Now it is below 6 mills." [83]

It would seem that the price Reclamation expects to get for Bridge-Marble peaking power is lower than the cost of base-load power generated by steam a decade ago, and that the price of peaking power does drop as base-load prices drop. If this is the case, reliance upon the sale of peaking power does not look like the salvation of the Bureau's hydroelectric ambitions.

Demand for peaking power is satisfied in many parts of the country by interconnected transmission lines enabling surplus power in one area to be sent to an area of peak demand. Commissioner Dominy recently spoke of two such interties: "One is the interconnection of private power transmission systems with the transmission grid of the Colorado River project. The other is the historic Pacific Northwest-Pacific Southwest intertie * * *. The Pacific Northwest-Pacific Southwest intertie, to be built by all interested parties—private, municipal, State, and Federal—will be the biggest single electric transmission system ever conceived and built in the United States * * *. The system will permit exchanges of large blocks of power between the Northwest and the Southwest, and enable each region to take advantage of diversities in peakload requirements." [84]

Such interties will presumably make it less and less necessary to fill peaking power requirements from powerplants in the area served. Might it not be economical for a large, efficient, relatively low-cost thermal or nuclear plant (or plants) to meet the peaking power needs of entire interconnected systems? Or existing hydroelectric plants might be utilized entirely to satisfy the peaking power requirements of power grids, leaving base-load generation to fossil-fuel or nuclear plants.

The need for peaking power is real, and hydroelectric plants are more competitive in this field than they are in the generation of base-load power. Peak power generation may be the best way for Reclamation to get the best possible return on its huge investment in existing hydroelectric plants. But in view of technological and economic trends, we seriously question whether peaking power justifies the construction of any new Reclamation hydroelectric plants anywhere—much less in Grand Canyon.

FOSSIL-FUEL OR NUCLEAR "CASH REGISTERS" FOR RECLAMATION?

David Brower, executive director of the Sierra Club, has offered two suggestions that would give Reclamation the pumping power and revenues it needs without involving the Grand Canyon or other scenic areas:

[82] Letter to C. Edward Graves from A. Giambusso, Apr. 26, 1965.
[83] See note 31.
[84] See note 48.

"It now remains to propose an amendment to the various bills now in Congress that would enable the Bureau of Reclamation to seek development funds from killowats produced by other means than Grand Canyon dams. We are fully aware of the traditional dependence the Bureau has upon power 'incident to the river.' People who don't like TVA or who think one TVA is enough are not likely to want another Government agency in the business of generating power for profit—enough people, probably, to make such an innovation politically impossible unless there are safeguards. We would suggest two possibilities:

"(1) Allow the Bureau of Reclamation to build equivalent steam generation (coal, oil, or gas) or reactor capacity only when necessary to save a major scenic resource, such as Grand Canyon or any of several stretches of wild river, each determination to be made by Congress.

"(2) Allow the Bureau to contract for private construction and operation of such substitute facilities (again, each authorized by Congress), with capital to be supplied at the same interest rate the Bureau enjoys and taxes forgiven, as the Bureau's are, most of the profits to go into the Southwest development fund (along with revenues from Hoover Dam, et al.) after it is paid out."

A shift in habits of thought or reversal of policy?

The Bureau of Reclamation should be released from its dependency upon a source of power and income that appears to be technologically and economically obsolescent. For Congress to authorize the Bureau to build steam or nuclear plants, under certain specified conditions, might require a shift in habits of thought. But it would require a radical change in policy, and the sacrifice of a respected tradition, for Congress to authorize the construction of power dams in Grand Canyon that would eviscerate the national park and endanger the whole national park system.

SUPPORTERS RISK DEFEAT OF THE CENTRAL ARIZONA PROJECT BY TYING IT TO UNNECESSARY POWER DAMS IN GRAND CANYON

Assuming for the sake of argument that it would be a mistake not to build Bridge Canyon and Marble Gorge Dams, the mistake could be remedied by building them later. If a convincing case for the dams can ever be made, the damsites will still be there. Assuming on the other hand that it would be a mistake to build the dams, the mistake would be irreversible. The damage would be done, and through eternity, could never be undone.

Let us be very clear about this: the Sierra Club does not oppose the water-importation and irrigation features of the central Arizona project, but it is unshakably opposed to the construction of any dams in Grand Canyon. So long as either Bridge Canyon or Marble Gorge Dam remains an extraneous appendage of the central Arizona project, the club must oppose the project in its entirety. We believe that this view is very widely shared, and that elimination of both dams would be the surest way for advocates of the project to gain needed support for it among Congressmen and their constituents.

Issue is integrity of national park system

If the late Howard Zahniser, father of the Wilderness Act, were alive to comment on proposals to dam the Colorado River in Grand Canyon, we know pretty much what he would say. He said it about Echo Park Dam (a project defeated in large part through his efforts) in volume XIX, No. 50 of "The Living Wilderness," published by the Wilderness Society. We have substituted "Bridge and Marble Dams" for "Echo Park Dam" and "Grand Canyon" for "Dinosaur National Monument," but the text is otherwise as Howard Zahniser wrote it in his editorial in "The Living Wilderness":

"* * * It is clear that the real issue is the integrity of the national park system, assuredly an issue that we must continue to face with vigilance and determination.

"A principle is involved—the principle that once an area has been set aside for preservation it must be held inviolate and used for commodity purposes only in a case of extreme national need. Former Secretary of the Interior Julius A. Krug once stated this principle, in its application to dams, as follows: 'Large power and flood control projects should not be recommended for construction in national parks, unless the need for such projects is so pressing that the economic stability of our country, or its existence, would be endangered without them."

"The proponents of (Bridge and Marble Dams) seem themselves to be deeply conscious that the controversy is in large measure over this principle. Conservationists have insisted again and again that their objection is not to dams, or to reclamation, or to water storage for power production, but to the choice of a site * * *. Yet the proponents of this project continue to urge the (Bridge and Marble Dams) proposal. In view of these circumstances, and the demonstration of alternatives to (Bridge and Marble Dams) there are, indeed, strong suspicions that the persistent advocacy of damming the (Grand Canyon) is deliberately intended to break down the national policy for park preservation and to secure for those who are responsible for impoundment projects the freedom to use any national park system site that seems advantageous. * * *

"Thus the (Bridge and Marble Dams) controversy is essentially a great debate over our national policy of park preservation. We are principals in this debate, and we must keep ever alert both in argument and refutation, insisting that the threatened invasion of the (Grand Canyon) be turned back and the sanctity of our national park system reaffirmed and thus strengthened."

To mutilate Grand Canyon and undermine the principle of park preservation would be bad enough at best. To do so when the sacrifice is neither necessary nor desirable would be an inexcusable act of wanton vandalism. The Sierra Club urges readers of this paper to study the matter carefully and bring the weight of their opinion to bear on opinionmakers and decisionmakers. The issue will be decided in Washington, but Washington's decision will be shaped by opinion in all sections of the country.

THINGS YOU CAN DO TO HELP KEEP GRAND CANYON INTACT

Rather than countenance dams in Grand Canyon, we should be thinking of (1) strengthening the protection that, by law and tradition, is supposed to be accorded Grand Canyon National Park, and (2) including the entire Grand Canyon, from Lees Ferry to Grand Wash Cliffs, within the national park boundaries or affording it equivalent protection. The Grand Canyon has done something for everyone who has visited it. Now people who have visited it, or hope to visit it, can do something for the Grand Canyon.

Citizens of a democracy have an opportuinty and a duty to raise a clamor against any proposal they oppose; if they remain passive and the proposal is adopted, they have only themselves to blame. There are many things you can do to inform yourself further and to make your opinion felt. Here are some of them:

(1) Borrow "Time and the River Flowing: Grand Canyon." by Francois Leydet, from a friend or a library. Leydet's book develops the case against dams in Grand Canyon at greater length than is possible here. Having obtained a copy of the book and absorbed its message, lend the book to people you wish to influence. It is a powerful persuader. (A big book with a hundred color photographs, it is necessarily expensive. But if you are deeply interested, you may want to own it. Available from the Sierra Club, $25.)

(2) Obtain a print of the 16-millimeter sound and color film, "Glen Canyon." This half hour film reveals the incredible beauty of Glen, and its side canyons, before they were drowned by Glen Canyon Dam, and it makes a powerful case against further dams in the canyons of the Colorado. Show the film to clubs, civic organizations, and other groups. (Obtainable from the Sierra Club for a $3 rental fee; also available for purchase at $275 per copy.)

(3) Discuss the issues in personal conversation and correspondence. The people you talk or write to may catch fire, and public opinion is nothing more than the sum total of individual opinions.

(4) Write the editor of your local newspaper. The fate of Grand Canyon is a "local issue" in every city and town in America. Write also to the editors of national magazines, to columnists, to radio and TV commentators.

(5) Propose resolutions against dams in Grand Canyon in clubs and groups you belong to. Send copies of such resolutions to President Lyndon Johnson, to Secretary of the Interior Stewart Udall, to the Congressman from your district and the Senators of your State.

(6) If you are qualified and able to do so, make it known that you are available to fill speaking engagements in your community.

(7) Register your opinion in a letter to President Johnson—perhaps the only man alive who could, by his own individual efforts, end the threat to Grand Canyon and the national park system. Send a copy of your letter, or another letter, to Interior Secretary Udall and your Congressman.

(8) Tell your Congressman how you would like him to vote on this issue. He is not obliged to follow your advice, but he will respect the opinions you express.

(9) Write to key members of the Senate and House committees that will report to Congress on bills providing for dams in Grand Canyon:

Hon. Wayne N. Aspinall, chairman, House Committee on Interior and Insular Affairs.

Hon. John P. Saylor, ranking minority member, House Committee on Interior and Insular Affairs.

Senator Henry M. Jackson, chairman, Senate Committee on Interior and Insular Affairs.

Senator Thomas H. Kuchel, ranking minority member, Senate Committee on Interior and Insular Affairs.

(10) Consider how opinion is formed and how things get done in your particular community. Consult with your most active and knowledgeable acquaintances. Use your imagination.

(11) Support the efforts of organizations that are fighting to save Grand Canyon. The Sierra Club will be glad to send you a list of them.

(12) Get as many people as you can to do as many of these things as they can.

The purpose of the Sierra Club, founded in 1892 by John Muir, is to explore, enjoy, and protect the scenic resources of the United States. The club has more than 32,000 members in all States of the Union. For further information, write the Sierra Club, Mills Tower, San Francisco (offices also in New York, Washington, D.C., Los Angeles, and Seattle).

[Editorial in September issue of Sierra Club Bulletin]

Dams Would Eviscerate Grand Canyon

The Grand Canyon of the Colorado extends unbroken from Lees Ferry, below Glen Canyon Dam, to Grand Wash Cliffs at the head of Lake Mead. How badly would the 280-mile canyon be maimed by the proposed Bridge Canyon and Marble Gorge Dams?

Both dams and both reservoirs would be wholly contained within Grand Canyon. Of the Colorado's course through the canyon it created, nearly half would become slack water reservoirs; the rest would become a tame trickle, metered through valves at the Bureau of Reclamation's pleasure. This would halt the processes that created the canyon, turning a living laboratory of stream erosion into a static museum piece. It would flood the habitat of wildlife that through the ages has depended on the living river for its own life. It would render invaluable archaeological and geological records inaccessible. It would inundate campsites on beaches and sandbars, and the sheer walls of new shorelines would offer no substitute. Fluctuations in reservoir level would stain the walls between high and low water. Dambuilders' access roads would disfigure the scene, as would power transmission lines.

This damage would be irrelevant, advocates of the dams assert, except insofar as it affected Grand Canyon National Park and Monument (which contain less than half of Grand Canyon). Portions of the canyon outside the park are in no way inferior to portions that are included, however, and the Sierra Club advocates national park or equivalent protected status for the entire canyon. But for the sake of argument, let's take the narrow view that only the park matters. What then?

Reclamation projects within the national park are permissible under the Grand Canyon National Park Act of 1919, but only on condition that they be "consistent with the primary purposes of said park." The primary purposes of the national parks were defined in the National Park Service Act of 1916: "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Bridge Canyon Dam would back water all the way through the national monument and 13 miles into the national park. Drowning scenery, natural and historic objects, and wildlife habitats, it would be totally inconsistent with the primary purposes of Grand Canyon National Park as defined by law.

Marble Gorge Dam would be upstream, regulating the Colorado's flow through the park and monument. "It is anticipated," says the Bureau of Reclamation, "that a minimum flow of at least 1,000 cubic feet per second will be maintained

* * * through the Grand Canyon." This pitiful trickle would hardly float a cork, much less a boat, and many of the canyon's scenic gems can only be visited by boat. If Marble Gorge Dam were to be built it would make Elves' Chasm, shown on this month's cover, very nearly as inaccessible as Fern Glen and lower Havasu Creek (which would be drowned by Bridge Canyon Dam) or Redwall Cavern and Vasey's Paradise (which would be drowned in Marble Gorge).

A thorough examination of the dam proposals, including their shaky economic underpinnings, has just been published by the club: Dams in Grand Canyon—a Necessary Evil? Priced at 35 cents, or 30 cents a piece in lots of 10 or more, this 20-page illustrated booklet provides plenty of ammunition for anyone who cares to help keep Grand Canyon intact.

Mr. ROGERS. Thank you, Mr. Nash.

The members will be recognized for approximately 3½ minutes apiece.

Mr. Aspinall?

Mr. ASPINALL. Mr. Chairman, I am glad to have Mr. Brower and Mr. Nash before the committee. I wish we had had Dr. Bradley before the committee also. I have been enjoying my friendship with Mr. Brower, opposing him and working with him, and a few other things, since the early fifties. I enjoy it very much. He is very dedicated to his work. I always appreciate the pictures he sends me.

Believe it or not, Mr. Brower, I read the material which is contained in the books, too. I sometimes wonder what a blind man would do when you send out these pretty pictures unless he had a very good understanding of the English language and somebody could read effectively to him. I do not think the pictures one way or the other are the determining factors in situations of this kind.

Let me ask you this question so I get the position of the Sierra Club. If you or your organization were prohibited from using these national parks or wilderness areas for your own trips, would you then be for protecting the areas for only their scenic, scientific, and ecological value?

Mr. BROWER. Yes, we would be.

Mr. ASPINALL. You would be?

Mr. BROWER. Yes.

Mr. ASPINALL. I think that is most important, because in most of these areas, your organization is the only one that en masse is able to enjoy any of the values that they have.

Mr. Nash, in your statement, you have attempted to compare the production of power through the use of hydroelectric generators and the use of thermal generators. Do you know the difference between consumptive and nonconsumptive use of water?

Mr. NASH. I believe I understand that, sir.

Mr. ASPINALL. Do you understand that hydroelectric generators are a nonconsuming facility in the generation of power as far as water is concerned?

Mr. NASH. Except for the evaporation, sir, is that not so?

Mr. ASPINALL. Except for the evaporation where? In the reservoir?

Mr. NASH. Yes, sir.

Mr. ASPINALL. That would be true of any lake as far as that is concerned.

Mr. NASH. Yes, sir.

Mr. ASPINALL. And thermal generators are consumptive users of water. Is that correct?

Mr. NASH. They need cooling water, 99 percent of which is returned in usable condition, I understand.

Mr. ASPINALL. But when the Secretary of Interior's office advises us that one plant would more than likely use between 60,000 and 100,000 acre-feet of water, it means consumptive use, as I view it.

Mr. NASH. I believe that is correct, sir, but the plant that I understand is to use up to 100,000 acre-feet of water would generate more electricity than all the dams on the Colorado River put together.

Mr. ASPINALL. I am not so sure about that. They are contemplating the construction of 10 thermal plants in the future as I understand it, someplace up to 10 thermal plants in order to make effective use of this great natural resource, coal, which underlies some of this area.

Now, in your own mind, does it appear to you to be sensible—I am not arguing now the esthetic value or the question of whether or not you should have this installation—does it not seem to you that the sensible thing would be to produce peaking power with hydroelectric generation, which is not a consumptive use, in order to have the best possible production of power in this area?

Mr. NASH. Sir, it would seem sensible to me to use existing hydroelectric plants for that purpose. I do not believe it is necessary to build new hydroelectric plants, particularly in the Grand Canyon, for that purpose.

Mr. ASPINALL. But you are not a physicist any more than I am; are you?

Mr. NASH. No, sir.

Mr. ASPINALL. You are not a rate expert any more than I am; are you?

Mr. NASH. No, sir.

Mr. ASPINALL. So this matter has to be left to the engineers, does it not?

I thank you. Mr. Chairman, I have asked for the comments of the Bureau on Dr. Bradley's statement. I ask unanimous consent that the reply be placed in the record following Dr. Bradley's statement.

Mr. ROGERS. Without objection, so ordered. Mr. Hosmer?

Mr. HOSMER. I shall reserve my time.

Mr. ROGERS. Mr. Udall?

Mr. UDALL. Thank you.

I want to take my time to comment on this book. Mr. Brower says in his statement that this book which is now in our files will become the chief reference book for the most important conservation battle of the decade.

I want to say he had better get another reference, because this book, as well written and pretty as it is, and it touched my heart when I read it, is one of the most misleading things I have ever seen. I would like to suggest that an analysis of this book and the pictures in this book which I have prepared be received and placed in the record.

Mr. ASPINALL. Do I understand that you have personally prepared the book or the analysis?

Mr. UDALL. The analysis.

Mr. ROGERS. Without objection, the analysis will be included in the record.

(The document referred to follows:)

"TIME AND THE RIVER FLOWING"

(An analysis by Representative Morris K. Udall of Francois Leydet's book on the Grand Canyon of the Colorado)

"Time and the River Flowing" is another of the magnificently illustrated publications of the Sierra Club in support of its legislative interests. I have read it with a great deal of interest and I commend the club for stating as strong a case as can be made in opposition to the construction of new dams on the Colorado River.

What I consider unfortunate, however, is that so much of this case has been made not against the dams and reservoirs in question, but rather against a "strawman" project that doesn't exist.

The Sierra Club's 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. Of these 79 pictures my analysis reveals that fully 45 of them are of scenes far removed from these dams or their reservoirs. Furthermore, an additional four pictures, while impossible to identify as to location, may be presumed to have been taken in the heart of Grand Canyon National Park and many miles from the affected areas.

No one denies that some areas along the Colorado River will be inundated by the proposed reservoir behind Marble Canyon Dam and the reservoir behind Bridge Canyon Dam. However, it is significant, I believe, that the Sierra Club had to go so far afield to make its case against these projects. In this entire volume one finds only 12 pictures of areas which would be inundated by these new lakes—6 at Marble and 6 at Bridge. Incidentally, several of these pictures are closeups of rocks and flora rather than broad, scenic vistas.

The book contains another 10 scenes which would be altered to some degree by these lakes. Significantly, several of these pictures are taken from the very bottom of the canyon where even a few feet of water level would change the picture.

Finally, there are two scenes in the book which, while they are adjacent to the proposed Bridge Canyon Lake, would not be altered in the slightest by the heightened water level. This is because the water level would be completely out of view, thousands of feet below these scenes.

This leaves but six photographs, all of which are impossible to identify by location. Four of these may possibly be inundated by the lake behind Bridge Canyon Dam. The final two scenes may possibly be areas that would be inundated by the lake behind Marble Canyon Dam.

Thus we see that, with all due respect to the determination of the Sierra Club to make a strong case against construction of these dams, what is portrayed in this beautiful volume has little relevance to the proposals contained in the Lower Colorado River Basin project. I am sure all lovers of the Grand Canyon will appreciate the excellent photographs contained in this volume but I trust they will understand that the truly magnificent scenes shown here are in no way endangered by this project. As a native Arizonan who takes great pride in the Grand Canyon I would be opposing this project with all my vigor if what is implied in these photographs were, in fact, the case.

In conclusion I want to make just one comment on the text of this book. In an impassioned epilog the author makes the following statement:

"The next time you visit the Grand Canyon, you might find yourself a quiet perch somewhere on the rim. Look off through the blue cast of space at the cliffs and terraces and amphitheaters and temples, search out the thin thread of the Colorado, rumbling through the gorge it has cut into the antiquity of the world, and breathe in your part of it all. It is within your power—and of those you can awaken—to make certain that this will endure."

I defy Mr. Leydet or any member of the Sierra Club to find any place on the rim of Grand Canyon National Park—where most of the pictures were taken—where such magnificent vistas as these would be altered in the slightest by the project Congress has before it today.

Now I should like to review in detail the photographs in this book:

1. The first frontispiece in the book is difficult to identify as to location. However, it may be assumed that this picture was taken between river miles 235 and 236 (mileage downstream from Lees Ferry). This is known as Vishnu Schist, and it is in Lower Granite Gorge just above the point where the Bridge Canyon Dam would be constructed. It is quite true that this scene would be inundated by the lake.

2. The second frontispiece in the book shows the Colorado River from the south rim of Grand Canyon National Park in the vicinity of Hopi Point. This scene is far removed from either of the dams or their reservoirs and would not be affected in the slightest by these projects.

3. The photograph opposite page 15 shows Yucca blooms at Toroweap overlook. This scene would not be altered at all by Bridge Canyon Lake, although the river would be elevated at this point 178 miles below Lees Ferry. The river, which is now 2,500 feet below this scene, would be more than 2,300 feet below once Bridge Canyon Dam was constructed.

4. Opposite page 18 is a photograph of cliff detail at Toroweap overlook. This picture was taken from the same elevation as the previous picture and at the same location. Once again, the scene would not be altered at all by the reservoir.

5. Opposite page 20 is a photograph looking upriver from Toroweap overlook. This scene is about 177 miles below Lees Ferry in the reservoir area. While the implication is that this scene would be flooded out by the reservoir, the fact is that the increased elevation of the river would be so slight that it would hardly alter the view seen there. From the rim to the water level is a drop of 2,500 feet at this point. In the foreground the added depth of the water would be 200 feet, leaving 2,300 feet of drop to the waterline. In the distance the depth would be but 170 feet, showing the rapid decline in water depth as the reservoir extends north and east toward Grand Canyon National Park.

6. Opposite page 22 is a detail spur of the Grand Canyon wall. While positive identification is impossible, this scene clearly is not in the reservoir area and would not be altered at all by these projects.

7. Opposite page 24 is a photograph looking downriver from near Powell Monument on the south rim of the park. This scene is far removed from either dam or reservoir and would remain untouched by these projects.

8. Opposite page 26 is a photograph looking upriver from Powell Monument on the south rim. Once again here is a scene which would not be affected by these projects.

9. Opposite page 28 is a photograph looking southeast to Sinyala Butte from Boysag Point, with Havasu Canyon in the upper right. This scene is at 154.8 miles below Lees Ferry. At this point the elevation is 5,700 feet, and the present water surface elevation is 1,792 feet. Backwater from the proposed reservoir would increase the water level to 1,876 feet, leaving over 3,800 feet of drop from the highest elevation to the river level. In this scene the increased water level would be almost imperceptible.

10. Opposite page 30 is a photograph of limestone walls downriver from Havasu Canyon. Positive identification is impossible, but it may be assumed that this location is approximately 157 miles downstream of Lees Ferry. From this river level it is obvious that increased elevation of the water surface would alter this scene. However, from the canyon walls thousands of feet above, the increased water level would appear slight.

11. Opposite page 32 is a photograph of a camp below Toroweap at 177 miles below Lees Ferry. At this point the river level would be increased from 1,686 feet to 1,887 feet, compared with an elevation of 4,200 feet at the top of the canyon wall. Exactly the same kind of photograph could be taken along the edge of the reservoir once the project was constructed.

12. Opposite page 44 is a photograph of boulder detail near 25-Mile Rapid. This closeup of rocks and boulders would be inundated by the proposed Marble Canyon Reservoir.

13. Also appearing on page 44 is a photograph of a tamarisk alongside Soap Creek Rapid at 11.2 miles below Lees Ferry. This scene of a single plant and canyon floor detail would be inundated by the proposed Marble Canyon Reservoir.

14. Opposite page 46 is a photograph of Marble Gorge below Sheerwall Rapid at 15 miles below Lees Ferry. The river at this point has an elevation of 3,017

feet compared with an elevation at the top of the canyon wall of approximately 3,300 feet. The reservoir would raise the water elevation 123 feet.

15. Also appearing opposite page 46 is a photograph of a campfire in Marble Gorge. The precise location is impossible to determine but it may be assumed that this particular campfire site would be inundated by the reservoir.

16. Opposite page 48 is a photograph of the mouth of Tiger Wash at 26.7 miles below Lees Ferry. The Marble Canyon Reservoir would increase the water level from 2,900 feet to about 3,140 feet compared to an elevation at the rim of the canyon of about 5,200 feet.

17. The lower photo opposite page 48 shows the Royal Arches at 41.5 miles below Lees Ferry. This scene is downstream from the proposed Marble Canyon Dam and would only be affected if an afterbay were constructed downstream from the dam.

18. Opposite page 50 is a photograph of a sunset as seen near Nankoweap Creek at 52.8 miles below Lees Ferry. This scene would not be affected by construction of either of these dams.

19. The lower left photo opposite page 50 shows Redwall Cavern at 33 miles below Lees Ferry. This cavern would be inundated by the proposed Marble Canyon Reservoir. At present the water surface elevation is 2,865 feet, compared to an elevation of the canyon wall of 3,250 feet.

20. In the lower right, opposite page 50, is a picture taken near Marble Gorge Dam site at 39 miles below Lees Ferry. The increased water level would alter this low-angle scene but not obliterate it. The surface elevation at present is 2,838 feet, compared to an elevation at the canyon rim of 3,600 feet.

21. Opposite page 52 is a view of Vasey's Paradise at 31.9 miles below Lees Ferry. This scene would be inundated by the Marble Canyon Reservoir.

22. Opposite page 54 is a beautiful scene of the river near the mouth of Tapeats Creek at 133.7 miles below Lees Ferry. This scene would not be altered by either of these projects.

23. Opposite page 56 is a mosaic of boulders in Nankoweap Creek at 52.3 miles below Lees Ferry. This scene will not be affected by either of the proposed reservoirs.

24. Opposite page 58 is a breathtaking scene of a dune and pool at the mouth of Comanche Creek at 67.5 miles below Lees Ferry. This scene in the heart of Grand Canyon National Park would not be affected by either of the proposed reservoirs.

25. Opposite page 60 is a photograph of evening primrose at Granite Falls Rapid, 93.5 miles below Lees Ferry. This scene would not be affected by either of the reservoirs.

26. Opposite page 62 is a photograph near the water's edge at 25-Mile Rapid. This closeup of rocks and flora would be inundated by the proposed Marble Canyon Reservoir.

27. Opposite page 64 is a photograph of a dune near Monument Creek at 93.5 miles below Lees Ferry. This scene would not be affected by either of the reservoirs.

28. Opposite page 66 is a splendid photograph of Red Canyon at Hance Rapid, 76.7 miles below Lees Ferry. This scene would not be affected by either of the reservoirs.

29. Opposite page 68 is another scene in Red Canyon. This scene also is far removed from either of the proposed reservoirs.

30. Opposite page 70 is a beautiful photograph looking down Bright Angel Canyon toward the south rim of Grand Canyon National Park. This scene would not be affected by either of the reservoirs.

31. Opposite page 72 is a view of aspen on the Kaibab Plateau. This scene would not be affected by either of the reservoirs.

32. Opposite page 74 is a scene of willows and sand dune near Nankoweap Creek. This scene would not be affected by either of the reservoirs.

33. Opposite page 76 is a scene of a sandbar opposite Lava Canyon at 65.5 miles below Lees Ferry. This scene would not be affected by either of the reservoirs.

34. Also opposite page 76 is a view of mesquites along Nankoweap Creek. This scene would not be affected by either of the reservoirs.

35. Opposite page 78 is a view of a sunset looking downriver from Nankoweap Creek. Again, here is a scene which would not be affected by either of the reservoirs.

36. On page 82 appears a picture of Granite Falls Rapid at 93.5 miles below Lees Ferry. Again, here is a scene removed from either reservoir area.

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37 and 38. Also appearing on page 82 are two scenes of Lava Falls at 179.4 miles below Lees Ferry. At this point Bridge Canyon Reservoir would raise the water level 200 feet.

39. The upper photo on page 83 is of Serpentine Rapid at 106 miles below Lees Ferry. This scene would not be affected by either of the reservoirs.

40. The lower photo on page 83 is another scene of Lava Falls, also called Vulcan Rapid. The water level here would be elevated 200 feet by Bridge Canyon Reservoir.

41 and 42. On pages 92 and 93 appear scenes of the canyon wall in Granite Gorge. The exact locations cannot be determined but it may be assumed that these scenes would be inundated by the Bridge Canyon Reservoir.

43. On page 100 in the upper left is a photograph of deer and fawn at Greenland Lake at Kaibab. This scene would not be altered in the slightest by these reservoirs.

44. In the upper right on page 100 is a scene of bassarisk and insect tracks in Salt Creek Canyon. Salt Creek Canyon joins the Colorado River at 92.6 miles below Lees Ferry, far removed from either of the reservoirs.

45. In the lower left on page 100 is a photograph of a bobcat drinking at Harvey Spring. This scene on the Kaibab Plateau would not be effected by either of the reservoirs.

46. In the lower right of page 100 is a photograph of a black-chinned hummingbird in catlaw at President Harding Rapid. This scene would not be affected by either of these reservoirs unless an afterbay reservoir were constructed downstream from Marble Canyon Dam.

47. In the upper left of page 101 is a photograph of a Kaibab squirrel. The Kaibab squirrel is a native of the Kaibab Plateau, clearly outside the areas of these projects.

48. In the lower left of page 101 is a photograph of a collared lizard. It is impossible to determine at what location this picture was made.

49. In the upper right of page 101 is a photograph of bighorn sheep near Elves' Chasm at 116.5 miles below Lees Ferry. This scene would not be affected by either of the reservoirs.

50. In the lower right of page 101 is a photograph of a canyon tree toad in Phantom Canyon. Neither this scene nor Phantom Canyon would be affected by either of the reservoirs.

51. In the upper left of page 104 is a photograph of a dragonfly in Clear Creek, Clear Creek joins the Colorado at 84.2 miles below Lees Ferry. Neither Clear Creek nor this scene would be affected by either of the reservoirs.

52 and 53. The two other photographs on page 104 show a great blue heron and an egret. The locations of these photographs are not known.

54. At the top of page 106 appears a scene in Elves' Chasm at 116.5 miles below Lees Ferry. This scene would not be affected by either of the reservoirs.

55. In the lower left of page 106 is a picture of Thunder River, which is a tributary to Tapeats Creek about 133 miles downstream from Lees Ferry. Neither Thunder River nor this scene would be affected by either of the reservoirs.

56. In the lower right of page 106 is a picture of Travertine Canyon at 229 miles below Lees Ferry. This scene would be inundated by the proposed Bridge Canyon Reservoir.

57. The upper photograph on page 109 is a scene at the head of Dubendorff Rapid, 131.6 miles below Lees Ferry. Neither Dubendorff Rapid nor this scene would be affected by either of the reservoirs.

58. At the bottom of page 109 is a detail of a dune at Dubendorff Rapid. Again, here is a scene which would not be affected by either of the reservoirs.

59. The upper photograph on page 111 is a beautiful scene looking northeast from near Yaqui Point in the heart of Grand Canyon National Park. This scene is far removed from either of the proposed reservoirs.

60. The lower photograph on page 111 is of Tapeats Creek. Neither Tapeats Creek nor this scene would be affected by either of the proposed reservoirs.

61. On pag 113 appears a scene of a beach at Spring Canyon, 204.4 miles below Lees Ferry. Bridge Canyon Reservoir would raise the water elevation at this point approximately 380 feet.

62. The upper photograph on page 115 is of Mooney Falls in Havasu Creek. This scene, approximately 5 miles up Havasu Creek from its junction with the Colorado River, would remain unchanged by Bridge Canyon Reservoir, although the reservoir would raise the water level at the lower end of Navasu Canyon.

63. The lower photograph on page 115 shows Havasu Creek at its junction with the Colorado River, 156.7 miles below Lees Ferry. This scene would be inundated by Bridge Canyon Reservoir.

64. The upper photograph on page 117 is of the shore along Hermit Rapid at 94.9 miles below Lees Ferry. Neither Hermit Rapid nor this scene would be affected by either of the reservoirs.

65. The lower photographs on page 117 shows "Mayan" reliefs below Havasu Creek. The exact location of this picture cannot be determined, but one can assume that this area of cliff would be inundated by Bridge Canyon Reservoir.

66. The upper photograph on page 119 shows a desert plume below Whitmore Wash at 189 miles below Lees Ferry. This little scene would be inundated by Bridge Canyon Reservoir.

67. The lower photograph on page 119 shows Fern Glen at 168 miles below Lees Ferry. Depending upon the elevation of this photograph, it is possible that this portion of the canyon wall would be inundated by the proposed Bridge Canyon Reservoir.

68. On page 122 appears a scene at the mouth of Whitmore Wash, 188 miles below Lees Ferry. The present river elevation is 1,597 feet at this point. Bridge Canyon Reservoir would raise the river elevation to about 1,875 feet compared with an elevation of 3,200 feet at the rim of the canyon.

(The five photographs appearing on p. 125 are scenes along the shores of Lake Mead.)

69. The upper photograph on page 127 is of a camp scene above Kanab Creek at 143 miles below Lees Ferry. The water surface at this point is 1,884 feet. Just upstream of the farthest extremity of the Bridge Canyon Reservoir, this scene would not be altered by the reservoir.

70. The lower photograph on page 127 shows a camp at Monument Creek, 93.5 miles below Lees Ferry. This scene would not be affected by either of the reservoirs.

71. The picture on page 129 shows Separation Canyon, 239.5 miles below Lees Ferry. This scene is 2 miles downstream from Bridge Canyon Dam site. It would not be affected by either of the proposed reservoirs but only by existing backwater from Lake Mead.

72. On page 141 is an evening scene below Toroweap, 177 miles below Lees Ferry. This photograph was taken from the same location as that appearing opposite page 32. The Bridge Canyon Reservoir would raise the water level here from the present 1,686 feet to 1,887 feet, compared with an elevation of approximately 4,200 feet at the rim of the canyon.

73 and 74. On pages 143 and 145 appear two exceptionally beautiful pictures of Deer Creek which joins the Colorado River about 136 miles below Lees Ferry. Neither Deer Creek nor these beautiful scenes would be affected by either of the reservoirs.

75. On page 147 is a photograph of Ruby Canyon, 104.6 miles below Lees Ferry. Again, here is a scene far removed from either of the reservoirs.

76. On page 149 is an exquisite emerald green photograph of Monument Creek, 93.5 miles below Lees Ferry. This scene would not be affected by either of the reservoirs and is many miles from either of them.

77. On page 151 appears a picture of desert plume and mallow in Marble Gorge. Positive identification of this picture is impossible but it may be assumed that this closeup of the floor of the canyon would be inundated by Marble Canyon Reservoir.

78. Appearing on page 153 is a typical Grand Canyon scene looking upriver from Hopi Point in the evening. As far as the eye can see there is nothing but the enchantment of nature untouched by human hand. This is the way it should be and the way it will remain if these two dams are constructed. This scene in the heart of Grand Canyon National Park is absolutely secure from any encroachments contained in the Lower Colorado River Basin project or any other legislation likely to be considered by the Congress.

79. On page 154 is a sunset scene looking upriver from Hopi Point in the heart of Grand Canyon National Park. Again, here is a scene that has no relevance to the proposed dams in the Lower Colorado project.

(Pp. 158 to 175 inclusive contain scenes in Glen Canyon which have been inundated by Lake Powell.)

Mr. UDALL. Let me say just to summarize my analysis that this chief reference book in this battle contains 79 pictures. Out of this

79, 45 of them have nothing to do with the dams and reservoirs. They are removed as much as 50 or 60 miles from anything even touched by these dams.

We finally get down to analyzing these 79 pictures and find only 12 of the scenes that would be inundated by the new lakes. Six of these twelve are behind Marble, which is completely outside the Grand Canyon, and only six are affected by Bridge Canyon Dam. Let me give my colleagues a couple of examples.

Before I proceed further, since this book has gone into the file, I ask unanimous consent that my copy go into the file with the analysis. We have prepared overlays showing where the water would be on each one of the 12 pictures that are affected by the dam. I hope any one who looks at their book will look at my copy and my analysis.

Mr. ROGERS. Without objection, the book will be received in the file for the purpose which you outline.

(The book referred to will be found in the files of the subcommittee.)

Mr. UDALL. This frontispiece picture is fine and it is beautiful. The only trouble is it is taken at Hopi Point, which is 50 river miles from the nearest point of the Bridge Canyon Reservoir, and at least 30 miles from Marble Canyon Dam.

If you turn on back here to the picture which is opposite page 15, a very beautiful view that shows scenery and plants, the river is at least a half mile below this. This view will look exactly the same way it does now.

You finally find at page 28 something that bears on the river and the dams. You find that the little blue which we have indented in there is the lake that you see. Otherwise, the view will be completely unchanged.

I will give my colleagues one more sample here. These very gorgeous sand dunes on page 58, the plants and the life that are shown there, you would think from reading the book that this would be utterly destroyed. They only happen to be 28 miles below the Marble Canyon Dam and 89 miles from the nearest point of the Bridge Canyon Reservoir.

Mr. ROGERS. The Chair recognizes Mr. Burton of Utah.

Mr. BURTON of Utah. I ask unanimous consent that I be allowed to yield my time to the gentleman from Arizona.

Mr. ROGERS. Without objection, the gentleman from Arizona is recognized.

Mr. WHITE of Idaho. May I also yield my time to the gentleman from Arizona?

Mr. ROGERS. Is there objection?

Without objection, the gentleman from Arizona is allotted 7 minutes.

Mr. UDALL. I thank my colleagues.

The point I am trying to make in this book without taking any more time on photographs is that this is the thing they are trying to use to defeat the project. Out of 79 pictures, only 12 are in the area that will be affected by the dams. I ask my colleagues to look at the overlays to see the effect this dam would have when it is completed. I think it is a devastating analysis and study. I hope my colleagues will look at it.

Mr. BROWER. Would it be possible to make a response here, either here or in writing?

Mr. ROGERS. Mr. Udall has the time.

Mr. UDALL. I waited a long time to make my comments on this. I will give you a minute's time.

Mr. BROWER. What I was calling the chief reference book for this battle in this hearing is the record of this hearing.

Mr. UDALL. On page 2 of your statement, you say:

> I should like to submit for inclusion in the record of these hearings, because that record is going to be the chief reference book for the most important conservation battle of the decade.

I am sorry. I read it quickly. I apologize to you. You did say the record of the hearings.

Mr. BROWER. The other point I make, and you can question the author of the book here if you wish, is that we at no time alleged or said that we were portraying in this book only what is going to be affected by the reservoirs. What we put in this book is the best photographic and textual interpretation we could make of the entire Grand Canyon, from Lees Ferry down to the Grand Wash Cliffs, in the Grand Canyon. That is the geological entity. This is what our book endeavors to cover, including the views from the rim, the views from the river, the living river. We tried to stress the importance of a living river, and also, in part of the argumentive portions of the text, what would happen to that living river if the dams were constructed.

Mr. UDALL. Does it not leave a false impression when you are trying to preserve a living river, and 95 percent of what you are showing will be left? I think it is the intent of the book to leave the impression that all of this will be gone.

Mr. BROWER. Our intention, and I think it comes off pretty well and fools no one, is that we would lose with those dams the living heart of the river, which is the most important part of the exhibit.

Mr. UDALL. Was not the living river, as you put it, destroyed when Lake Powell was constructed?

Mr. BROWER. No; not by a long way. One of the pictures of the rapids was taken when Lake Powell was practically closed. There is enough flow below that to keep the river alive.

Mr. UDALL. It is going to be over the dead bodies of many citizens of Arizona and California that you stop that river from flowing. The testimony here has shown that we need 7½ million acre-feet to use in that river every year. It has to come down from here. How can you argue as one of you did in your statement that there will not be any water flowing in the river? We have to have it at Lake Mead. You say the river's flow will be stopped through Grand Canyon?

Mr. BROWER. It will be greatly reduced. It will be an off-again, on-again river, especially if the dam is used for peaking purposes.

Mr. UDALL. You stated that the great thing about this river is that it is a wild river. You have water coming down there in the spring in great torrents. Now you suggest that because the flow of the river is going to differ from time to time, something is going to be lost. I thought that is what you want, great flows of water coming through there as it did since the beginning of time.

Mr. BROWER. I think one of the earlier witnesses pointed out that when water is turned off as though with a faucet, it has an effect that one of the reclamation men once described, I am sure in jest, when he said that after the dam is constructed, they would open it now and again and flush us river runners down.

Two things happened on our two trips: On the one we ran to make the photographs for this book, the water was turned off and people flew by from the Park Service warning us to get out because there would not be any water. There was trouble on the more recent trip this year when the river was turned down during the night and the boats were far from water the next morning. That happened to be a happy circumstance. The reverse would be quite unhappy.

Mr. UDALL. I am afraid I shall not convince you and I am sure you will not convince me.

Mr. BROWER. I will keep trying.

Mr. UDALL. Let me use what time I have left to correct more false impressions which have been left. The committee has been told that if the Marble Dam is built the Bureau is taking steps to provide access for river boat runners, talking in terms of an elevator primarily for access to the powerplant, but which could be used for the river runners. Present and estimated river traffic is relatively small and thus, only limited access is now provided. But costs are included in the Marble Canyon project, allocated to recreation for means of getting all the river runners that want to get down the river access to get down to the river. I would say in my contention, these dams are constructed to make sure that you people and others have plenty of access to the river and I think this can be arranged and will be arranged without difficulty. The specter held up here, of locking up the river so no one can get down to it, is not going to occur and has not occurred with the other dams. I think it is misleading to suggest that anyone wants to keep people away from the river.

Another comment I want to make is my objection to the people who come before this committee who think they know better than the water engineers of all the States affected about the waste of water from the river. We are short of water. We are starving for water. If we felt we were going to waste more water through evaporation than we would save by these dams, we would be against them, too.

The gentleman from Colorado said today, that if the dams are not built, the water ends up in Lake Mead anyway and this is one of the lakes that evaporates water better than most. It is wide and broad and exposed to the hot sun and the wind. These narrow canyon lakes that will be impounded by these two dams are about as good sites as you can find anywhere in the world for avoiding evaporation.

Mr. BROWER. I cannot forbear commenting that in an earlier controversy before this committee, the Bureau of Reclamation's experts on evaporation were proved wrong by this witness. I think the figures on evaporation are all pretty much estimates. The only thing that is measured fairly accurately still is the evaporation from Lake Mead. But I think that if you were to go to the Geological Survey and the hydrologists there for your information, you would find that the excess evaporation resulting from these two dams would be at least 100,000 acre-feet.

Mr. UDALL. My answer is that our engineers say that you get much more than that if the same water, which undoubtedly would flow through the canyon, gets to Lake Mead and spreads out.

Mr. BROWER. I think there was a correction on that from a member of the committee on what the meaning of that is. This is the same kind of reasoning we got into in the reverse way when we were proposing at one time that Glen Canyon be built higher, using the Bureau of Reclamation's own figures, so that Echo Park Dam would not need to be built at all. The water could be stored at a higher Glen with much less loss of total water by evaporation.

Mr. UDALL. I am sure neither you nor I have these answers, but we have had so many self-appointed experts on hydrology and evaporation give us information that I am inclined to rely on the experts and the people in our States who have made a lifetime study of this.

Mr. ROGERS. The time of the gentleman has expired.

The Chair recognizes Mr. Wyatt.

Mr. WYATT. I would like to inquire, if I can, and either of the gentlemen may answer, whether or not the Sierra Club itself has employed or had available to the club experts either in power or in hydrology?

Mr. BROWER. We have had a good many experts available to us. Included in our 32,000 members are a good many who are with Government departments, many who are working with engineering firms, who are caught in the embarrassing position of not being able to have attributed to them statements that are perfectly accurate. This is a difficulty that happens again and again.

I know of one research firm and I know of a major engineering firm who cannot submit testimony in their own name because this would embarrass them before the Bureau of Reclamation, with whom they have separate contracts. This is one of the difficulties that the common citizen has in trying to bring before the Congress, with very limited means anything at all that would begin to counteract the very adequately financed Government bureaus who can present their case and augment it with training aids in the Capitol rotunda or maps all over the room.

We therefore do have the support of the people who know these things. One person who helped me most on the Echo Park battle was Walter L. Huber, now dead. He was the president of the American Society of Civil Engineers. He went over all my material very carefully. I can say this now. I could not say it then.

We have similar help now from very skillful people, who are on a par with any of the Federal engineers—whose salary the public also pays.

Mr. WYATT. Thank you, Mr. Brower, very much. I might say I am looking through your two books and I find them fascinating.

I would like unanimous consent to yield the balance of whatever time I may have left to Mr. Hosmer.

Mr. ROGERS. Mr. Hosmer?

Mr. HOSMER. I ask unanimous consent to use the time with my regular time.

Mr. ROGERS. He has yielded you a minute and a half.

Mr. Tunney?

Mr. TUNNEY. I would certainly like to welcome Mr. Brower.

It is nice to see you again. I certainly appreciate your statements. I am curious to know if there are, to your knowledge, any hydrologists or experts working for any of the State agencies in the lower basin which would support the position that you have been arguing today, that it would be better to not have these hydropower plants, these dams, built along the river, that you could more efficiently pay for this by using thermal plants?

Mr. BROWER. I guess the first part of your question leaves me a little vague.

Mr. TUNNEY. I am wondering if there are any State agencies affected in the lower basin, Nevada, Arizona—or in the upper basin, any hydrologists, who would support the position you have taken today?

Mr. BROWER. I do not know. There may very well be. I doubt that any of them in the basin States now, if they are in the State water resources groups, could speak out. This is true of the chief adviser we have on this subject.

Mr. TUNNEY. Why is it that all the State agencies seem to take the same position? Can you explain that?

Mr. BROWER. I think that the States have had it made quite clear to them that they are not going to get very far with the project unless they present a common front. I think this was made clear by Secretary Udall. But I do not like to sound as if we are in a position of not wanting the water delivered that we are talking about. We want the water on the land. We are talking entirely about how it is financed and the parks.

Mr. TUNNEY. Are you suggesting that it would be best to have a per capita tax on the water users downstream?

Mr. BROWER. This is one of the suggestions that is made by Professor Bradley in the latter part of his statement. He has done about as much research on this as anyone. He suggests several alternatives, one of which, and not quite facetiously, is that if the cost of these dams could be invested in Government bonds, that would produce more income than the dams themselves would.

Mr. TUNNEY. Well, Mr. Udall was making some comments regarding the fact that so many of these pictures that are in this book, "Time and the River Flowing," for example, are not representative of those areas which are going to be inundated with water. I am curious to know from your point of view, do you think that this book fairly and objectively represents the point of view of the conservationists?

Mr. BROWER. Well, I think that it is eminently fair and just as accurate as we could make it. There is no attempt to mislead and this is the first time it has been charged that it is misleading. I think that it does what it purports to do, represents the asset that the whole Grand Canyon is, upstream and downstream, from rim to river. It also does show the kind of thing that is lost.

Mr. ROGERS. The gentleman's time has expired.

The Chair recognizes the gentleman from California, Mr. Reinecke.

Mr. REINECKE. Thank you very much, gentlemen. I appreciated both of your testimonies.

We seem to be coming to a focal point here on this question of evaporation, as my colleague from Arizona has pointed out. I think it would be well for some of us on the committee to prepare some questions for the department and get answers so we do get clarification on this matter. I personally feel that we should at reasonable costs preserve all natural beauty where reasonable alternatives are available to us. But we are living under a pretty heavily industrialized society, where power is an essential thing. However, I think you people have represented yourselves very well. I certainly do not take offense at the suggestion that it was a misunderstanding on the part of my colleague.

Thank you, Mr. Chairman.

Mr. ROGERS. Mr. Burton?

Mr. BURTON of California. I would like personally to welcome Mr. Brower and Mr. Nash from my part of the country.

I have been impressed with your demeanor. Your statement interests me and I have been quite impressed with Dr. Bradley's statement.

You would favor or disfavor a lower Bridge Canyon Dam?

Mr. BROWER. We are against any further dams in the Grand Canyon. This represents an evolution in our own thinking. There was a time, and the Grand Canyon book makes this clear in one of my own statements there in the early part, when the Sierra Club was for the Bridge Canyon Dam. Ten years ago I was testifying in favor of a higher Glen Canyon Dam and I wish I had been struck dead at the time. We found out how wrong we had been.

I would just stress that over these years, our own thinking has evolved and I still hope that Mr. Udall's will.

Mr. BURTON of California. Your point with reference to the loss of perhaps 100,000 acre-feet presupposes the construction of both dams?

Mr. BROWER. Those are the Bureau of Reclamation's figures for both dams as we had them available in the presentation material earlier.

Mr. BURTON of California. That is just one reason, separate and apart from other reasons, in your point of view, as to why the dam should not be constructed; is that it?

Mr. BROWER. We are opposed to having a major scenic resource, famous all over the world, altered in a major way, especially in its heart, from its original structure—especially in the national park and national monument, because these have particular meaning to the people. I think I could comment—if I knew what Mr. Udall's comments were—which reservoirs we have in the parks, which reservoirs are there as precedents. I could comment on how none of them would be the damaging precedent this would be. We are concerned about the national park system itself. If that cannot stand up and be upheld by the Congress, there is not much point in trying to put new parks in it, which this committee has very thoughtfully been doing. The other points, the economics, the hydrology, we get into in ancillary argument.

We start with the point that we want to save Grand Canyon from what we think is a major threat. Having determined that, we try to figure out what the alternatives are, what the arguments are, as best we can.

Mr. BURTON of California. How do you address yourself to the point that just a few hundred people have been taking advantage of these river rapids?

Mr. BROWER. This does not bother us, really, at all. Taking advantage by actually riding the river is quite an experience. I have not gone down anything like the ride through Grand Canyon itself. I have gone through Glen Canyon many times and through Dinosaur twice. But it is my own feeling that until someone has had the experience of being on a living river and going with it and finding what that river means to a land or to a whole countryside, he should be very wary of passing judgment that would extinguish this force. It is a beautiful thing.

Mr. ROGERS. The time of the gentleman has expired.

We have the gentleman from California, Mr. Hosmer, for 5 minutes.

Mr. HOSMER. Mr. Brower, let me say I am among those who are delighted that you did not drop dead 10 years ago. I think you and the Sierra Club have done a magnificent job for the country and because I happen to think you are a little off-base on this one, I hope it will not destroy the friendship we have always had.

Can you tell me how many people approximately have gone down this stretch of the river below the park?

Mr. BROWER. I cannot, but I think we can supply a pretty good figure there.

Mr. HOSMER. Would you say the order of magnitude was somewhere around 900?

Mr. BROWER. Something like that. I think 600 this last year.

Mr. HOSMER. I mean altogether?

Mr. BROWER. About 900 altogether; 600 this year, which gives quite a rise to project from.

Mr. ROGERS. Would the gentleman yield to the Chair?

Mr. HOSMER. Yes.

Mr. ROGERS. How many of those 900 were killed in the process? Any?

Mr. BROWER. There have been fatalities. I cannot give the number. But I think François Leydet, in the audience, who wrote the book and knows, says five.

Mr. HOSMER. I think we have in this country a population of somewhere around 190 or 200 million people.

Mr. BROWER. I am afraid it is.

Mr. HOSMER. I direct your attention to this display showing the map of the national park and an area of 13 miles of the some 100 miles which the Bridge Canyon Reservoir would penetrate. I also direct your attention to a scale profile of the area where the Bridge Canyon Reservoir would enter the park territory. I direct your attention to the depth of the lake at Deep Canyon and ask you if the lake would be visible from any point of observation on the rim of the canyon?

Mr. BROWER. I believe it would, but I defer to François Leydet, who will be a witness later, who can supply the answer to that.

Mr. HOSMER. Were you here yesterday when Senator Goldwater testified?

Mr. BROWER. I got the later part of the statement.

Mr. HOSMER. He made a statement that it would cost somewhere between $350 and $1,000 per individual to make this trip down the river. Does that sound somewhere in the ball park?

Mr. BROWER. No; we have conducted trips down there and I know Georgie White does for less than that.

Mr. HOSMER. For individual? How much?

Mr. BROWER. I don't know. I will have to supply it.

Mr. HOSMER. You have to be a member of the Sierra Club or somebody connected with that?

Mr. BROWER. Oh, no.

Mr. HOSMER. What does it cost to go down there, from California, to make that trip?

Mr. BROWER. I do not have the answer to that. I can supply it.

Mr. HOSMER. It would be several hundred dollars, would it not?

Mr. BROWER. But also in supplying that, I can supply what it costs to rent a powerboat to get into the canyon—when you can get into it—at the head of Lake Mead.

(Information will be found in a letter on p. 818.)

Mr. HOSMER. I think the boat rental rates at Lake Powell would be more comparative.

What I am leading up to is, I would like my children to see some of the wild territory out here. I have two youngsters. I cannot spend $350 or $1,000 to send them down that river. But I could drive up to a lake there and rent a powerboat and get them in there. Now, why do you want to keep that territory from my children and other children for the less than 900 people in history that have gone up that area? Why can't the rest of we Americans go in there?

Mr. BROWER. I think we must preserve, among other things, the opportunity for adventure, for something that is a little more inspiring than running a motorboat.

Mr. HOSMER. And that 13 miles of the whole United States has to have the attention of the Sierra Club for saving?

Mr. BROWER. No; we are talking about the entire length of the Grand Canyon.

Mr. HOSMER. The only place that Bridge Canyon Dam is going to go is in the first 13 miles of the park.

Mr. BROWER. Begging your pardon, Mr. Hosmer.

Mr. HOSMER. I see what you mean. I will grant you that. I am talking about the rest of that canyon, too.

I am going to show you two photographs, one of which purports to be a representation of the canyon at the point 13 miles into the park where the lake would essentially begin, just a little bit below that. The other of the pair has been colored in to show what it might look like having the lake there. Admitting that the coloring is not as good as the natural colors would be, and so forth, I want you to tell this committee what is the vast difference there that would so derogate and deteriorate this piece of real estate that we are to continue it as inaccessible and remote and deprive most of the American people from the opportunity of seeing it?

Mr. BROWER. Well, in the first place, we would not accept either photograph for publication, because they are not very good.

In the second place, these two photographs miss the issue completely. The Bureau of Reclamation is not in business to provide recreational access for the public. They have done very well.

Mr. HOSMER. We have recreational benefits at all our projects that are at public expense and not reimbursable. We recognize that, do we not?

Mr. BROWER. We do.

Mr. HOSMER. They are an incidental?

Mr. BROWER. Six hundred miles of existing reservoirs are fine, except for Lake Powell, which I would like to see emptied out again.

Mr. HOSMER. You do not want to answer my specific question?

Mr. BROWER. Your specific question is that at this point, at the head of the reservoir, presumably, there is not an extraordinary difference. But neither picture is a seeking out fact, in my own opinion.

Mr. ROGERS. The time of the gentleman has expired.

Mr. HOSMER. Mr. Chairman, I ask unanimous consent at this point to insert in the record a statement I have made relative to Bridge Canyon's esthetic problem, and it is my own work.

Mr. ROGERS. Without objection, the unanimous consent request will be granted.

(The statement follows:)

STATEMENT OF MR. HOSMER

NOTICE TO CONSERVATIONISTS: THE GRAND CANYON WILL NOT BE FLOODED

Members of Congress are being deluged with letters from honest and sincere people protesting what they call the flooding out of the Grand Canyon. If this were about to happen I would be right in there with them protesting as loud as anybody. This is not the case, however, and I would like to put the record straight.

There are before the Interior Committees of both the House and Senate bills to authorize the Lower Colorado River Basin project, formerly known as the Pacific Southwest water plan. This is a bold, necessary, and imaginative project for the vital purpose of relieving arid conditions in the States of Arizona, Nevada, and California, whose increasing populations, burgeoning industries, and large agricultural economies are contributing so greatly to the progress of the United States and its position of world leadership. New and additional sources of water simply must be found if this area of our Nation is to continue playing its major role in America's destiny.

Already the State of California is investing over a billion dollars in the Feather River project which—as vast as it is—only will provide water sufficient for increased uses during the immediate future. The desalting of sea water holds great promise for the distant future but only by maximum utilization of nature's own water can this vital element of life be supplied to homes, factories, and farms at a cost which will not stifle the economy on the Pacific Southwest.

The Lower Colorado River Basin project represents a historic act of unity between the States of the Lower Colorado Basin which for a century have fought amongst each other over their shares of the Colorado River's meager waters. The project's concept is fully within the criteria for sound resource management. It will repay every cent of Federal investment in it and, by underpinning the improvement and advancement of the Pacific Southwest, will provide substantial additional tax resources to all levels of government.

The keystone and all-important features of this project is a concept of regional water resources development financed by an overall basin account. Hydroelectric plants will provide the necessary revenues to underwrite the pumping plants, aqueducts, reservoirs, pipes, and conduits that make water available. Without these hydroelectric plants the plan is totally infeasible and impossible of accomplishment.

The plan envisions construction of two dams for hydroelectric generation. Marble Canyon Dam is to be upstream from Grand Canyon National Park. Bridge Canyon Dam will be downstream at the headwaters of Lake Mead. Its lake will back upstream about 93 miles. Approximately the last 13 miles of the headwaters of this lake will be in Grand Canyon National Park to the extent that the natural bed of the Colorado River is within the park's boundary at this location. Less than 1 percent of the total geographic area of the park will be

affected. No part of the reservoir will be visible from any established observation point on the rim or on the river. One would have to float far downstream to detect any change whatever. This is hardly a "flooding out" of the Grand Canyon. It interferes in no way with any use of the Grand Canyon which conservationists are making.

When the Grand Canyon Park was created by act of Congress in 1919 it was specifically understood that the park was not to interfere with reasonable developments. The act specifically provides the following:

"Whenever consistent with the primary purposes of said park, the Secretary of the Interior is authorized to permit the utilization of areas therein which may be necessary for the development and maintenance of a Government reclamation project."

This is a context in which the Lower Colorado River Basin project has been formulated. Let me say, emphatically, that there is no intention or even a remote physical possibility of "flooding out" Grand Canyon. A stretch of 104 miles of natural river will remain between the headwaters of Bridge Canyon Dam and the Marble Canyon Dam. This magnificent chasm created by the forces of nature dwarfs even the most dramatic efforts of man. We couldn't flood it if we wanted to. And, we do not want to. The only thing that will happen in the canyon is realization of the awareness that long ago, in 1919, was expressed that there must be some reasonable development of the Colorado in this general area if the river's waters are to be used to the fullest extent possible for the benefit of the Pacific Southwest and all Americans.

Some people have argued that the sum of 10 cents a year from every individual in the United States would compensate for the loss of Bridge Canyon and Marble Canyon Dams. This simply would mean an added cost to the water and power users or to the taxpayers of the United States of $18 to $20 million annually. This kind of added cost is simply irrational in relation to the minor extension of a beautiful new lake, a relatively minor distance into the Grand Canyon National Park. The 104 miles of natural river just mentioned, will include about 91 miles within the boundaries of Grand Canyon National Park itself. The same matchless and unaltered view still will be available from the rim. The same muleback trips or long, arduous foot descent and climb will be possible and in no way deteriorated or impaired.

Some people are suggesting instead of hydroelectric plants that thermal-generating plants be installed at other locations to act as cash registers for the Lower Colorado River Basin project. This, too, is lacking in reason in relation to the purposes and economics of the project. The dams are needed not only to produce power but as well to regulate flow of the river which varies greatly from year to year. The system of lower basin dams, including Davis, Parker, Hoover, Bridge Canyon, and Marble Canyon, will insure steady supplies of water for the lower basin in wet years and dry years. These dams will operate in conjunction with those of the Upper Colorado River Basin to regulate the entire river so that tremendous benefits will accrue to all seven States which have major dependence on it. Additionally, newly developing economics of power generation in the Far West are placing an ever-higher premium on hydroelectric power for peaking purposes. For this reason the Bridge and Marble Canyon Dams' hydroelectric facilities can be operated to maximize electric revenues in a manner which thermal-generating plants can never be.

Unless the Lower Colorado River Basin project as planned is allowed to proceed, the Nation will not keep faith with the people of the Pacific Southwest. The Colorado River is the lifeblood of the Rocky Mountain and Pacific Southwestern States. The lower basin has seen no river developments of consequence since Davis Dam was completed in 1950. In this decade and a half, the population of Arizona, southern Nevada, and southern California—the service area of the Lower Colorado River Basin—has increased 85 percent and there is no sign of any letup in growth. The visionary leaders of the early days had the wisdom to know that the Colorado River's primary use must be for sustaining the life and economy of the area it serves. The time has now come when it must be developed to its maximum for that purpose. Construction of Bridge and Marble Canyon Dams are an integral part of the plan devised by cooperative efforts of the Federal Government and States to that end. Any further stalemate will have disastrous consequences. It must be prevented at all costs.

Already many of the most dedicated of conservationists are commencing to appraise these facts as they are and realistically withdrawing their objections to the construction of these dams. They are aware of the extreme need of both the Pacific Southwest and the entire country for maximum development of the

Colorado. They know that the cause of conservation can only be harmed by an unreasonable campaign aimed at an unreasonable objective; namely, paralysis of the growth and progress of America. They respect not only needs and viewpoints other than their own with respect to economic developments, but as well the vast recreational opportunities these two new beautiful lakes will open up to millions of their fellow citizens.

SIERRA CLUB,
San Francisco, September 14, 1965.

SUBCOMMITTEE ON IRRIGATION AND RECLAMATION,
House Committee on Interior and Insular Affairs,
Washington, D.C.

GENTLEMEN: When David Brewer and I were testifying for the Sierra Club in opposition to H.R. 4671, on August 31, Congressman Craig Hosmer, of California, referred to river trips through Grand Canyon costing as much as $1,000. His point was that reservoirs in Grand Canyon would enable people of low income to enjoy boat trips in the canyon at much lower cost.

We assured the committee at that time that Sierra Club trips through the canyon cost much less than $1,000, but since we did not have facts and figures at hand, we promised to send them for inclusion in the recrod of the hearings. Sierra Club trips in Grand Canyon in recent years were as follows:

1961: Two 9-day trips, @$225 ($25 per day).
1962: One 9-day trip, @$225 ($25 per day).
1964: One 6-day trip, @$140 ($23.33 per day).
1965: Two 10-day trips, @$275 ($27.50 per day).

By way of comparison, I have been told by National Park Service personnel that concessionaires at Lake Powell charge $25 per person for the 1-day excursion from Waweap to Rainbow Bridge. I am also informed that 16-foot boats may be rented for $8 to $10 per day without motor or $33 to $35 per day with a 28-horsepower outboard. In 1963, the last year that the Sierra Club or anyone else was able to run river trips through Glen Canyon, the club had six 6-day trips costing $105 ($17.50 per day) and two 8-day trips costing $120 ($15 per day).

Sierra Club river trip charges include three meals a day and "lodging" at night, and we feel that they better serve the needs of low-income vacationers than do reservoir excursions as exemplified by facilities at Lake Powell. The "water highway" created by reservoirs behind Bridge Canyon and Marble Gorge Dams would be closed to everyone who could not afford to pay a rather high toll for the privilege.

We would greatly appreciate it if you would insert the information contained herein at an appropriate place in the record of the testimony given by Mr. Brower and myself.

Sincerely,

HUGH NASH,
Editor, Sierra Club Bulletin.

Mr. ROGERS. The subcommittee will stand in recess until 2 p.m.

(Whereupon, at 11:45 a.m., the subcommittee recessed, to reconvene at 2 p.m., on the same day.)

AFTERNOON SESSION

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

Let the Chair make this observation at the present time.

We have received a great number of letters—and I mean a great number of letters—in which the writer has stated "I want this included in the record."

Well, the record is replete with views both pro and con from groups, associations, a number of individuals who have come here before the committee. The Chair would ask unanimous consent that these letters be included in the file, and reference made to them in the record, so that the record will not be cluttered. Is there objection? If not, the letters will be included in the file and referred to accordingly.

(The committee has received letters or wires opposing the proposed construction of Bridge Canyon Dam or Marble Canyon Dam, or both, from the following:)

C. R. Cutright, Wooster, Ohio
Owen Van Buskirk, King Ferry, N.Y.
Mervyn L. Rudee, Houston, Tex.
Dr. Jean A. Smith, San Marcos, Tex.
Randolph Crossley, Honolulu, Hawaii.
Kenneth N. Anglemire, Chicago, Ill.
Mrs. Rorick Cravens, Houston, Tex.
Cornelia M. Smith, Waco, Tex.
Charles F. Baker, Houston, Tex.
Mrs. Ethyle R. Bloch, Fort Wayne, Ind.
Mrs. Katie K. Quilter, Houston, Tex.
Forrest Daniell, Houston, Tex.
Gregory D. Hitchcock, Santa Barbara, Calif.
Beula Edmiston, Los Angeles, Calif.
Mrs. Beth Anderson, Portland, Oreg.
H. Harlan Crank, Houston, Tex.
Mrs. K. B. Blanchard and 26 others, Midland, Tex.
Mrs. H. J. Clarke and six others, Houston, Tex.
Benj. Feld, Houston, Tex.
Mr. and Mrs. Robert Holmes, San Jose, Calif.
Roy V. Comeaux, Baytown, Tex.
A. R. MacAlister, Houston, Tex.
Mrs. F. W. Stoerkel, Houston, Tex.
Mrs. Lee Wehle, Fort Wayne, Ind.
Mrs. Charles A. Van Patten, New York, N.Y.
Mrs. Edwin L. Petrie, Downers Grove, Ill.
Thomas Morley, Minneapolis, Minn.
Daphne Furra, Houston, Tex.
Riley L. Loop, Houston, Tex.
Nina H. Eloesser, San Francisco, Calif.
Mrs. Mervyn Rudee, Palo Alto, Calif.
Hardy R. Fields, Houston, Tex.
Max H. Jacobs, Weimar, Tex.
M. C. Johnston, Austin, Tex.
J. D. Orton, Houston, Tex.
Douglas W. Steeples, Richmond, Ind.
Warren M. Pulich, Irving, Tex.
Gene W. Blacklock, Odem, Tex.
T. M. Daniel, Houston, Tex.
S. H. Waples, Houston, Tex.
Louise Blevins, Houston, Tex.
Mrs. Ethel W. Thorniley and seven others, Detroit, Mich.
Mrs. G. W. Parker, Jr., Fort Worth, Tex.
Marvin E. Smith, Prescott, Ariz.
H. Lewis Batts, Jr., Kalamazoo, Mich.
Walter L. Ammon, Midland, Tex.
Mrs. Frank D. Lewis, El Paso, Tex.
Mrs. Edward W. Kelley, Houston, Tex.
Melvin T. Beddoe, Houston, Tex.
Mrs. F. H. Seewald, Beaumont, Tex.
Anne B. Stedman, Boston, Mass.
Cornelius A. Wood, Andover, Mass.
Mrs. C. R. Middleton, Houston, Tex.
Jack P. Goode, Seabrook, Tex.
Mrs. C. A. Wheatley, San Antonio, Tex.
Mrs. Frank Bryan, Houston, Tex.
Clara E. Miller, Houston, Tex.
Mrs. E. P. Dimmick, San Antonio, Tex.
Mrs. Steve Garza, Mercedes, Tex.
Leonard C. Brecher, Louisville, Ky.
Fritzi Ingrid Lemke, East Meadows, N.Y.
Albert H. Lemke, East Meadow, N.Y.
Mrs. Agnes Chittick, Houston, Tex.
Mrs. Ray Schiflett, Houston, Tex.
Mrs. Margery M. Rhodes, Houston, Tex.
Mrs. Helen Mead and seven others, Houston, Tex.
Mrs. B. R. Cox and eight others, Houston, Tex.
Mr. and Mrs. Joe R. Hurd, Houston, Tex.
Gertrude R. Shattuck and 12 others, Waltham, Mass.
Miss E. Colleen Moore, Houston, Tex.
Mr. and Mrs. Lloyd Anderson, Webster, Tex.
Mr. and Mrs. M. B. Halfin, Jr., Crosley, Tex.
Mrs. S. Sapp, Houston, Tex.
Eunice Tjaden, East Peoria, Ill.
Mrs. H. L. Pearson, Vernon, Tex.
W. Walworth Harrison, Greenville, Tex.
Russell L. Jolley, Houston, Tex.
Mr. and Mrs. T. J. Hansen and son, Galveston, Tex.
Frances H. Duff, Escondido, Calif.
Mr. and Mrs. L. L. Jansen, Houston, Tex.
Linda Freed, Houston, Tex.
Mrs. Willie Tracy McCorquodale, Houston, Tex.
Mrs. D. C. Van Siclen, Bellaire, Tex.
Mrs. R. E. Martin, Houston, Tex.
Wirt A. Warren, Wichita, Kans.
William G. and Deane Feetham, Ontario, Calif.
Mrs. John R. Barnard, Mill Valley, Calif.
A. W. Wheeler, Sterling, Ill.
Mrs. Veronica W. Rabedeau, Saratoga, Calif.
Melbourne E. Rabedeau, Saratoga, Calif.
Florence C. Bode, Westerley, R.I.
Marjory Gane Harkness, Tamworth, N.H.
Rena J. White, Philadelphia, Pa.
Bennett Stokes, San Antonio, Tex.
Mrs. Leona M. Bryson, Houston, Tex.
Dorothy Hirshon, New York, N.Y.
Geth Osborn, Fort Worth, Tex.
I. M. Abel, Beaumont, Tex.
Mrs. Kerr Rainsford, Katonah, N.Y.
Mrs. James A. Baker, Pittsburgh, Pa.
Douglas A. Barnes, Grinnell, Iowa
Robert E. Zuppke, Minneapolis, Minn.

Mrs. William Sattler, Concord, Calif.
Mrs. Clifford W. Brown, San Antonio, Tex.
Dr. and Mrs. J. F. Kurfees, Crestwood, Ky.
John F. Benkelman, San Jose, Calif.
Barbara Bell, Cambridge, Mass.
Laurence G. Cowles, Bellaire, Tex.
Mrs. Inslee Flickinger, Palo Alto, Calif.
Miss Alice Schoelkopf, Palo Alto, Calif.
Miss Joan E. Garrett, Houston, Tex.
Mrs. Burton R. Flake, Houston, Tex.
Mr. and Mrs. Richard L. Nelson, St. Paul, Minn.
Mary B. Hutchins, Houston, Tex.
Gladys Bryant, Ojai, Calif.
Mrs. J. D. Orton, Houston, Tex.
Mrs. Bess T. Goode, Palo Alto, Calif.
Mr. and Mrs. Tom L. Kister, Houston, Tex.
Mabel Irene Kaiser, Houston, Tex.
Margaret E. Byrn, Palo Alto, Calif.
Miss Hazel C. Green, Wimberley, Tex.
Jere F. Block, Tulsa, Okla.
Howard Phipps, Jr., New York, N.Y.
Miss Monica Ann Evans, Kalamazoo, Mich.
John George Fletcher, Pleasanton, Calif.
Sara B. Chase, Irons, Mich.
Daniel Flesher, St. Paul, Minn.
Robert C. Glidden, Hillsboro, Calif.
R. W. Solberg, Walnut Creek, Calif.
Rob L. Ruark, Midland, Tex.
Ann M. Bendy, Houston, Tex.
Glen Thoma, St. Paul, Minn.
Dr. Leon B. Levy, Corpus Christi, Tex.
Norman G. Roth, Dayton, Ohio.
Rex B. McLellan, Houston, Tex.
Mr. and Mrs. Walker M. Alderton, Tucson, Ariz.
Mr. and Mrs. Wm. B. Layton, Jr., Tahoe City, Calif.
George Burgess, Middlebury, Vt.
Cora E. Burgess, Middlebury, Vt.
Wayne A. Held, Anaheim, Calif.
William A. Salant, Chico, Calif.
Mrs. Alice Thomas, Caro, Mich.
Mrs. D. B. Hummel, Long Beach, Calif.
David Marrack, M.D., Bellaire, Tex.
Joyce Wildenthal, Houston, Tex.
M. P. McEvoy, Milwaukee, Wis.
Raymond J. Ensley, Dickinson, Tex.
Mr. and Mrs. Don Labberton, League City, Tex.
Mrs. Carolina Burton, Dickinson, Tex.
William R. Kabele, Dickinson, Tex.
Mildred B. Kabele, Dickinson, Tex.
Mrs. K. R. Joseph, Houston, Tex.
Mrs. J. H. Tabony, Jr., Houston, Tex.
Kenneth R. Joseph, Houston, Tex.
Noel Joseph, Houston, Tex.
Thomas Morley, Minneapolis, Minn.
Mrs. G. H. Aigner, Houston, Tex.
Mrs. Frank Lawson, Houston, Tex.
Mrs. Edith Faucher, Houston, Tex.
Mr. and Mrs. R. E. Dimon, Houston, Tex.
Helen W. Wade, Milwaukee, Wis.
Fritz F. Holt, Houston, Tex.
Mrs. Jack P. Little, Houston, Tex.
Mr. and Mrs. Lawrence J. Kocurek, Houston, Tex.
Mrs. John D. Verrill, Los Angeles, Calif.
Mrs. H. Cramer, Houston, Tex.
Beatrice Freeman, Homestead, Fla.
John M. Carley, Houston, Tex.
Mrs. Berenice Brentzel, Houston, Tex.
Mrs. Kent Day Coes, Upper Montclair, N.J.
Emily Langham, Shepherd, Tex.
Mr. and Mrs. L. J. Smith, Shepherd, Tex.
Julia J. Rout, Shepherd, Tex.
Mrs. C. R. Cummings, Shepherd, Tex.
Frances Cummings, Shepherd, Tex.
Mr. and Mrs. Charles Cummings, Shepherd, Tex.
Marguerite and Otto Ivonen, Beulah, Mich.
Mrs. John Strohmenzer, New York, N.Y.
Mrs. D. B. Saunders, Houston, Tex.
J. S. Newman, Houston, Tex.
Joseph Oelbaum, New York, N.Y.
Clifton L. Bond, Houston, Tex.
Marilyn A. Ashley, Bell, Calif.
Horace G. Walters, East Stroudsburg, Pa.
Mr. and Mrs. C. Lipp, Houston, Tex.
K. F. Farmer, Houston, Tex.
Dirk Baird, Philadelphia, Pa.
Tommy J. Brewer, Houston, Tex.
Miss Bertha E. Miller, Swan Lake, N.Y.
Harold E. Ramsey, Houston, Tex.
Mr. and Mrs. I. K. Sheffield, Houston, Tex.
Ralph Witzel, Houston, Tex.
Mr. and Mrs. Donald Keith, Fullerton, Calif.
Dawson C. Bryan, Houston, Tex.
Leonard B. Rothfeld, La Porte, Tex.
Miss Gladys V. Taylor, Houston, Tex.
Mrs. Edward Francis Ryan, Manchester, Mass.
Mrs. William L. Conger, Houston, Tex.
Mrs. Stanley Newhall, Jr., Fort Wayne, Ind.
W. K. Oliver, Bellevue, Ohio
Nellie M. Naylor, Rock Island, Ill.
Mr. and Mrs. James P. Voorhies, Houston, Tex.
Mrs. W. Emerson Scott, Caro, Mich.
Benson Harvey, Easthampton, Mass.
Jean Witt, Racine, Wis.
Irma and Allan G. Ballard, Sr., Cranford, N.J.
Henry J. Campbell, Jr., Garden City, N.Y.
Members of Sierra Club, San Francisco, Calif.
Marietta Hunt, Wichita Falls, Tex.
Mrs. Ralph C. Golt, Indianapolis, Ind.
Stuart B. Robbins, Laurel, Md.
B. D. Orgain, Beaumont, Tex.
Mrs. Woodrow Erwin, Houston, Tex.

Mrs. S. M. Tenney, Hanover, N.H.
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W. Shepley Curtis, Hanover, N.H.
Louis P. Ritandale, Millbrook, N.J.
Olen and Velma Fox, Wichita Falls, Tex.
Edgar A. Johnson, Denver, Colo.
Miss Marion B. Stiens, Chicago, Ill.
Norma McNatt, Merced, Calif.
R. Robbins, Freedom, N.H.
Malcolm P. Ripley, New York, N.Y.
Amory W. Ripley, Millbrook, N.Y.
Beatrice Jeannelle, Chesterton, Ind.
Mrs. Robert Work, Barrington, Ill.
J. Kenneth Watson, Houston, Tex.
Mrs. A. J. Wray, Houston, Tex.
Sarah Hugus, Washington, Pa.
Miss Mary Van Dyke, Swarthmore, Pa.
R. C. Libby, Glendale, Calif.
Mr. and Mrs. Wendell B. Cook, Storrs, Conn.
Leonora and Erwin Strohmaier, Berkeley, Calif.
Jessie M. West, Takoma Park, Md.
Ralph C. Byle, Jr., Houston, Tex.
Mrs. O. K. Eden, Houston, Tex.
Madam Jean Couturier, Greenwood Lake, N.Y.
J. D. Woodson, Jr., Houston, Tex.
Mrs. Walter Hudgins, Hungerford, Tex.
Mrs. C. W. Harkins, Houston, Tex.
Mr. and Mrs. Walter W. Holm, Houston, Tex.
Mr. and Mrs. Peter S. Sajjadi and 27 others, Houston, Tex.
Franklin C. Effenberger, Brenham, Tex.
E. C. Walters, Houston, Tex.
Mrs. Elliott I. Organick, Houston, Tex.
Mrs. Justine Bond, Houston, Tex.
Mr. and Mrs. Rives Adam, Houston, Tex.
Kathleen B. Hall and five others, Bellaire, Tex.
Mr. and Mrs. Don Labberton, League City, Tex.
Diane Rankin, Denver, Colo.
Raymond J. Ensley, Dickinson, Tex.
Mrs. J. D. Andrews, Houston, Tex.
Campbell Loughmiller, Dallas, Tex.
Mrs. Glen O. Tipton, San Pedro, Calif.
Bob Prentky, Los Gatos, Calif.
Mrs. Melvin Horton, Pasadena, Calif.
Richard W. Ekdahl, Houston, Tex.
Mrs. Helen D. Slater, Luling, Tex.
Mrs. David L. Hinton, Houston, Tex.
Mrs. Arthur Kay, Houston, Tex.
Mrs. J. H. Tabony, Jr., Houston, Tex.
Mrs. J. A. Frambach, Houston, Tex.
Mr. and Mrs. John Lightfield, Houston, Tex.
Carl S. Frederick, St. Louis, Mo.
Mrs. Walter Carlson, North Augusta, S.C.
Roy Crockett, Kokomo, Ind.
C. H. Kindred, Stuart, Fla.
Mrs. J. Sanford Newman, Houston, Tex.
Mrs. H. Benjamin Duke, Jr., Littleton, Colo.
Mrs. Elinor D. Clemons, Flagstaff, Ariz.
Mrs. Charles S. Wise, Houston, Tex.
Mr. and Mrs. Hugh H. Carroll, Houston, Tex.
Mr. and Mrs. S. D. Hilmuth, and nine others, Houston, Tex.
Mrs. Mary Cree Cosby, Bowie, Tex.
Tom Murphy and 145 others, Pittsfield, Mass.
Mr. and Mrs. J. D. Orton, Houston, Tex.
Mabel Irene Kaiser, Houston, Tex.
Virginia Searcy, Elkhart, Ind.
Mrs. Ludwig Faletti, Hillsboro, Ill.
Mrs. F. H. Seewald, Beaumont, Tex.
Mrs. Dorothy K. Roosevelt, Birmingham, Mich.
Miss Olive Patricia Leigh, Colorado Springs, Colo.
John G. Fletcher and 102 others, Pleasanton, Calif.
Nina H. Eloesser, San Francisco, Calif.
Stewart and Denise Elliott, Rhineback, N.Y.
Virginia A. Kelley, Englewood, Calif.
Mrs. George S. Bryan, Madison, Wis.
Martha Lyman, Fremont, Calif.
Ralph C. Byle, Houston, Tex.
Mrs. Sara F. Zimet, Denver, Colo.
Katharine Bruce, Colorado Springs, Colo.
Miss Hazel C. Green, Whimberley, Tex.
Harold Mathes, Denver, Colo.
S. B. Goodman
J. M. Damon
M. C. Johnston, Austin, Tex.
Miss Jennifer M. Puck, Denver, Colo.
Gerry C. Atwell, Missoula, Mont.
Dorothy Webster, Saginaw, Mich.
Richard V. Smythe
Marjorie P. Prescott, Anchorage, Alaska
E. C. Walters, Houston, Tex.
John M. Carley, Houston, Tex.
Mrs. E. B. Reeve, Denver, Colo.
Miss Florence Kraemer, Chicago, Ill.
Mr. and Mrs. Ralph A. House, Lake Jackson, Tex.
Bright M. Dornblaser, Greenfield, Mass.
Ralph F. Peters, Milwaukee, Wis.
Donald H. Runck, Detroit, Mich.
Alan Stamm, Beverly Hills, Calif.
Franklin C. Effenberger, Brenham, Tex.
Mrs. Kenneth Gertsen, Baltimore, Md.
Eleanor A. Steele, M.D., Denver, Colo.
Robert W. Pearson, Gunnison, Colo.
Mrs. Harold C. Hedges, Kansas City, Kans.
Mrs. Dorothy H. Johnson, Chicago, Ill.
Eleanor C. Kemp, Los Altos, Calif.
Leona B. Gerard, Corona Del Mar, Calif.
Armin Fuehrer, Denver, Colo.
Susan Grosswiler, Colorado Springs, Colo.
Philip R. Pennington, Berkeley, Calif.
Nancy Holmes, Denver, Colo.

52-850—65——53

Katie Hammond, Denver, Colo.
Virginia E. Nolan, Denver, Colo.
Clinton M. Kelley, Englewood, Calif.
Howard E. Mohler, Harveyville, Kans.
Hugo H. Huntzinger, Holbrook, Ariz.
Harald Drewes
R. W. Wilson, Phoenix, Colo.
Dr. and Mrs. William W. Pope, Denver, Colo.
Mrs. H. Benjamin Duke, Jr., Littleton, Colo.
Ruskin S. Freer, Lynchburg, Va.
G. H. Heidorn, M.D., Minot, N. Dak.
Herman Arthur, New York, N.Y.
Miss Catherine D. Shaw, Los Angeles, Calif.
Richard M. Brett, Woodstock, Vt.
Charlotte E. Mauk, Berkeley, Calif.
Michael Schalit, Denver, Colo.
Dorothy Donaldson, New York, N.Y.
Ross W. Smith, Rapid City, S. Dak.
Miss Mary Joe Danquard, Houston, Tex.
Walter E. Weyman, Richmond, Calif.
Dr. Daniel H. Carson, Ann Arbor, Mich.
Miss Lillie Schwenke, Houston, Tex.
Edna H. Hill, Littleton, Colo.
Mary Ellen Young, Houston, Tex.
Robert Z. Norman, Hanover, N.H.
William D. Kesner, Pomona, Calif.
J. G. Roof, Houston, Tex.
Mrs. Mervyn Lea Rudee, Houston, Tex.
Gerald Jenny, Laramie, Wyo.
Martin Freidman, San Rafael, Calif.
Robert C. Russell, Iowa City, Iowa
Alexander Rubi, New York, N.Y.
Dr. David Cowen, New York, N.Y.
Mrs. T. J. Lanham, Fort Wayne, Ind.
Melba A. Grafius, Washington, D.C.
Mrs. M. J. Sullivan, Houston, Tex.
Edith Strahan, Denver, Colo.
Mrs. Thelma Braddock, Kerrville, Tex.
Mrs. C. T. Wells, Houston, Tex.
Reynolds T. Harnsberger, Markham, Va.
Miss Theresa Blake, Enfield, N.H.
Curtis K. Skinner, Salt Lake City, Utah.
Mrs. Herbert L. Spencer, Newfoundland, Pa.
Robert L. Kendall, Durham, N.C.
Roderick Nash, Hanover, N.H.
E. Warner Shedd, Jr., East Calais, Vt.
Edwin E. Larson, Cambridge, Mass.
Mr. and Mrs. Hugh H. Carroll, Houston, Tex.
George Alderson, Logan, Utah
Helen M. Wade, Milwaukee, Wis.
Mrs. Arthur G. Tillman, Macomb, Ill.
Jean S. Morrow, Macomb, Ill.
J. W. Galbreath, East St. Louis, Mo.
Peter Ratcliffe, Boulder, Colo.
Dr. Thomas L. Prather, Gunnison, Colo.
Eva Groves, Idaho Springs, Colo.
Barbara Conroy, Lakewood, Colo.
Carol J. Lind, Evergreen, Colo.
Lesley T. Julian, Boulder, Colo.
Katie Lee, Aspen, Colo.
Mrs. Vera W. Warfield, Boulder, Colo.
Mr. and Mrs. R. D. Working, Broomfield, Colo.
Mr. Robert Dally, Glenwood Springs, Colo.
Mr. Clifford W. Trow, Boulder, Colo.
Cassandra Hynes, Boulder, Colo.
Mr. and Mrs. Arden L. Buck, Boulder, Colo.
Mrs. Beatrice Perry, Loveland, Colo.
Mr. Edwin L. Crow, Boulder, Colo.
Mr. and Mrs. Carl N. Callister, Longmont, Colo.
James and Mary Bryant, Boulder, Colo.
James S. Conklin, Denver, Colo.
Hardy L. Shirley, Syracuse, N.Y.
Laurence G. Cowles, Bellaire, Tex.
Richard A. Jones, Boulder, Colo.
Mrs. Robert D. Goodwin, Boulder, Colo.
Mrs. William D. Bensema, Boulder, Colo.
Gerald and Mary Joyce May, Boulder, Colo.
Gerald I. Conner, Fort Collins, Colo.
Miss Miriam Brooks, Boulder, Colo.
Ruth Jean Somers, Aspen, Colo.
E. H. Hilliard, Jr., Denver, Colo.
Ramona Boudreau, Flagstaff, Ariz.
Mr. and Mrs. W. W. Davis and others, Houston, Tex.
Mahlon Speers, Colorado Springs, Colo.
Robert B. Johnston, Salinas, Calif.
David A. Swanson, Tempe, Ariz.
Ruth H. Newlon, Denver, Colo.

(The committee has received letters or wires opposing the Lower Colorado River Basin project from the following:)

Marlyn C. Lawrence, Lafayette, Colo.
Mrs. Harriet B. Koropp, Allenspark, Colo.
Mrs. Stuart A. Mace, Aspen, Colo.
Mrs. Charles Worth, Aspen, Colo.
William Reich, Oakland, Calif.
J. L. Wiles, Pasadena, Tex.
George T. Knowles, Beverly Hills, Calif.
Roland, Case Ross, Los Angeles, Calif.
Jack E. Davis, La Crescenta, Calif.
Mrs. T. M. Stout, Northridge, Calif.
Mr. and Mrs. John H. Brintman, Houston, Tex.

Mr. ROGERS. Mr. Aspinall?

Mr. ASPINALL. Mr. Chairman, off the record for a minute.

(Discussion off the record.)

Mr. ASPINALL. Mr. Chairman, the way it looks at this time, with the unanimous consent granted this morning for two witnesses to have 30 minutes each—it appears that the remaining time, in order to get through tomorrow, will have to be divided so each one of the remaining witnesses has 10 minutes to present their case or position and any questions that take place.

I would ask unanimous consent that Dr. John Ricker, Dr. John Tyson, Mr. James Barrett, Mr. Richard Lamm, Miss Madelyn Leopold, Mr. Francois Leydet, and Dr. Daniel Luten be called in the order in which I name them, and that they be allowed to testify first, and each one be given 10 minutes.

Mr. ROGERS. Is there objection? The Chair hears none, and the subcommittee will proceed in that manner.

Dr. John Ricker.

Dr. Ricker, I notice your statement is not very long. Did you want to read that, Doctor, or just put it in the record?

Dr. RICKER. I would prefer to just put it in the record.

Mr. ROGERS. Without objection, it will be included in the record in full, and you may proceed to summarize it, Doctor.

STATEMENT OF DR. JOHN RICKER, PHOENIX, ARIZ.

Dr. RICKER. My name is John Ricker. I live in Phoenix, Ariz. I come here as a private citizen.

I have practiced medicine for approximately 25 years in Arizona.

I realize that water to Arizona is extremely important. My stand today is that the dams in the Grand Canyon are not necessary to get the water to Arizona. This is all included in my statement. And numerous people have testified that are much more expert, much more eloquent than I am, and I see no reason to go over the various reasons why I feel this.

I agree completely with David Brower, Mr. Smith, and others.

I have brought copies of the Arizona Republic for Sunday, August 22, which gives a very interesting account, very short—there is a picture on the outside of one of the beauties in Marble Gorge that will be covered by the dam. I would like the committee to look at this for their own interest, and I would like to request that this be entered in the files of the committee.

Mr. ROGERS. Without objection, it will be included in the file, Doctor, and referred to in the record.

Dr. RICKER. I think the article speaks for itself, and I really have no more comments on it.

I have hiked considerably in the Grand Canyon. Today we talk about boating on the beautiful reservoir that will be developed, boating on the wild rivers, the expense of doing these things.

However, hiking is of no great expense to anybody, outside of getting there. But several people can band together and get in a car and drive to the Grand Canyon from parts of the West, certainly from parts of Arizona, at no great expense, and hike very cheaply.

I have no idea how many hikers a year get into the Grand Canyon. But there must be thousands. And many of them, of course, go down the major developed trails, and never get out of that particular area. But others go into the numerous nonmaintained trails in the park and

really experience something that you cannot see anywhere else in the world.

I have been on or led groups of from 10 to 40 in various areas in the canyon, of all ages, sexes, different experiences, and physical condition, and almost anybody can do it.

If a lake were built there, some of this hiking would not be possible. It would not be possible to reach the river, for instance. Now we can get down the river at many points, camp on the sand bar, by a rapid—it is quite peaceful and completely natural. If the lakes were there, they would come up to the steep walls of the canyon, and it would be impossible to get to the river.

I really don't have anything more to say about that.

(The statement of Dr. Ricker follows:)

STATEMENT OF JOHN RICKER OF PHOENIX, ARIZONA

Mr. Chairman and gentlemen of the committee, I am a practicing physician in the State of Arizona and have been for the past 25 years. I come here as a private citizen to give my views on the building of the Grand Canyon dams. My family and I have our stake in the future of Arizona. We realize that Arizona needs water in order to prosper, but do not feel that damming the Grand Canyon is necessary to bring us water. In fact with the apparently decreasing precipitation over the past 10 or 15 years, every effort should be made to save water. Storing water in open reservoirs where it is lost by seepage into the previous rocks as well as by evaporation does not seem to be the answer.

The basic reason for eliminating the dams from the Southwest water plan is to preserve the Grand Canyon in its natural state, but there are economic factors as well. Experts have already testified that nuclear and fossil fuel generators can put out power at a rate competitive with hydropower. I would like to quote from a speech given by Dr. Willard F. Libby, Nobel Prize winning chemist, at Arizona State University last May: "It is absolutely clear that it won't be long before atomic power will be competitive any place on earth. We are—right now—3 years ahead of schedule." In that same speech he also mentioned that sea water can be converted to fresh water for 15 cents per 1,000 gallons by atomic power and at the same time produce cheap electric power.

Why, then, should we build expensive dams which will be permanent and at the same time impair the scenery, natural beauties, and wildlife of the Grand Canyon? If steam-power generating plants were built and found to be impractical after some years of use, they could be moved, dismantled, or scrapped. It's pretty difficult to get rid of a concrete plug in a deep canyon.

The proponents of the dams talk about peaking power which can be sold at high prices to finance the dams and the central Arizona project. At the present time the most desirable combination for the production of both peaking and base power is a combination of hydro and steam generation. The regional intertie and decreasing cost of nuclear power would seem to solve some of the peaking power problem. Why wouldn't it be feasible to construct steamplants on the shores of Lake Havasu at the pumping stations for the water diversion. These plants could use power to pump water up to a storage reservoir during quiet times when base power only was needed. When it was necessary to provide peaking power, the full force of the generators could be turned to that and let the water flow by gravity into central Arizona.

The recreation value of the new lakes made by these proposed dams has been used as an argument in favor of dams. We already have an abundance of lakes on the Colorado—some 600 miles of them—where a type of recreation is available. A variety of experiences is certainly desirable—why should everyone wish to water ski, roar around in power boats, or fish in a lake? Some prefer to test their skill against the forces of a wild river in rubber rafts or specially built river boats. Some want to hike in a geologically unique region where history of a billion years can be read in the rocks where they know it will go on for another billion if need be unless hampered by the efforts of man. Other people prefer to camp on a sheltered sand bar lulled to sleep by the gentle roar of river rapids rather than on exposed hardpan or a mud flat where the sound of motorboats and raucous voices accompany their slumbers.

It is said that the dams would open up the Grand Canyon to more people that could never see it otherwise. This may be true, but just because an area is inaccessible to all but a small handful of people who are willing to put forth the effort to get there, is no reason to change it. I would like to preserve the Grand Canyon in its natural state for my children and their descendants. The following suggestions are respectively submitted:

(1) Explore other methods of producing power to implement and finance the central Arizona project.

(2) Enlarge the Grand Canyon National Park by including all of the Grand Canyon from Lee's Ferry to Grand Wash Cliffs. A portion of Marble Gorge and much of the country on the north side of the Colorado River around Deer Creek and Kanab Creek as well as all of the Grand Canyon National Monument at least should be in the park.

Thank you for this opportunity to appear before this committee to express my views.

Mr. ROGERS. Thank you.

Mr. Aspinall, do you have any questions?

Mr. ASPINALL. Dr. Ricker, you quoted one of the eminent scientists, Dr. Willard F. Libby, born within 35 miles of where I live. Are you able to evaluate his statement, or do you just quote him because it happens to fit in with your thinking?

Dr. RICKER. I am afraid I will have to say I quoted him because it fitted in with my thinking.

Mr. ASPINALL. That is all.

Mr. ROGERS. Mr. Hosmer.

Mr. HOSMER. You know at the present time they are not producing fresh water from the ocean for 15 cents per thousand gallons or anything like that, don't you?

Dr. RICKER. Yes.

Mr. HOSMER. You also know that if you could produce electricity without cost, it would only have a very small affect on a reduction in cost to the consumer, because that is only a small fraction of the cost of electricity—do you not?

Dr. RICKER. Yes.

Mr. HOSMER. I suppose hikers can go to areas where there are not rivers as well as where there are.

Dr. RICKER. Yes, they can.

Mr. HOSMER. And they do so?

Dr. RICKER. They can go into areas where there are no rivers, you say?

Mr. HOSMER. Yes.

Dr. RICKER. Yes.

Mr. HOSMER. And with the rapidity of air transportation to various parts of the world, and even in the United States, isn't it a fact that a great deal more territory now is opened up to people who desire to do hiking than there ever was in previous generations?

Dr. RICKER. Yes, but at great expense.

Mr. HOSMER. Yes. And you are asking this area be left open at a fairly great expense, too, are you not?

Dr. RICKER. I was merely pointing out some of the advantages of the Grand Canyon as it is.

Mr. ROGERS. Your time is expired.

Mr. Udall.

Mr. UDALL. Dr. Ricker, I respect your sincerity in coming here. I think you are tragically wrong. It hurts particularly to have a fellow

Arizonan take the position you have taken. But I do respect your sincerity in coming here.

I would make two comments. One comment is that even if both these dams were constructed, you would still have a hundred miles of wild river in the Grand Canyon, with all the sand bars that you mention to camp upon. So that they are not totally destroyed.

Second, it seems to me that an Arizonan, especially one who comes here and takes the position that you do, has to make up his mind, that you will have one of three things: Pinal County, my district, and Maricopa County eventually will dry up and wither if people leave; or second, you are going to have to put the Federal Government in the business of running steamplants, which you talk about here, which many Arizonans think is socialism and is outrageous and wrong; or third, you are going to have to accept these two lakes that in my judgment do very little damage to the things that you and I both believe in: in natural beauty.

As among these three alternatives, the very clearest one to me is that we take the lakes and we build a dam.

But I recognize you do not agree.

These are hard choices. I have lived with this thing all my adult life. Arizona has waited for a generation to get action on this project.

I regret very much that you are of the opinion that you are. But as I say, I recognize your sincerity.

Mr. ROGERS. Mr. Wyatt.

Mr. WYATT. Well, Dr. Ricker, I want you to know that I believe we all appreciate your interest and good citizenship in coming here to testify in a matter that you feel deeply on. I am not indicating that I feel you are right or wrong. But I appreciate your appearance here.

Thank you, Mr. Chairman.

Mr. ROGERS. Mr. Reinecke.

Mr. REINECKE. Dr. Ricker, did you imply that any proposed steamplant should be built by the Federal Government or private facilities?

Dr. RICKER. I did not mention it at all. I merely, in my statement, mentioned it as a possibility of substitute method of financing the central Arizona project. I am not an expert in those fields.

Mr. REINECKE. But you feel it could be done by private utilities as well as by the Federal Government, as an alternate source of power?

Dr. RICKER. I think so.

Mr. REINECKE. I would like to indicate at the time I went through Grand Canyon we had a 7-year-old girl on the trip with us, and several men in their seventies, and one lady in her sixties. I think this attests to the fact that any type of trip, if handled properly, could be done in relative safety, and that these trips are not as hazardous as a great many people think.

I have nothing further.

Mr. ROGERS. Thank you very much, Doctor, for your contribution.

Dr. John Tyson.

STATEMENT OF DR. JOHN T. TYSON, PHOENIX, ARIZ.

Dr. TYSON. Mr. Rogers, Chairman Aspinall, I am honored and a little awed coming before a committee of Congress here, so I would like to take the liberty of reading just parts of my testimony in this 10-

minute period, and ask permission that the statement be submitted in its entirety, including the documentation which I won't give in my reading.

Mr. ROGERS. Without objection, Doctor, your statement will be included in the record the same as if you had read it in full.

Dr. TYSON. Gentlemen, I come from Phoenix, Ariz. My last 2 years there have been with the Public Health Service as a physician-pediatrician working with the Arizona Indians.

I am about ready to enter private practice in the Southwest.

It would be presumptuous of me to pose as an expert on some of the things which I am going to mention. My axe to grind is that of an interested taxpayer, private citizen, and amateur conservationist, and a sympathetic friend of the outdoors.

I can only share with you the facts and feelings which I have personally, but with the full confidence that their validity makes my point of view that of many thousands of ordinary citizens, from Arizona and elsewhere, if only they had the full information on the issues at stake.

In brief, I am here to testify against the building of these two dams and in favor of the central Arizona water project, which I hope will bear the name of Carl Hayden.

We certainly need the water.

I just in my own analysis want to make this distinction, to point up the fact that these dams are not necessary, and I kind of think from my own sources of information, which are different from Senator Fannin's, who I talked with yesterday, of course, make this feasible.

In brief, it is not an issue of private versus public power, not an issue of the Sierra Club versus the Bureau of Reclamation, not the lower versus upper basin States, not the preservation of the Grand Canyon versus needed water for Arizona. These are false issues.

I believe the proposal to build the dams is simply a case of public interest versus misinformed public opinion and inappropriate Government initiative.

Just to briefly summarize what I state on the economics, as far as the water gained, it just seems to me there are figures to show that there is water lost from these two reservoirs in excess of 100,000 acre-feet.

Now, I had a friend in a private utility company that tells me it takes 20,000 acre-feet to make a million kilowatts of power from coal sources. If the proposed generation of the power from these two dams is about 1.5 million kilowatts, this is 30,000 acre-feet of water that the coal would need to produce the same power than the dams would use up a hundred thousand acre-feet.

I think this should be checked out. It is either right or wrong. Either I have my facts right or they are wrong.

As the members of this committee well know, these dams are being built for power purposes alone at tremendous cost to the taxpayer dollar, when it seems unnecessary to do so.

Before I became a physician, I majored in economics in Swarthmore College near Philadelphia. I remember studying about earlier dam projects which paid for themselves many times over in flood control, secondary power production, when there were no alternatives. In such cases, the long amortization based on 3 percent interest on the balance of the unpaid capital—this was reasonable.

We are not against all dams. However, this is not the case in these two dams.

It seems just obviously unrealistic to base it on 3 percent interest when we have to pay 4 percent interest from the Government.

Now, I would just like to enter, just for the files, a Fortune magazine editorial here on this very same subject, and just make, on this interest rate business, a little poem, a poetic paraphrase of John Saylor's testimony, in which Kenneth Boulding poetically stated:

> * * * The long-term interest rate
> Determines any project's fate;
> At 2 percent the case is clear,
> At 3 percent some sneaking doubts appear,
> At 4 percent it draws its final breath,
> While 5 percent is certain death.

Well, this 50-year amortization becomes even more unrealistic when one realizes that costs in atomic power are steadily being diminished. With this possibility on the horizon, steam powerplants I hope from private industry should get the contract for their job, since their investment costs are less than one-third of the comparable hydroplants—they could be more easily amortized in a shorter period of time and put to pasture more easily if and when atomic power becomes the dominant factor.

With so many alternatives that seem feasible, this is a far cry from the misconception that I think that so many Arizonans have that we need the dams to get the water. This is not the case.

As a geologist, I am also in an amateur status. But I can attest to the fact that the geological strata exposed in Marble Canyon Dam, the proposed reservoir area, far below the surface on either side of the Colorado River Basin.

I was at Keams Canyon for a while, with the Hopi Indians there, and it is Mesozoic straight on the top and the Paleozoic, the billion-year-old rock, are several thousand feet below the surface. This implies that leakage through these strata of water in the reservoir would permanently seep out, never to be recovered, even if the water levels in the dam were reduced from time to time—and I have a little picture to illustrate this.

This is kind of contrary to Commissioner Dominy's contention that this seepage loss is water in the bank. And if this—and I say only if—this geological information is correct—because it has to be checked out—and/or if some of the more pessimistic estimates of Colorado River flow in future years are correct, and I refer to last week's testimony by a Coloradan Johnson as reported by our Arizona Republic, then Bridge and Marble Canyon might well follow the unfortunate fate of the Bureau of Reclamation's dam in the San Carlos Indian Reservation in my own State. This reservoir never filled up because of the inaccurate estimates.

My analogy might be one worth considering, especially because of the high cost of these dams. It would be of considerable interest if the U.S. Geological Survey made a study into this and reported back to us.

I have been led to believe qualified experts from this agency have not even been consulted on this.

In any event, these possibilities of cheaper power from other sources may well leave these dams as $500 million white elephant edifices

legislated by this committee and built in 1970 only because we did not take the trouble to project our thinking into the 1980's.

Finally, the conservation plea—and this has already been attested to, I think, in the book "The Grand Canyon." This concern for the preservation of the living river and its unique life forms and good scenery is in keeping with the express policy I think of President Johnson in emphasizing the quality of experience in the American scene. But I concede to Mr. Udall, to Mr. Hosmer, that this point sometimes—practicality deems it necessary to substitute quantity for quality. And many think that this quality is something worth conserving.

When I went over to Senator Scott, who I knew from correspondence when I was a former Pennsylvanian, his office is receiving between 70 and 100 letters a week all against the Grand Canyon Dam, as his representative, Bailey, told me.

Well, my own personal encounters with the river in hiking, horseback riding, and I hope some day White River boating—I can vouch for the validity of this point of view, and I believe that the vast majority, probably almost down to the man, the Americans who have experienced the thrill of the inner canyon share this feeling with me. And for those who have not, I hope they take the opportunity to read this—to read this book, and wait until the time that they or their children or their children's children can experience the views more directly, by pack horse or hiking.

As a pediatrician, I have a special concern for these future generations.

I would suggest that everyone look into this book and read it. It is one of our major things to contribute.

(The full statement of Dr. Tyson follows:)

TESTIMONY CONCERNING THE SOUTHWEST POWER PLAN, BY JOHN T. TYSON, M.D., PHOENIX, ARIZ.

THE INTRODUCTION

In the way of introduction, I am Dr. John T. Tyson, with origins as a Philadelphia Quaker, now a resident of Phoenix, Ariz. My last 2 years have been spent with the Public Health Service as a physician pediatrician working with the children of the Pima, Hopi, Apache, and Navajo Indians, and I am now about to enter the private practice of medicine in the Southwest. Before the members of this hard-working and distinguished committee it would be presumptuous of me to pose as an expert witness or to pose as one who represents a large pressure group. My "ax to grind" is that of an interested taxpayer and private citizen, an "amateur" conservationist, and a sympathetic friend of the outdoors through camping and hiking activities.

I can only share with you the facts and feelings which I have personally, but with the full confidence that their validity makes my point of view that of many thousands of ordinary citizens, from Arizona and elsewhere, if they only had the full information on the issues at stake.

THE THESIS

I am here to testify against the building of the Bridge Canyon and Marble Canyon Dams, and in favor of the central Arizona water diversion project, which I hope will bear the name of Senator Carl Hayden, who has championed this cause for so long. I hope CAP legislation is passed this year. Arizona needs the water. However, I wish to emphasize this distinction (i.e. between Bridge-Marble Dams and the CAP), to point up to the fact that these two dams are not necessary for the CAP, which could and should receive power for pumping its water from coal, and later probably atomic power sources.

In brief, I believe this to be not an issue of private power versus public power; not Sierra Club "alleged" idea of keeping all nature in the raw versus Bureau of Reclamation's "alleged" idea of building the dams at any cost; not Upper Basin States versus Lower Basin States water rights; not an issue between preservation of the Grand Canyon National Park versus needed water for Arizona. These are false issues.

I believe the proposal to build the Bridge and Marble Canyon Dams to be simply a case of public interest versus misinformed public opinion and inappropriate State-Federal Government initiative.

THE ECONOMICS

I believe the evidence shows that the two proposed dams are not necessary for reclamation and water storage purposes, especially since Glen Canyon Dam has more than fulfilled these purposes for the Colorado River water resources at present and in the future, and that the building of two new large reservoirs would only decrease water available for use to both Upper and Lower Basin States, because of evaporative losses. (I refer here to 1959 U.S. Geological Survey papers, Circulars 409 and 410 by Langbein and Leopold as evidence for this fact.) Not only would it waste precious water (estimated water loss from these two reservoirs is in excess of 100,000 acre-feet/year), but this same process of evaporation would increase the salinity of the water left, to the danger of the Lower Basin States' and Mexico's water utilization for generations to come.

As the members of this committee well know, these dams are being built for power purposes only at tremendous cost of the general American public taxpayer's dollar (three-fourths of a billion dollars), when it would seem uneconomical and unnecessary to do so (and I might add in these days of the war on poverty and the war in Vietnam, we have such pressing alternative uses for our Federal tax dollars).

Before studying to become a physician, I majored in economics at Swarthmore College near Philadelphia. I remember studying the benefits of earlier TVA and Bureau of Reclamation projects, which indeed paid for themselves many times over in flood control, water conservation, and secondary power production, when there were no tenable alternatives at the time. In such cases, 50-year amortization based on 3-percent interest on the balance of the unpaid capital seemed reasonable.

However, this is not the case in the Bridge and Marble Canyon Dam situation. Since flood control and water storage needs are already taken care of by existing dams (especially Hoover and Glen Canyon Dams), financing and subsidizing a strictly power facility on the basis of 50-year amortization based on 3 percent interest seems unrealistic, especially since the Government has to pay 4 percent to finance its own long-term debt. But even conceding the dubious arithmetic, there is evidence that the cost of producing the pumping power from coal resources in Four Corners area would be comparable, and that these fossil fuel powerplants could be built faster and with a much lower initial investment cost, which might well come from taxpaying private utility company sources. (I refer here to the Federal Power Commission, Power Survey Report No. 18, July 1963, as basis for these cost comparisons: also, I wish to enter as a supplement at the end of my testimony the full text of the article in April 1965 Fortune magazine on this same subject, in which Kenneth Boulding (professor of economics at the University of Michigan) poetically stated:

"* * * The long-term interest rate
Determines any project's fate;
At 2 percent the case is clear,
At 3 percent some sneaking doubts appear,
At 4 percent it draws its final breath,
While 5 percent is certain death.")

The 50-year amortization becomes even more unrealistic when one realizes that costs in atomic power are steadily being diminished, so that one can reasonably project that power costs from atomic sources may probably have cost advantage over present-day techniques within a decade.

With this realistic possibility on the horizon, steam powerplants should get the "contract" for the job, since their "investment costs" are less than one-third that of comparable hydroplants; they could be more easily amortized over a shorter period of time; and they could therefore be "put to pasture" more easily if, and when, atomic power becomes the dominant factor. Indeed in these days of de-

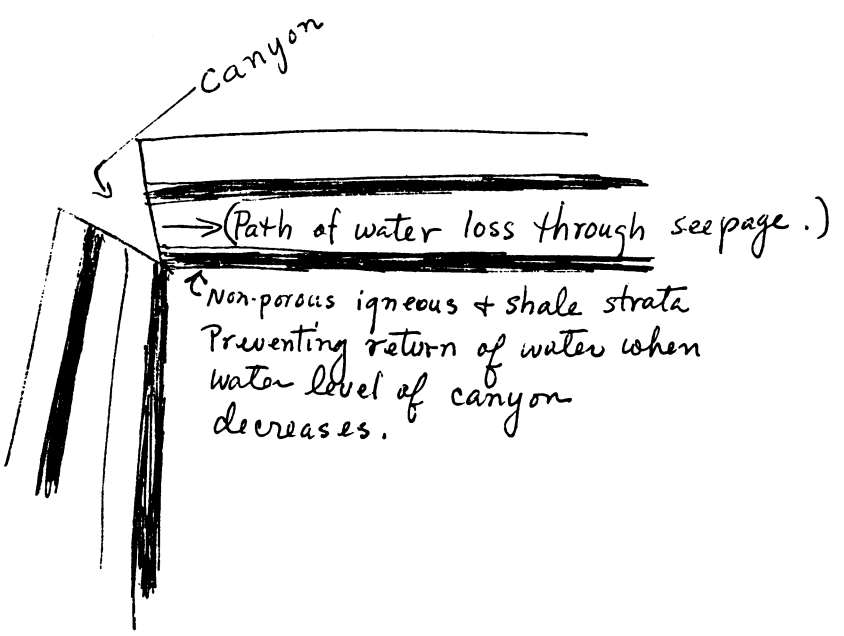
clining costs of power production from fossil sources, and recent breakthroughs in transmission of power over long distances, it might even be feasible to utilize Appalachian and Pennsylvania coal, possibly shipping this coal by sea to coastal steam plants in Texas, i.e., if the economics of the situation proved this to be feasible. Have these possibilities been considered?

With so many alternatives that seem feasible, this is a far cry from the misconception that so many Arizonans have that we need these dams to get the water.

THE GEOLOGY

As a geologist of a "rank amateur" status, I can attest to the fact that the geological strata exposed in the Marble Canyon Dam and proposed reservoir area (members of the highly porous sandstone and limestone formations—Coconino, Supai, and Redwall)—are far below the surface on either side of the Colorado River.

This implies that the leakage through these strata from water in the reservoir would permanently seep out, and never be recovered, even if the water level in the dams were reduced from time to time. A picture will illustrate this point:



This is quite contrary to Bureau of Reclamation Commissioner Dominy's contention that this seepage loss is "water in the bank" (implying that the geological strata are level and not of a declining altitude).

If the above geological information is correct, or if some of the more pessimistic estimates of Colorado River flow in future years are correct (I refer to last week's testimony by the distinguished Coloradan, Edward C. Johnson), then the Bridge and Marble Canyon Dams might well follow the unfortunate fate of the Bureau of Reclamation Dam on the San Carlos Apache Indian Reservation in my own State of Arizona. The reservoir behind this dam never filled up because of inaccurate prior estimates of available supplying "head waters," and/or evaporative and leakage losses.

My analogy between the San Carlos Dam which never attained its level for power or water storage purposes might be one worth considering, especially since the costs of the Bridge and Marble Dams would be much higher and irreparable; and certainly neither the Upper or Lower Colorado Basin can afford to waste a lot of water going into geological strata—water which may never be directly utilized as it should be in an area which needs to preserve all it can. It would be of considerable interest to inquire if the U.S. Geological

Survey has made a study into the proposed dam sites and their ability to store, conserve, or waste water. What are their estimates of the amount of water which would be available 10 years from now for the CAP? I have been led to believe that qualified experts from the USGS have not even been consulted on these most important and decisive matters.

In any event, these possibilities of cheaper power from coal and atomic sources, and unfavorable geologic strata, may well leave these proposed dams as $500 million white elephant edifices, legislated by this committee and this Congress, built in 1970, only because we didn't take the trouble to project our thinking into the 1980's.

CONSERVATION PLEA

I believe the conservation case against these dams will be eloquently attested to in David Brower's testimony on behalf of the Sierra Club. This concern for the preservation of the living river and its unique life forms and magnificent scenery is in keeping with the expressed policy of President Johnson in emphasizing quality of experience in the American scene.

In my few personal encounters with the Colorado River in hiking, horseback riding, reading (and I hope someday white-river boating), I can vouch for the validity of this point of view, and believe that the vast majority of Americans who have experienced the thrills of the inner canyon share this feeling with me.

For those who haven't had the opportunity of appreciating the life-force and beauty of the inner gorge, which would be damaged by these proposed "white elephant" dams, I can only urge you to seek this experience vicariously by perusing the book, "The Grand Canyon—Time and the River Flowing," until that time when you or your children or children's children can experience the views and wonders more directly by boat, packhorse, or hiking in future years. (As a pediatrician I have a special concern for these future generations.) I would suggest that all persons directly concerned with this impending legislation spend some time with this book before passing judgment on this matter. Although I am not a member of the Sierra Club, I hope that these Grand Canyon books could be purchased by this distinguished committee, and in their efforts to publicize the facts, be distributed to key members of the Bureau of Reclamation, the Congress and the Park Service, so that these important matters of quality and beauty can be seen in their proper perspective, and considered before final judgment is cast on the building of these dams.

THE JUDGMENT

Earlier this month, I received inspiration from viewing directly the wonders of the Canyonlands National Park in Utah. As I was overlooking the magnificent rock and river scenery of the upper Colorado River, my thoughts returned to the lower Colorado and the Grand Canyon.

The last Congress will be long remembered for preserving canyonlands of Utah as a national park for future generations. Does this Congress want to be remembered as the Congress which marred the beauty in the depths of the Grand Canyon Park, stopped the living river, and set the precedent for the destruction of our national park system, which was supposed to keep inviolate "the scenery * * * and the wildlife therein * * * and leave them unimpaired for the enjoyment of future generations"?

The Grand Canyon is as much of our heritage from which we draw inspiration as Abraham Lincoln's idea of "One Country" and Woodrow Wilson's idea of "One World."

To borrow a phrase from President Theodore Roosevelt: Let's have a "Square Deal" for the Grand Canyon and the American taxpayer who is being asked to finance these costly "White Elephant" dams which don't make sense economically and would permanently mar the natural beauty of this our greatest national park.

UDALL AND KENNEDY SPEAK

In working as a doctor with the Indian people during the past 2 years, I have come to appreciate certain aspects of their culture, some of which are relevant to the matters we concern ourselves with today.

I think Secretary Udall has stated this more eloquently than I could in his book "The Quiet Crisis." I quote from his chapter titled "The Land Wisdom of the Indian":

"It is ironical that today the conservation movement finds itself turning back to ancient Indian land ideas, to the Indian understanding that we are not outside of nature, but of it. From this wisdom we can learn how to conserve the best parts of our continent. In recent decades we have slowly come back to some of the truths that the Indians knew from the beginning: That unborn generations have a claim on the land equal to our own; that men need to learn from nature, to keep an ear to the earth, and to replenish their spirits in frequent contacts with animal and wild lands. And most important of all, we are recovering a sense of reverence for the land."

To paraphrase this old Indian truth, "In [the Appreciation of] Wildness Is the Preservation of the World" (incidentally the title of another eloquent Sierra Club book which addresses itself to this very same idea).

And John F. Kennedy in his introduction to the book by Secretary Udall had this to say:

"Our story has been peculiarly the story of man and the land, man and the forest, man and the plains, man and water, man and resources. It has been the story of a rich and varied natural heritage shaping American institutions and American values; and it has been equally the story of Americans seizing, using, squandering and, belatedly, protecting and developing that heritage * * *.

"The race between education and erosion, between wisdom and waste, has not run its course * * *. Each generation must deal anew with the 'raiders' * * * and with the tendency to prefer short run profits to long run necessity. The nation's battle to preserve the common estate is far from won."

RECAPITULATION

For these many reasons—economic, geologic, conservation, and philosophic—"to preserve our common estate" for future generations, I can only concur with Theodore Roosevelt when, standing on the rim of the Canyon in 1903, he said: "In the Grand Canyon, Arizona has a natural wonder which, so far as I know, is in kind absolutely unparalleled * * *. I want to ask you to do one thing in connection with it in your own interest and in the interest 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."

Gentlemen, I thank you for your kind attention.

Mr. ROGERS. Dr. Tyson, your time is expired; you were allotted 10 minutes, and that has expired. Thank you very much for your presentation.

The next witness is Mr. James Barrett of the Indiana Chapter of the Izaak Walton League.

Mr. BARRETT. Mr. Chairman, I do have a written statement.

Mr. ROGERS. Without objection, your statement will be included in the record in full, Mr. Barrett, and you may proceed to discuss it now, if you desire. I will let you know when you have consumed 5 minutes, and you can submit for questions if you want to do that.

STATEMENT OF JAMES M. BARRETT III, CHAIRMAN, WILDERNESS AND NATURAL AREAS COMMITTEE, INDIANA DIVISION, IZAAK WALTON LEAGUE OF AMERICA

Mr. BARRETT. I very much want to express my personal appreciation and that of the Indiana division for the opportunity to appear here.

As the chairman of this wilderness and natural areas committee, I am speaking for the some 5,600 members of the Indiana division as authorized by its officers.

I will skip over the first part of my paper, which simply reiterates the resolution adopted by the Izaak Walton League in Cody, Wyo.

I, of course, want to state, as I think is true of all of us, that we recognize the requirement of the water allocations of the Supreme

Court, and we do not oppose soundly conceived plans for providing water for the Southwest.

Our concern is the protection of the canyon, which is, I believe, the prime example of a natural area in this country.

In the opinion of the division, the basic issue is not whether these dams are legally permissible under the law, nor whether they are economically feasible, nor whether, as the Bureau likes to point out so often, that they will provide some more recreation.

In my opinion and that of the division, the basic issue is the integrity of this unique natural wonder—I think the greatest of the natural wonders in the country, and of the park system itself, of which is certainly is the cornerstone, and with these I think the set of values by which we as a nation intend to measure our uses of nature.

We do not want to be drawn or do not intend to be drawn into support for these dams on the basis of engineering calculations or economic calculations of peaking power benefits, and we do not believe the Nation should be asked to sacrifice this unique and wildly magnificent place on the anvil of a benefit-to-cost ratio.

Under any circumstances other than a truly national emergency involving our survival, which clearly does not now exist, there can be no serious doubt that the canyon should be protected.

The Bureau, of course, rests much of its case on the dams being the paying partner, and the efficiency of hydroelectric generation, peaking power, the higher price of peaking power. But I submit that even if this is established, that the dams are the most efficient method, and at the peaking power, premium prices will continue long into the future—this is not proved either necessary or a justification. The most that it can prove is feasibility.

I think it is a fundamental fallacy to conclude that a favorable benefit-to-cost ratio proves either necessity or feasibility. In my judgment—excuse me—necessity or justification. In my judgment, it can only establish feasibility at best.

Skipping on a bit—the question of recreation—two points.

The Bureau of Outdoor Recreation has itself stated, and I quote on the third page:

> The Bridge Canyon Dam cannot be justified on the grounds of recreation because of the unusual existing recreational values of the area and the adverse effects the dam and reservoir would have on those values.

Speaking of both dams, the Bureau has said that the water-oriented recreation cannot be considered one of the primary purposes because there are less costly alternatives available.

In addition, I believe that the people of this country, both now and future generations, are entitled to a diversity of types of recreation. I recognize the value of reservoirs. They are widely appreciated by people. But free-flowing streams are also—we are also entitled to free-flowing streams. And the grandest of all certainly is the Colorado River through the Grand Canyon.

None is more worthy of protection.

Jumping on—I would like to read the paragraph at the bottom of page 3.

> I believe that far more than the preservation of even the canyon and the park is at issue. At issue is the ability of this Nation as a mature people to exercise self-restraint needed for a living in a measure of harmony with

nature as we must, or perish. At issue is the preservation of that diversity so necessary to the freedom we cherish and to our very well-being. If our Nation, the richest in recorded history, chooses these dams over protection of these values in this unique area, I believe we will be building lasting monuments to our indifference, our mediocrity and our cynicism. I submit that we will demonstrate our sound judgment, self-restraint and maturity when we have refused to sacrifice these values in this area to this expediency.

Mr. ROGERS. Doctor, you have consumed 5 minutes. If you wish to go ahead, you may do so.

Mr. BARRETT. No; that is substantially what I have written.

(The complete statement of Mr. Barrett follows:)

STATEMENT OF JAMES M. BARRETT III, FORT WAYNE, IND., FOR INDIANA DIVISION, IZAAK WALTON LEAGUE OF AMERICA

Mr. Chairman and members of the committee, the Indiana division of the Izaak Walton League of America appreciates this opportunity to state its position on the Lower Colorado River Basin project and the proposed dams within Grand Canyon.

My name is James M. Barrett III, and as chairman of the wilderness and natural areas committee of the Indiana division I am representing the division's 5,600 members by express authorization of the division president, Mr. Roy B. Crockett, and the secretary and president-elect, Mr. Thomas E. Dustin.

Resolution No. 1 of the national Izaak Walton League of America, unanimously adopted in June of this year at Cody, Wyo., emphatically opposes construction of dams at Bridge Canyon and Marble Gorge within the Grand Canyon. This opposition, backed without reservation by the Indiana division, rests on two fundamental bases:

1. Each of these dams would impair Grand Canyon National Park and Monument. When the park and monument were established the promise was made to the people of all of the States that this region was to be preserved, unimpaired, for the enjoyment of future generations. This is what the American people then desired, what they now demand, and what they are entitled to. In spite of a denial by the Bureau of Reclamation, the fate of the entire national park system is involved. Grand Canyon National Park is the cornerstone of that system. If we cannot defend it, then there is no unit of the national park system which can withstand attack by the expediency of the moment.

2. Neither of these dams would "contribute to the water needs of the Southwest, but are conceived solely for the purpose of producing hydroelectric power to finance a water supply project elsewhere in the region." It is highly questionable whether either of these dams fall within the definition of "reclamation." They are not "necessary" within the meaning of the 1919 act establishing Grand Canyon National Park. That they are clearly inconsistent with the primary purpose of the park and monument is denied by hardly anyone.

We recognize the existence of the water allocations decreed by the U.S. Supreme Court. We do not oppose soundly conceived plans for providing water for the Southwest in ways which would not adversely affect values such as those of the Grand Canyon. Neither Bridge nor Marble Dam meets these criteria.

In the opinion of the Indiana division, the basic issue is not whether either of these dams is legally permissible under the act creating the park (though we are convinced that they are not), nor whether either of them is economically feasible, nor even whether, as the Bureau of Reclamation is so fond of pointing out, more miles of reservoir would be added to the 600 miles already available in that area for recreation.

The basic issue is the integrity of our country's most unique natural wonder and of the national park system itself—and with these, also, the set of values by which we as a nation are to measure our uses of nature. We will not be drawn into support for these dams on the basis of engineering calculations which weigh "peaking power" benefits against the values of this priceless canyon and its river. The Nation will not be persuaded to sacrifice this unique and wildly magnificent place on the anvil of a benefit-to-cost ratio. Under any circumstances other than a truly national emergency involving our survival

(which clearly does not now exist), there can be no serious doubt about the proper decision of this issue.

The Bureau of Reclamation rests much of its case on the necessity of the dams and their powerhouses as the "paying partner" in the project. This argument relies heavily on valuing the power at "peaking" prices, rather than at the lower "baseload" prices, and on the claimed efficiency of generation by power dams. Even if it were possible to prove that higher peaking power prices will continue long into the future, and even if it could be established that power dams are the most efficient means of generating it, this would not prove the necessity of either of the dams. The most that it could prove would be their economic feasibility. It is a fundamental fallacy to conclude that a favorable benefit-to-cost ratio can prove either necessity or justification. At best it can only suggest feasibility.

Providing water to the Southwest is the stated purpose of the Lower Colorado River Basin project; yet these dams will clearly reduce both the quantity and the quality of the water available from the Colorado River. The existing reservoir basins on the river already provide more storage capacity than can be utilized. Any additional reservoir will simply waste water through evaporation and seepage and thereby reduce the quality of that which remains.

The asserted benefits of these reservoirs for "recreation" are also open to challenge. We agree with the statement of the Bureau of Outdoor Recreation that: "No additional recreation benefits can be claimed for the proposed Bridge Canyon Dam because of the unusual existing recreation values of the proposed reservoir area and the adverse effects the dam and reservoir would have on these values. Water-oriented recreation cannot be considered one of the primary purposes for constructing (the dams) because less costly alternatives for expanding recreation facilities in this area are available."

Moreover, the people of this Nation are entitled to a diversity of types of "recreation." They are entitled to enjoy free-flowing streams and rivers and the wildlife they support. None is more worthy of protection than this region of the Colorado River; and this protection can yet be fully achieved.

That these dams would impair Grand Canyon National Park and Monument cannot be doubted. The Deputy Director of the Bureau of the Budget has himself stated: "* * * there is no disagreement that the (Bridge Canyon) dam would alter the wilderness character of this part of the river." Furthermore, Marble Gorge Dam would severely restrict the flow of the Colorado River through the park. Construction of it would almost certainly be used to justify the prompt construction of the Kanab Creek diversion project, under which at least 90 percent of the river's water would be removed from its natural channel at a point east of the park and fed back only at the head of Bridge Canyon Reservoir. Imagine the consequences—a virtually dry riverbed in the park, a flooded channel in the monument. This is the grossest of impairment.

In an attempt to justify the dams, the Bureau of Reclamation has spoken of "breaking faith" with the people of the Southwest if they are not built. But the 1919 act made no commitment to them that was not made to the entire Nation: that the park be preserved unimpaired for the enjoyment of future generations. It is the American people of all 50 States, both now living and yet to be born, who are entitled to have the Grand Canyon preserved intact and unimpaired.

Far more than the preservation of even the canyon and the park is at issue. At issue is the ability of this Nation as a mature people to exercise the self-restraint needed for living in a measure of harmony with nature, as ultimately we must, or perish. At issue is the preservation of that diversity so necessary to the freedoms we cherish and to our very well-being. If our Nation, the richest in recorded history, chooses these dams over such values, we will be building lasting monuments to our indifference, our mediocrity, and our cynicism. We will demonstrate our sound judgment, our self-restraint, and our maturity when we have refused to sacrifice these irreplaceable values to such expediency.

The precedents already exists for their preservation, in legislation both enacted and pending. The National Park Service Act itself states the principal. The Wilderness Act of 1964 furthers our commitment. The wild rivers program and other legislation now before the Congress express our continuing need.

The Indiana division of the Izaak Walton League of America urges your committee to reject both Bridge Canyon Dam and Marble Gorge Dam, as well as any further regimentation of the Colorado River between Glen Canyon Dam and Lake Mead. We urge the Congress and the administration to consider further measures for the preservation of the whole of the canyon between these two sites.

Thank you.

Mr. ROGERS. Mr. Udall.

Mr. UDALL. I assume your organization is in favor of the Indiana Dunes.

Mr. BARRETT. Yes.

Mr. UDALL. Since I am a despoiler of the canyon in this case—let me tell you that when no one else would introduce the administration's Indiana Dunes bill in the House in the last Congress, and I did, and I am willing to fight for it.

Mr. BARRETT. We appreciate it.

Mr. UDALL. I am sorry you come here against this needed project. I went back to the 1955 hearings, when they were trying to get the upper basin project, and 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 10 years later that we don't need the dams, atomic power is right around the corner again, and Arizona has to wait 15 or 20 years for this to occur. And I still don't think it is right around the corner.

The previous witness said that one of the Senators was receiving 70 letters a week. The reason he is receiving them, in my judgment, is that most people are misinformed. We have a letter here to one of my colleagues, and the sender wrote Representative Pickle and said:

Please stop construction of Bridge and Marble Canyon Dam sites, they will destroy much of the natural beauty of the Yellowstone National Park and Monument.

I think this is typical of the information a lot of people are getting.

Finally, before my time runs out, I think Mr. Hosmer has developed a point that is very important.

Grand Canyon National Park has roads on both rims, probably a hundred miles of road. Why? So people can go along the gorge and see the Grand Canyon. These roads destroyed birds' nests and gopher holes and some trees, I am very sure.

Now, what Mr. Hosmer suggested is that this 13 miles is also in the park, and it is along the edge of it, and this provides a water highway, so that people can see the gorge from another angle. And as I said in these hearings, rather than destroying the Grand Canyon, I think it simply makes it accessible in the same way that the roads make it accessible.

I think this is a very good analogy and one that has not really been fully considered by you people.

Mr. ROGERS. The time of the gentleman has expired.

Mr. Hosmer.

Mr. HOSMER. Yes. Those letters that were referred to, that are flooding Congress, more than the Grand Canyon is ever going to get flooded—do you know what lobby has pushed the button and started them?

Mr. BARRETT. No; if I may answer. Travel on a reservoir will show you a part of the canyon wall above the reservoir. But we sub-

mit that the uniqueness of all parts of the canyon is the flowing river and the ecology surrounding it, the life forms.

Mr. HOSMER. We are talking about the inability of anybody, in the whole history of our Nation, except 900 people, ever to get in and look at it. And that sounds to me like a pretty ridiculous proposition.

Mr. BARRETT. On that basis, then, you would make it impossible for anyone at any time in the future ever to see that area.

Mr. ROGERS. The time of the gentleman has expired.

Mr. Wyatt.

Mr. WYATT. Mr. Barrett, in your statement on page 1 you say:

When the park and mine were established, the promise was made to the people of all the States that this region was to be preserved unimpaired for the enjoyment of future generations.

I am interested in your authority for that statement. How and in what way was that promise made, sir?

Mr. BARRETT. Paragraphs 1 and 2 are paraphrasing the national resolution of the league. I recognize the fact that there was a reservation in the Park Act. However, it is a question of the reservation being contingent upon, No. 1, necessity, and No. 2, consistency with the primary purpose.

Now, the primary-purpose expression, of course, appeared in the 1961 act creating the park. That is the basis for the statement.

Mr. WYATT. Well, actually, that is not, to my judgment, any promise that it is to be preserved unimpaired. The possibility that, if there is a necessity for it, that it can be done—that is not an unconditional promise that it can be kept that way unimpaired.

Now, one other question.

You say in the same paragraph, "If we cannot defend it, and there is no unit of the national park system which can stand attack by the expediency of the moment"—you recognize the difference between the legislation authorizing the Grand Canyon National Park and legislation authorizing other national parks, where there is not this exception.

Mr. BARRETT. I recognize that. But as the point was made earlier this morning, I do not think that the people of this Nation are going to be legalistic in their view of the integrity of the national park system.

Mr. WYATT. That is all I have.

Mr. ROGERS. Mr. Reinecke.

Mr. REINECKE. Thank you.

Mr. BARRETT. Inasmuch as you refer to the previous witness, I would like to corroborate a piece of his evidence in indicating that about 20,000 acre-feet are required per million-kilowatt. This I think is borne out by the testimony by Commissioner Dominy that 100,000 acre-feet of water are required for the 5-million-kilowatt plant proposed for the Kaiporowits plateau. And this offsets the anticipated evaporation from the two reservoirs, while at the same time you have 5 million kilowatts power instead of 2.1; 2.1 itself is not attainable, because there is not enough, water in the river to generate that much electricity.

Mr. ROGERS. Thank you, Mr. Reinecke.

Thank you, Mr. Barrett.

Mr. BARRETT. Mr. Chairman, thank you for switching the order of witnesses so that I might appear.

(Letter from Thomas E. Dustin, secretary and president-elect, Indiana Division, IWLA, follows:)

THE IZAAK WALTON LEAGUE OF AMERICA,
INDIANA DIVISION,
August 22, 1965.

Statement of the Indiana Division Izaak Walton League of America re H.R. 4671, H.R. 4706, and H.R. 9248, authorization of Bridge and/or Marble Canyon Dams on the lower Colorado River in Grand Canyon.

Hon. WALTER ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation, Committee on Interior and Insular Affairs, House Office Building, Washington, D.C.

DEAR CONGRESSMAN ROGERS: The Indiana Division of the Izaak Walton League of America wishes to be placed in the record of hearings as being vigorously opposed to any and all measures to authorize either the Bridge Canyon or Marble Gorge Dams on the lower Colorado River, or to any other regimentation of the river in the Grand Canyon area between Glen Canyon Dam and Hoover Dam.

It is the position of our 5,600 members that no further degree of artificiality such as represented by these projects be permitted to intrude either directly or indirectly on the Grand Canyon.

It is acknowledged and recognized by all—opponents and proponents as well—that neither of these projects are for purposes of reclamation in the sense of supplying water to any part of the Southwest, but are exclusively proposed to produce Federal hydroelectric power to offset costs of other phases of the Southwest water plan—power, we would add, which can be produced in that region in abundance by many alternative means.

No agency of Government has a right to expect the people of the United States to surrender the natural values of the national parks or the national monuments for projects of this type, or of any other types which we can conceive. Nor are we at all moved by the massive public relations effort by agencies of the Department of the Interior designed to persuade the American people to permit these projects in the name of "recreation." One lake is much the same as another, and the enormity of Lake Mead behind Hoover Dam, and of Lake Powell now flooding Glen Canyon, are quite enough to satiate those types of recreational needs.

In our view, any additional compromise of the Colorado River or of the Grand Canyon National Park or Grand Canyon National Monument is unthinkable and unacceptable.

We suggest further that such proposals can be considered nothing better than expedient, that it is only a matter of time until the state of the art reaches the point where desalinization will make vast quantities of fresh water available, that every region of the Nation has its own peculiar limitations the Southwest not excluded, and that if the American people permit this intrusion upon their domain in the Grand Canyon, there will not be a single unit of the national park system anywhere which can be maintained safe from manipulation or destructive compromise.

Less than 1 percent of the Nation's area is devoted to its national parks and monuments. We believe that these tiny remnants of our greatest natural examples—and most particularly the Grand Canyon—must be reserved intact for their inherent and incalculable capacity to inspire and re-create, the American people, and that government should be high-minded enough not even to suggest to the people that these values be surrendered.

We would add that the very existence of serious proposals such as these can do little but add to the growing cynicism becoming so universal in our country. The people have a right to see these national park institutions remain unassaulted as remaining strongholds of idealism, grace, and highest purposes. They represent only the tiniest fraction of our land and water mass, and must properly remain protected from the ordinary, the common, and even the crass and thoughtless applications to which so much of the American scene as been diverted.

The Indiana division of the league wishes to reserve the right to append this statement with other material of supporting nature, and/or to have its representative testify personally at the hearings.

With your permission, we would like to have the attached editorials from the March 1965 edition of the Hoosier Waltonian (the State newspaper of the Indiana Division, IWLA) and from the April 9, 1965, edition of the Fort Wayne News-Sentinel printed in the record following this letter.

Sincerely yours,

THOMAS E. DUSTIN,
Secretary and President-elect.

(The editorials referred to are not within the rules of the committee and can be received for the file.)

Mr. ROGERS. Our next witness is Mr. Richard Lamm, representing Colorado Open Space Coordinating Council.

STATEMENT OF RICHARD D. LAMM, ON BEHALF OF COLORADO OPEN SPACE COORDINATING COUNCIL, INC., AND THE FEDERATION OF WESTERN OUTDOOR CLUBS

Mr. LAMM. Mr. Chairman, I wonder if I might insert my statement in the record as if read.

Mr. ROGERS. Without objection your statement will be included the same as if read in full, Mr. Lamm.

Mr. Chairman, I would like to add a few comments, if I might.

I would like to particularly discuss the nature of a conservationist, if I may. I think sometimes, too often, we are felt to be progress pacifists, sitting on the track of civilization as it moves ahead. I would suggest this is not our case. I would suggest that all that we ask is that progress move ahead with a conscience, that progress move ahead with a sense of values. I think this is our key point.

We do not mind progress, we mind blind progress. We do not mind engineering, we mind blind engineering.

I think we realize as advocates we sometimes overstate our position. We sometimes possibly go too far and make statements which we do not have to make in an advocation capacity of the ability to refute those people who have studied this thing as a matter of vocation.

But I do believe that our essential point here is unimpeachable.

I believe that what we feel is that nothing as magnificent as the Grand Canyon, one of our great natural endowments, should be impaired without two things being necessary. No. 1 is that it is absolutely essential for the national interest, and No. 2 is that there are no other accessible alternatives. I think it is this area which bothers us.

Arizona needs the water. Nobody questions that. But I think what really bothers us is the fact that there do seem to be other alternatives, acceptable ones. There are alternatives which are more economical, there are alternatives which are definitely more acceptable. Except that they lack one thing. I believe that they do not fit in the orthodox political channels. They are not easy to do. They are different, and I understand—I am led to understand—that they pose problems which I fully did not appreciate when I came here.

I understand, for instance, that when you subsidize—it is only $26 million a year, that is what we keep thinking, to save the Grand Canyon. I did not realize the indispensable nature of the feasibility study to this project—the fact that these things historically have been tied in together, and the fact that if you breach the wall once now,

each one of your constituents would ask you to breach the wall, and not combine a project with some revenue-producing component.

We ask special consideration for this. We would suggest that $26 million a year is not this much money, and in this one instance possibly we could make an exception to the project of combining the revenue-producing factor with the feasibility study. We also would request actually that you people be both historians and prophets. I believe there are some of us on both sides of the line that realize the problem. I would suggest that Representative Udall would probably, if these floodgates of the Grand Canyon Dam are ever closed, would shed more tears privately than we would, some of us, publicly.

But I would suggest that you consider the whole view and the fact that this is one of our national—this is a national park, sort of a national Smithsonian Institution. Recently you people authorized over a million dollars to buy a Gutenberg Bible, which will sit over here in the rare books room in the Library of Congress and probably only five people will handle it every year. I feel this comes closer to the analogy of what we are talking about here—and the fact that if it is not necessary, indispensable, that this decision, being irrevocable—that this decision be deferred, that other alternatives be looked into.

I believe we have to consider the future generations also, future people that will want to use this canyon, future people that will want this sense of wilderness.

I believe that they will be the ones that will judge us on our foresight or damn us for our folly.

I have nothing further to say.

(The statement of Mr. Lamm follows:)

STATEMENT BY RICHARD D. LAMM, REPRESENTING THE COLORADO OPEN SPACE COORDINATING COUNCIL, URGING DELETION OF BRIDGE AND MARBLE DAMS IN THE LOWER COLORADO RIVER BASIN PROJECT

Mr. Chairman, my name is Richard D. Lamm. I represent the Colorado Open Space Coordinating Council, Inc., and the Federation of Western Outdoor Clubs. In addition to the Federation of Western Outdoor Clubs, I am specifically speaking for the following members of the Colorado Open Space Coordinating Council, Denver Botany Club, Colorado Federation of Garden Clubs, Colorado Federation of Women's Clubs, Colorado Mountain Club, Colorado White Water Association, Denver Field Ornithologists, Mile-Hi Alpine Club, Regional Parks Association, Rocky Mountain Trail Association, and University of Denver Alpine Club.

While I cannot claim that my appearance has been financed by the dimes and nickels of widows and orphans, I would like to emphasize that my appearance here today is a group effort involving no little sacrifice. Many different people took 5 nondeductible dollars out of their paychecks to send me here today. It is easy for groups with an economic or pecuniary self-interest to finance trips to Washington to articulate their grievances. It is not so easy for average citizens to petition their Government. I represent thousands of people whose interest is merely a desire to attempt to save one of this country's most impressive natural endowments—the Grand Canyon.

The most important duty I am charged with is to request—to plea—that public regional hearings be held in regards to this matter. The Grand Canyon is a national landmark, a worldwide attraction. The Nation as a whole must be given the chance to speak on its preservation. We in Colorado would particularly like to request regional hearings be held in our State. We value the Grand Canyon highly. I speculate—in a moment of chauvinism—that if Colorado were, as they say on the license plates—"The Grand Canyon State"—we would not trade her irreplaceable beauty for a stopgap incomplete answer to our water problems. I plead with you to hold regional hearings so that you

may properly gage public opinion. I promise that in my place would stand legions.

I should like to list for you our objections to that part of the Lower Colorado River Basin project which involves the building of the Grand Canyon dams, euphemistically called Bridge and Marble Dams. If some of our arguments are weaker than others, I ask your tolerance. Despite the thousands of man-hours that have been put into this project, I cannot put my tongue around every esoteric point in my presentation. Projects which arise out of the avocations of many, however valid, are susceptible to subtle impeachment by those who make a vocation in the same area. But the validity of the main thrust of my argument is, I believe, unimpeachable. That is that anyone who desires to tamper with any part of our national natural heritage—like the Grand Canyon—should carry the extremely heavy burden of proof that such a violation is absolutely necessary to the national welfare, and that there are no other acceptable alternatives. The proposed Grand Canyon dams fail on both counts. They are not necessary. There are other acceptable alternatives. We will go further; we will state that these dams are such folly that we are appalled that their consideration should even occupy the time of this committee.

My first point—already well made in prior testimony—is that this project involves the illegal use of water. We see now, evidenced by volumes of testimony, that there is not enough water in the Colorado River to go around. The Bureau of Reclamation did not adequately account for evaporation, seepage, and increased upper basin use. The incredible thing about this now accepted fact is that nowhere is it mentioned in any of the publications of the Bureau of Reclamation. Such an omission could result from either one of two things: (1) Either it was conveniently and purposely withheld, or (2) they overlooked it and made a blunder of incredible proportions. In either case, the omission of such a major factor casts in grave doubt the remainder of the feasibility study. This one omission, we believe is symbolic of other inaccurate and over-optimistic data which appears in the feasibility studies.

DON'T AGREE WITH THE CONCEPT OF CENTRAL PARK

My second point is that, while the Grand Canyon dams were intended to provide revenue, they cannot, in fact, even pay for themselves. Even under optimum conditions, Marble Canyon power will have to be sold at a loss. Follow these facts: The Bureau places the average power cost at 5.3 mills per kilowatt-hour. It intends to sell all power (peaking and nonpeaking) for 6 mills per kilowatt-hour over a 78-year period. But, a 1964 Federal Power Commission survey discloses that the maximum competitive price at which power will sell during the 1976–2076 period will be 4.4 mills per kilowatt-hour—1.6 mills below the Bureau's hoped-for price. Thus if the Bureau had to sell at 4.4 mills per kilowatt-hour—17 percent below cost—it would lose 27 percent of its anticipated revenues from the project. With a 1973 completion data, the dam would be obsolete as a revenue source 3 years after the turbines started turning. This does not take into account projected nuclear plants which may be producing power for 2.1 mills per kilowatt-hour by 1980. In addition to these figures, the Office of Science and Technology estimates that revenue selling prices may go as low as 1.6 mills per kilowatt-hour. (Note: Today Glen Canyon power also sells for 6 mills per kilowatt-hour, but it only operates four of its eight turbines. Does this mean there is no market for 50 percent of the dam's capacity?)

Much has been made of the peaking power factor in Marble Canyon feasibility studies. One justification for the 6 mill per kilowatt-hour price is that peaking power—for heavy industrial or early evening domestic use—is worth more than normal load power. However, a nationwide grid of high-voltage transmission lines, already underway, will make power price differentials and peaking power a thing of the past.

If the Bureau of Reclamation continues to insist on including Marble Canyon Dam in the Lower Colorado River Basin project, we must expect disastrous economic consequences: power production at Marble will have to be subsidized. Not only has the Bureau vastly overestimated the selling price of this power; it has made the further error of overestimating the flow of the Colorado River. The truth is that Marble will not produce the amount of power originally projected. According to the Bureau's 1964 report, "Marble Canyon Project," feasibility is based on an annual average riverflow of 10,550,000 acre-feet.

Yet, the Bureau's own calculations conclude that evaporation and seepage, plus future upper basin use, will decrease the flow to 8,250,000 acre-feet annually—2,300,000 acre-feet short of the Bureau's own feasibility figures. This means that only 1.7 billion kilowatt-hours per year can be produced, not 2.1 billion as originally projected. As any businessman knows, a decrease in production increases the unit cost. In this case the cost will rise 0.8 mills, expanding the cost to 6.1 mills per kilowatt-hour. Since the competitive price will be 4.4 mills per kilowatt-hour, this escalates the taxpayer's power subsidy to 1.7 mills per kilowatt-hour.

To summarize: Marble Canyon Dam will not provide revenue for the Lower Colorado River Basin development fund; rather, it will require a continuing outlay of taxpayers' funds. Marble Dam's hydroelectric power will become noncompetitive by 1976 and will have to be subsidized. The purported need for peaking power will no longer exist with nationwide transmission lines providing power to peak areas when demand in other areas is low.

Diminishing the flow of the Colorado River through evaporation and seepage will result in economic losses from potential downstream sales for industrial and domestic water use. Finally, increased salinization of irrigation water in the Salt River Basin will place the ability of the United States to fulfill its treaty obligation with Mexico in jeopardy.

By burning coal or gas, private industry in the Southwest can provide power at a profit—for about 3.4 mills per kilowatt-hour today. The Southwest water plan says: "The total proposed Bridge Canyon and Marble Gorge capacity will provide only a small increment in the projected future demand of the area * * *." Vast reserves of coal, gas, and other fossil fuels are capable of meeting power demands in the Four Corners area far into the future. Thus economic justification for the Grand Canyon dams evaporates.

Let us now consider the geologic aspects. If Marble Canyon Dam is actually constructed, its reservoir will leak like the proverbial sieve, spilling the desert's liquid gold in all directions.

This startling discovery was disclosed recently by Dr. William C. Bradley, associate professor of geology at the University of Colorado at Boulder. Ironically, his conclusions are best supported by the Bureau's own feasibility studies on Marble Canyon Dam, and by the recent data on Glen Canyon.

Marble Canyon Dam will abut a rock formation called the Redwall limestone which geologists agree is the most "cavernous" in the Grand Canyon region. While dam abutments appear firm at the damsite, hundreds of caverns are located a few miles upstream. Great caves near the present waterline of the Colorado River, in the proposed reservoir area, are hundreds of feet long and from 5 to 40 feet wide. These massive "tubes" will carry reservoir waters underground and are a substantial reason why Marble Canyon Dam should not be built.

Marble Canyon Dam will raise the water level of the Colorado River 300 feet in a giant reservoir northwest of the Painted Desert. Besides the cavernous Redwall limestone, the reservoir walls will consist of other porous or permeable limestones and sandstones, known to geologists as the Coconino, Kaibab, Moenave, and Navajo.

Redwall limestone is analogous to other famous cavernous rocks in the United States: the Madison limestone of Montana and Wyoming, the Leadville formation of Colorado, and some of the famous cave-forming rocks in the Ozarks. All are known to geologists for their caverns which make them excellent oil and water reservoirs.

As if building one's "house" on the sand were not enough, Professor Bradley points to another problem that could haunt the Bureau of Reclamation for years to come. Rocks on the north bank of the proposed reservoir dip down gradually to the northwest. On the south bank, they dip down to the southeast. This means that when the water level is raised 300 feet at Marble Dam it will be forced under tremendous pressure, into inclined planes of porous rock and along numerous northwest-southeast trending "faults" or cracks in the earth's surface. Thus water from the north side of the reservoir will "run away" through underground paths toward the Kaiparowits Basin near Escalante, Utah. Water from the south side will flow to the southeast, toward the Black Mesa Basin.

According to Professor Bradley, no one can predict exactly how long water will leak away from Marble Canyon Reservoir before a new ground water level is attained. Water may rush very swiftly through underground caverns, as

though an open tunnel. Seepage toward an "adjusted" ground water level may be much slower.

The geologist is quick to admit that all reservoirs, wherever located, suffer from what is called "bank storage." Thus the Marble Canyon problem is one of degree. The region around the proposed reservoir is very arid. A huge apron of rocks 300 feet thick extending out on all sides of the reservoir could be slowly filling with bank storage water—soaking up the precious Colorado River like a sponge—for decades.

Even though some of the water from bank storage is theoretically recoverable, if and when Marble Canyon Dam is ever emptied, it is otherwise unavailable to users on the Lower Colorado. Its continuing absorption by porous rocks must be subtracted from the total flow of the river. According to Dalas Cole, chief engineer, Colorado River Board, about 25 percent of the water in Lake Powell above Glen Canyon Dam is going into bank storage. It leaks into rock formations less permeable than those surrounding Marble Canyon. According to Cole: "With Lake Powell less than a quarter full at 6.2 million acre-feet content, streamflow records indicate that an additional 1.6 million acre-feet has seeped into the porous lake bottom and sides since the dam was put into operation." (See Boulder City News, January 1965.) This water loss represent 107 percent of the amount that we must deliver to Mexico every year under an international treaty.

Professor Bradley points out that if the Bureau proceeds with its plans for Marble Canyon Dam, it could be a tragic and expensive error, twice repeated. In 1960 the Bureau completed Anchor Dam on the Bighorn River near Thermopolis, Wyo. As expected, the reservoir filled with water. Then quite unexpectedly, it drained with a resounding gurgle-gurgle into underground "sinks" and caverns in the Madison (i.e., Redwall) limestone. Patch jobs failed and the reservoir is empty to this day. Where did the water go? The Bureau of Reclamation is still trying to find out.

Lastly, we feel that Grand Canyon is magnificent enough to deserve better treatment from us than its use as an ephemeral short-term solution to regional water problems. The Grand Canyon belongs, as do other national parks, to our natural birthright. Farsighted people of generations past set these aside as sort of a natural beauty bill of rights to which succeeding generations shall benefit. It is a Smithsonian Institution of natural beauty which cannot be measured by how many more people can boat upon it if we make it into a reservoir. A year ago Congress authorized $1 million to buy a Gutenberg Bible which will sit in the Rare Books Room of the Library of Congress to be yearly used by only a handful of people. In this transaction you valued manmade antiquity—we ask you here to value God-made antiquity.

We believe that this will not be difficult to do. While advocacy often precludes objectivity, we have strained to see a valid reason for the Grand Canyon dams. In none of these do we see an imperative overwhelming national need—the minimum requirement before we set the dangerous precedent of violating one of our natural landmarks; instead we find the opposite—the project is to be built on the shifting sands of false assumptions, incorrect figures, inaccurate estimates. The planners have overestimated the revenue from these dams as they have overestimated the water in the river; then—as if to adjust for their optimism—they underestimated the costs.

Exactly what would be the effect of the Grand Canyon dams on a scenic wonder of the world? Bridge Canyon Dam, temporarily on the shelf, would flood the entire length of Grand Canyon National Monument and 13 miles of Grand Canyon National Park. Marble Canyon Dam, only 13 miles upstream of the eastern park boundary, would flood 50 miles of the remote and wildly beautiful Marble Gorge, all the way to Glen Canyon Dam and Lake Powell.

Secretary of Interior Udall calls this a "peripheral invasion." The Bureau of Reclamation, in a position paper of March 16, 1965, claims: "Construction of the Marble Canyon Dam and Reservoir will have no effect on the national park since the dam and reservoir would be upstream from the park boundary." What extraordinary statements. Let's look at the facts.

From the downstream end, the naturalness of the Colorado River in the western 40 miles of Grand Canyon is already ruined by flooding and mud deposition. Upstream, the natural Colorado River flow, now blocked by Glen Canyon Dam, used to be 20,000 to 100,000 cubic feet per second but has now nosedived to 8,000 to 24,000 second-feet. The Bureau is now permitting only 9,000 second-feet through the dam, a flow too low for boat navigation.

When Lake Powell is full—if ever—water volume past the Glen Canyon Dam turbines may vacillate from 8,000 to 24,000 second-feet causing a 7- to 8-foot vertical fluctuation (daily or weekly) in the river level in Grand Canyon National Park. This is more than enough to precipiate drastic changes in local ecology. No living thing can survive near the water's edge with short-term fluctuations of this magnitude. During those sudden drops, so common with power dams, silt will accumulate in side canyons, burying real beauty spots.

Can the Bureau then claim no effect from Marble Canyon Dam, which will be 50 miles closer to the Grand Canyon National Park and Monument? Perhaps there is "no effect" until Grand Canyon is flooded clear to the top.

The 439,000-acre Gila Wilderness Area in southwestern New Mexico was the first area in the United States to be officially designated as "wilderness." Hooker Dam would back water into this wilderness area; it must be eliminated from the Lower Colorado River Basin project or the act will be nothing but a scrap of paper; with all other wilderness and primitive areas defenseless against the Bureau of Reclamation' insatiable ambition.

The Grand Canyon Act of 1919 reads in part: "That, *whenever consistent with the primary purposes of said park*, the Secretary of Interior is authorized to permit the utilization of the areas therein which may be necessary for the development and maintenance of a Government reclamation project." [Italic added.] But, as Richard C. Bradley writes in the winter 1964–65 issue of The Living Wilderness: "Is a fluctuating reservoir that destroys all life within its zone of fluctuation 'consistent with the primary purposes of the park?'"

President Johnson, in his historic White House message on natural beauty, might well have been talking about Grand Canyon when he said: "Yet the storm of modern change is threatening to blight and diminish in a few decades what has been cherished and protected for generations."

Senator Frank Lausche, of Ohio, recorded in the Congressional Record of April 7, 1965, stated: "Benefits from the proposed dams would be strictly local, while the loss of scenic and esthetic value to the canyon would be international. We propose the spending of hundreds of millions * * * to create new recreation areas and to beautify the country, and, at the same time, propose to spend billions to destroy a wonder of the world."

President Theodore Roosevelt said when he proclaimed the Grand Canyon National Monument in 1908: "Leave it as it is. The ages have been at work on it, and man can only mar it."

We feel that there are much better alternatives both to the power and to the water needs of this area. To give but one example, the President's Office of Science and Technology estimates that a nuclear-powered combination desalinization and powerplant could be produced by 1980 (about the same date that the Bureau of Reclamation project would be in full use) that would do the following:

(*a*) Produce 52 billion kilowatt-hours of electricity per year (versus 6 to 7 billion kilowatt-hours per year from the Grand Canyon dams).

(*b*) Produce this power for 1.6 mills per kilowatt-hour (versus 5.3 mills per kilowatt-hour or more.)

(*c*) Produce 1,570,000 acre-feet of fresh water each year. (No water would be produced by the Bureau's project.)

(*d*) Produce this water at a cost of $65 per acre-foot. (Bureau of Reclamation's value of water—$66 per acre-foot. The cost of water depends, of course, on the selling price of the power. If power from the nuclear plant were sold for the Bureau's estimated price, the water could be given away free.)

(*e*) Cost $2,290 million (versus $1,704 million for the Bureau's project).

We note that the above is not meant to be a comparison between two alternate proposals; desalinization can solve the Southwest's water problems, while the Bureau of Reclamation's proposal cannot. Such desalinization plants will be necessary for future development and growth of the area whether the Bureau's project is built or not.

A few other features relative to the desalinization project are:

(1) The water could be produced where it is most needed—on the California coast.

(2) Similar plants could be located on the Gulf of California as a cooperative venture with Mexico. Transport costs to the Phoenix-Tucson area would be about the same as those from Havasu Lake. These plants would

greatly improve the strained relations with our neighbor to the south, while the central Arizona project would inevitably cause further irritation.

(3) Desalinization actually produces fresh water, and from an inexhaustible source. There is no limit to the amount of development that could take place, both in the Pacific Southwest and in the Rocky Mountain region, whose surface water would be under far less demand.

(4) The particular plant outlined above would be only a forerunner of larger, cheaper, and more efficient plants to be built in the future. If the Grand Canyon dams were built, we would have to live with their inefficiency for the next hundred years.

(5) Desalinization plants destroy nothing. Grand Canyon would remain intact for a few million more years, and perhaps the residents of the Southwest could finally learn to live at peace with their natural surroundings, and to appreciate the magnificent setting with which nature has blessed them.

In closing we urge you to consider the precedent that the proposed dams would set for other violations of our scenic heritage. Will each region be compelled to sacrifice their national landmarks and attempt to put them to work subsidizing that areas particular problems? The time has come to draw the line. We ask you to draw it here and now, and vote down the Grand Canyon dams.

Mr. ROGERS. Mr. Aspinall.

Mr. ASPINALL. I wish to thank Mr. Lamm for his statement. He sets forth his position very well. We are in agreement on some other matters—I understand—so I will let it rest there.

Mr. ROGERS. Mr. Hosmer.

Mr. HOSMER. You brought along a statement of the Colorado Young Democrats opposing the construction of the Bridge and Marble Canyon Dams. What do you want to do with that?

Mr. LAMM. I am only an errand boy on that one. I do not speak for that group. I only ask that it be inserted in the record.

Mr. HOSMER. I think it a rather strange thing that the Colorado Young Democrats would revert with relish to the Republican President's statement, Theodore Roosevelt, while silently denouncing a program of a Democratic President, Lyndon Johnson.

I suggest that it might better go in the files than in the record, Mr. Chairman.

Mr. ROGERS. Is the statement presented by you as a representative of the Young Democrats, Mr. Lamm?

Mr. LAMM. No; very clearly not.

Mr. ROGERS. You are just delivering it for them.

Mr. LAMM. That is right.

Mr. ROGERS. It will be received by the committee subject to the rules of the committee.

Mr. LAMM. I am sorry it was handed out. I meant to have it only included in the record. I am here as a representative for the Colorado Open Space Coordinating Council.

Mr. ROGERS. Your time is expired.

Mr. UDALL. I appreciate your sincerity. I think you do your State a disservice, because it has a big stake in this bill, and I think you people from Arizona have done our State a disservice. But, again, this is a world in which people have different views and I respect yours as I am sure you respect mine.

Mr. Chairman, lest the impression be left that all Arizona conservation groups are against this project, I ask unanimous consent that a three-sentence resolution of the Arizona Conservation Council, composed of the following 15 organizations: Arizona Parks & Recreation Association, Arizona Bowhunter Association, Arizona

Federation of Garden Clubs, Arizona Association of Landscape Architects, Arizona Game Protective Association, Arizona Federation of Women's Clubs, University of Arizona Wildlife Conservation Club, Arizona State Horsemen's Association, Arizona Council of Camera Clubs, Arizona Zoological Society, Coronado section of the American Camping Society, Arizona State Parks Association, Arizona State Rifle & Pistol Association, Arizona Outdoor Writers Association, Maricopa Audubon Society, be placed in the record at this point.

Mr. ROGERS. Is there objection?

The Chair hears none, and it will be included.

(The material referred to follows:)

A RESOLUTION

Whereas new sources of water are essential to the economy of the State of Arizona and its future growth; and

Whereas the Supreme Court of the United States has upheld Arizona's claim to its fair share of water from the Colorado River; and

Whereas the Colorado River is the last major source of water available to the State: Now, therefore, be it

Resolved, That the Arizona Conservation Council endorse the proposed central Arizona project and urge its immediate enactment by the Congress of the United States.

Mr. ROGERS. Mr. Burton.

Mr. BURTON. Mr. Lamm, I would like to congratulate you on an articulate statement. I can only say I am glad you live in Colorado and I hope you stay there and do not come across the line into Utah.

Mr. ROGERS. Mr. Wyatt.

Mr. WYATT. Mr. Chairman. I would only like to comment, Mr. Lamm, on your figures on desalinization, and how soon it will be achieved in quantity and cost, that would relieve this area. From the testimony that we have had before this committee, I would like you to know that it does not appear that relief in this area is presently available from the fact that we know possibly it will come through additional breakthroughs. But as it stands now, it is not in sight on a scale to solve the problem.

Mr. LAMM. Mr. Wyatt, I notice from statistics that something like 90 percent of the scientists that have ever lived are alive today. I would think we cannot look historically on a problem like this. I think our breakthroughs are coming so fast. I think the people will judge the feasibility study a hundred years ahead. Why cannot you gage our technological advance by the same things by which you gage the feasibility studies?

Mr. ASPINALL. What is your business, Mr. Lamm?

Mr. LAMM. I am an attorney.

Mr. BURTON. Will the gentleman yield to me? Can you tell me, Mr. Lamm, what the date was that this Open Space Coordinating Council was formed? Where was it organized?

Mr. LAMM. I can only tell you approximately. I think it was a year ago last April.

Mr. BURTON. Thank you.

Mr. ROGERS. Thank you very much, Mr. Lamm, for your presentation.

Our next witness is Miss Madelyn Leopold, of Washington, D.C.

Miss Leopold, I think you probably qualify as the youngest witness to ever come before the subcommittee. You may have a seat, if you like.

Do you have a written statement?

Miss LEOPOLD. Yes; I do.

STATEMENT OF MISS MADELYN LEOPOLD, WASHINGTON, D.C.

Miss LEOPOLD. My name is Madelyn Leopold. I am testifying as a private citizen, obviously. I go to National Cathedral School. I am going to be a senior this year. I would like to read a statement that I have written, that I would like to have you hear.

My purpose in testifying to you today is merely selfish. For the majority of people, the most obvious reason why these dams should not be built is that they will yield the Southwest a real net loss of water, which would be a ridiculous sacrifice in this chronically arid region. However, I am personally interested in the sacrifice of beauty the erection of these dams would affect, the travesty they would play upon the country's current drive to beautification. I am against the dams because they will create pure ugliness, and I don't want the future generations, or mine, to suffer from your mistake. For those of you who have never seen what a dam can do, I would like to tell you from my own experience.

This summer, I spent a week in a rubber raft floating down the San Juan River to Lake Powell. The river was magnificent in its force and motion. It was clean and alive. The canyon was as breathtaking as any Gothic cathedral, for like a cathedral, it was hundreds of feet high; intricately carved; and splendidly colored by sun, shadows, and white moonlight. Even such a comparatively small canyon was worth missing a trip to Europe.

But Lake Powell was another thing: the water was flat and still, like a lake, yet lacking all the beauty of a lake. It was dirty and littered, the trash lying to rot on the motionless water. The canyon was only about 50 feet high, and the feeling I experienced upon moving from the river into the lake was somewhat like that of going from a cathedral into a bomb shelter. Furthermore, the walls of the canyon were streaked with silt left by the water as it rose and fell, regulated, as it were, by a faucet. Imagine the Colorado River reduced to the mere dimensions of a bathtub. The proposed dams in the Colorado would, in fact, create a similar situation, different only in that they would ruin a more beautiful spectacle.

Furthermore, if you drown the living Colorado, you will eliminate any educational value whatsoever that the canyon today offers to the tourists and their children. Being a student myself, I am very much aware of the effectiveness which a concrete example can have in illustrating a dry textbook fact. Today the canyon is the living scene of history, the very site of great American pioneer exploration. On the San Juan River, when my father spoke of Powells and the first expedition on the Colorado, I really could see the history being relived in the story waters of the river. And the Grand Canyon, too, is the most beautiful example of geological processes now existing on earth. If you drown the river, the creator of the canyon will be extinguished, and the canyon will become only a ludicrous imitation of its

former self, no longer a thing of nature, for nature cannot operate with a faucet. For students like myself, and people with a feeling for beauty, the erection of these dams would be a great mistake.

I have discussed this with my classmates and my friends have all said: "How can they do that to the Grand Canyon, of all places? If the public knew about it, the Government wouldn't get away with something like that." Among my peers there is a lot of disillusionment with Government, but nobody could believe that an elected administration would sink as low as to deface the Grand Canyon. And, of course, the public is uninformed. If Americans knew of this project, they'd be as amazed as my friends. But no one knows. Just yesterday I saw an article in the July McCall's about the Grand Canyon in which the author calls it "not just an American spectacular * * * (but) a true world wonder for all the world's people." How can this administration advocate natural beauty and "see America first" when it seeks to deface that beauty? For your children, and theirs, I would hope that you could leave just this one token of your personal values, that future generations may sigh at the spectacles of Grand Canyon and say to you, "Those Americans knew the value of real beauty."

Thank you very much.

Mr. ROGERS. Thank you, Miss Leopold. There may be some questions.

Mr. Aspinall.

Mr. ASPINALL. I would like to ask one or two questions.

You are a very talented young lady. Who is your father?

Miss LEOPOLD. My father is Dr. Leopold.

Mr. ASPINALL. Where does he live?

Miss LEOPOLD. In Washington, D.C.

Mr. ASPINALL. Is he interested in conservation?

Miss LEOPOLD. Yes, he is, sir.

Mr. ASPINALL. May I say that I think that you are a very good successor to the late Howard Zahnizer, who was one of the best writers on such matters as this that you can find any place.

Now, let me ask you the $64 question.

How many young people, Miss Leopold—of course, I am acquainted with what you have just said about the San Juan. How many young people, do you think, in the United States will be given the opportunity to take the trip that you have taken?

Miss LEOPOLD. Sir, I cannot really tell. I know of a few—at least a handful—just among my friends who have had the chance to do it and have done it—at least similar things.

Mr. ASPINALL. I think what this committee is up against is trying to decide how much space we will leave for young people who are blessed with the background and the family that you have, to enjoy some of the things that you like as compared with those people who will have to take the other. And I don't have any criticism of your statement as to the values, because I think you have done a good job.

Mr. ROGERS. Mr. Hosmer.

Mr. HOSMER. No questions.

Mr. ROGERS. Mr. Udall.

Mr. UDALL. Well, I congratulate this young lady on a fine statement. I recognize your strong feelings about this. Many people

have come here and said they love the Grand Canyon. I do, too. Just for the record, I don't think I have said this before: We have talked for 10 days about Lees Ferry. My great-grandfather was named John D. Lee, and he was the man who established and built the ferry.

Another grandfather on my mother's side was Jacob Hamlin, the first one of the Mormon pioneers to come into this area.

My grandfather on my father's side was David K. Udall, sent by Brigham Young to go down into northern Arizona and settle that area. He traveled this area and crossed the Colorado with his family and their wagons and cows.

I grew up in this area, and I have been in it. I have represented it in Congress, I have flown over it. I think I love it as much as anyone. In my judgment these dams will not harm the basic values that are there.

I am one who has supported every major conservation measure since I have been in Congress, and I hope I can continue to do so, and any disagreement I have with people on this is a sincere one on my part.

Mr. BURTON. Mr. Chairman, I would like to congratulate this young lady on a most effective statement. I think I have never had a more charming adversary, Mr. Chairman.

I appreciate your coming before the committee.

Mr. WYATT. Miss Leopold, I would like to congratulate you upon making a very fine presentation. I have listened to everything you have said and I will give it consideration. Thank you.

Mr. REINECKE. Thank you, Miss Leopold. I am glad to have such an ally.

Mr. ROGERS. Miss Leopold, the Chair thanks you for an excellent presentation. Thank you very much for coming.

Miss LEOPOLD. Thank you, sir.

Mr. ROGERS. Our next witness is Mr. Francois Leydet, author of the book "Time and the River Flowing," about the Grand Canyon.

STATEMENT OF FRANCOIS LEYDET, AUTHOR OF THE BOOK, "TIME AND THE RIVER FLOWING"

Mr. LEYDET. My name is Francois Leydet, and I live in Belvedere, Calif.

Mr. ROGERS. Without objection, Mr. Leydet, your statement will be included in the record the same as if you had read it in full.

Mr. LEYDET. I consider it a very great privilege, Mr. Chairman, to appear before this committee. I'll admit further that, since this is my first such appearance, I also find it a somewhat awesome experience—just as sobering, in a different way, as Hance Rapid or Horn Creek Rapid or Lava Falls, through which I was rowing my dory only a month and a half ago.

I suppose that my principal qualification for appearing before you is the fact that I have twice traveled through the Grand Canyon from Lee Ferry to Lake Mead. I did it for the first time last year, and used the experience as a narrative threat in my book about the Grand Canyon, "Time and the River Flowing." And I did it again in June and July of this year. So when I decry the irreparable damage to the canyon that Marble Gorge and Bridge Canyon Dams would be, I can borrow a phrase from Commissioner Dominy's beautifully illus-

trated booklet, "Lake Powell: Jewel of the Colorado," and say, "I know; I was there."

I wish I could illustrate my presentation with slides and films taken on these trips. I would show you places like Vasey's Paradise or Redwall Cavern in the Marble Gorge, which will be under almost 300 feet of water if Marble Gorge Dam is built.

I would show you the incredibly beautiful entrance to Havasu Creek—the creek of the Blue-Green Water—which will be 80 feet underwater if Bridge Canyon Dam is built.

I would show you some of our campsites—at Soap Creek, beneath Toroweap Overlook, at Whitmore Wash, Spring Canyon, Travertine Falls—the hospitable beaches, the graceful sand dunes, shaded with mesquite and tamarisk and brightened with desert primrose and mallow, and the golden glory of desert plume. These campsites will all be drowned by the reservoirs.

I would show you tracks of ringtailed cat, of bobcat, beaver cuttings and otter slides, and a band of 17 bighorn sheep grazing by the riverbank—native canyon dwellers who will probably be exterminated as the waters rise behind the dams.

I would show you our boats running the rapids, and have you share some of the thrill, the exhilaration, the feeling of aliveness and freedom that flames in you in those brief, everlasting seconds.

Even so, photographs or films, no matter how beautiful, can only give you a suggestion of the reality they portray. Were I ever so eloquent, I could only hope to hint at what a living Colorado River means in the Grand Canyon. Neither pictures nor words can fill your ears with the roar of the rapid, or delight them with the cascading song of the canyon wren; they cannot fill your body with the heat refracted from the ebony-black Vishnu schist, a rock older than life itself; they cannot fill your soul with the cumulative impact of 3 weeks spent in one of the most glorious places on the face of this earth, 3 weeks from which you emerge, as Walter Stegner put it so well—

a single, separate, vertical, and individual in the world, part of the environment of trees and rocks and soil, brother to the other animals, part of the natural world and competent to belong in it.

You see, this is the sort of experience that will be denied to us, and to our children, and to their children throughout the generations, if these dams are built in the Grand Canyon. Do not be taken in by the Bureau of Reclamation argument that only "hardy, adventurous boatmen" now visit the inner reaches of the Grand Canyon, and that if the dams are built thousands of recreationists will be able to see the marvels hitherto available only to us daredevils.

This year, we found a notebook cached under an overhang in Elves' chasm which had been signed by previous boat parties. One of these included a 12-year-old child and a 61-year-old grandmother. Mack Miller, who met us with his jet boats below the last rapid and towed us to Temple Bar on Lake Mead, informed me that our party brought to 544 the number of people who had traversed the Grand Canyon in 1965, and that before the end of the year the total was expected to reach 700—including Senator Barry Goldwater and his family who made Colorado River history by portaging their boats around Hance Rapid by means of a helicopter. In other words, in 1965 alone more than three quarters as many people will have run the Colorado

through the Grand Canyon as have passed through it before in all the years since Maj. John Wesley Powell's initial traverse in 1869.

We may still be a fairly small club, but our membership is growing fast and it is open to all. It may be true, as the Bureau of Reclamation proclaims, that many more people would see the Marble Gorge and the lower 100 miles of the Grand Canyon if the two dams were built. But what they would see would be a mutilated remnant of what we saw, and instead of the unique, vital experience we had, they would know only the standardized, mechanized sort of recreation already amply supplied by Lake Havasu, Lake Mohave, Lake Mead, Lake Powell, Granby, Flaming Gorge, and Navajo Reservoirs, and others, all of them on the Colorado River or its tributaries.

I think that what I am trying to get across to you is what Secretary Udall had in mind when he wrote, in his preface to the booklet, "Wild Rivers":

> **America's rivers flow deep through our national consciousness. Their courses beckoned us to explore a new continent and build a nation, and we have come to know, depend upon, and love the rivers that water our land * * * Future generations are entitled to know the wild river heritage that has been so significant in the development of this Nation and its character. If they are to know that heritage, we must now make provision, Federal and State, to keep some of our rivers, or portions of them, wild and free, protected from uses that destroy their natural beauty and recreational desirability."**

I find it a little ironic, and very sad, that the coauthor with the Secretary of Agriculture Freeman of the above-quoted foreword to "Wild Rivers" should now be championing a project to mutilate the last significant wild stretch of the Colorado River, that virile, brawling stream which through the eons has carved, and is still carving by occasional permission of the Bureau of Reclamation, the Grand Canyon.

To me, and to most Americans who have traversed the Grand Canyon at river level, the erection of Marble Gorge and Bridge Canyon Dams would be a tragedy, a desecration, an act of vandalism. Frankly, the Bureau of Reclamation's arguments have not convinced me that such a necessity exists.

The basic purpose of the Pacific Southwest water plan, or lower basin storage project, is to import 1.2 million acre-feet of water a year into central Arizona: the so-called central Arizona project.

I am not here to testify against the central Arizona project, or the other water diversion features of the lower basin storage project. I am only here to testify against Bridge Canyon and Marble Gorge Dams. It is my contention that these dams are not needed, in any engineering sense, to get Colorado River water into central Arizona. That far from conserving water, they would waste enough through evaporation alone to fill the yearly needs of a city the size of Denver. That alternative sources of power exist or could be constructed far more quickly and cheaply than the dams. That steamplants, for instance, using the abundant and still practically untapped coal reserves of the Southwest, and producing the same peak capacity as Bridge and Marble Dams, could be built at a saving in initial cost equal to the half billion dollar price tag of Bridge Canyon Dam. That such thermal plants (or nuclear plants) could be erected close to the markets for their power, thereby obviating the need for long, costly, waste-

ful, and unsightly transmission lines that would be required to bring the dam's power output to market.

These economic objections apply to both Bridge Canyon and Marble Gorge Dams, as does the esthetic argument that the dams would be fatally destructive to some of the grandest scenery to be found anywhere on earth, and that they would accomplish the very thing that President Theodore Roosevelt warned against in a speech delivered at the rim of the Grand Canyon in 1903, when he said:

> In the Grand Canyon, Arizona has a natural wonder which, so far as I know, is in kind absolutely unparalleled throughout the rest of the world. I want to ask you to do one thing in connection with it in your own interest of the country—to keep this great wonder of nature as it is now * * * I hope you will not have a building of any kind, not a summer cottage, a hotel, or anything else, to mar the wonderful grandeur, the sublimity, the great loveliness and beauty of the canyon. Leave it as it is. You cannot improve on it. The ages have been at work on it, and man can only mar it.

But there is a further objection applicable to Bridge Canyon Dam. As you know, Mr. Chairman, this dam would back water for 93 miles: through the whole 40-mile width of Grand Canyon National Monument, and 13 miles into or adjacent to Grand Canyon National Park. The intrusion of a manmade lake into the national park and monument would be, to say the least, a nonconforming use of these preserves. It would represent a violation of the National Parks Act of 1916, which states that—

> the fundamental purposes of the * * * parks * * * is to conserve the scenery and the natural and historic objects and the wildlife therein, and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.

The Presidential proclamation establishing Grand Canyon National Monument contains no reclamation reservation of any kind. The act of Congress establishing Grand Canyon National Park does contain the following language:

> Wherever consistent with the primary purpose of said park, the Secretary of the Interior is authorized to permit the utilization of areas therein which may necessary for the development and maintenance of Government reclamation projects.

We have already had testimony to the effect these dams are not necessarily for these projects and, too, that they would conflict—they are not consistent with the primary purposes of the park.

I want to emphasize a third word in there, the word "reclamation." I question very strongly whether the central Arizona project can really be termed a "reclamation" project. As testimony before this committee already has established, no new land will be reclaimed by Colorado River water imported into central Arizona. The water will only help partly to alleviate the overdraft on Arizona's ground water reserves. Even more to the point, the whole pattern in central Arizona, as in southern California, is for increasing preemption of irrigated or irrigable lands by residential, commercial, and industrial developments. You may or may not think this a good thing, depending on your attitudes and interests. But I would call this urbanization, not reclamation, and the Grand Canyon National Park Act says not a word about any area therein being utilized for the development and maintenance of a Government urbanization project.

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It seems that many of these objections were considered by the Bureau and were influential in its recommendation that Bridge Canyon be deferred for future reconsideration. But there was a very interesting reaction to the Bureau's finding. Senator Moss of Utah was quoted in the press as saying that he would not be surprised if a determined effort were made to keep Bridge Canyon Dam in the legislation we now are discussing. Otherwise, Senator Moss said, Utah might never persuade Congress to reconsider its rejection of Echo Park and Split Mountain Dams, both of which Congress turned down in the 1950's because they would have invaded Dinosaur National Monument.

Conservationists, and all who would defend our national park system against private or governmental invasions, won that round. Unfortunately, we do not have a knockout punch. The Bureau of Reclamation can always pick itself up off the mat and come out flailing for a project which once was defeated. The Bureau, on the other hand, does have a KO punch. Allow them to build Bridge Canyon Dam and nothing short of a well-placed hydrogen bomb will destroy that dam after we have found that the dam was uneconomic, unnecessary, prematurely obsolete, and doomed sooner or later to be choked with silt.

In an esthetic as well as an economic view, I would be just as sorry to see Marble Gorge Dam authorized as Bridge Canyon Dam. But the latter-mentioned proposal really has me worried. For if Grand Canyon National Park is considered too sacred for mutilation by the dam builders, certainly Dinosaur will not be. And then what would stand in the way of other water and power projects of the Bureau of Reclamation and Army Corps of Engineers that would vandalize Glacier National Park, Yellowstone National Park, Grand Tetons National Park, Yosemite National Park, Kings Canyon National Park, Mammoth Caves National Park, Big Bend National Park, or Arches National Monument?

Mr. Chairman, I began my testimony with allusions to experiences and impressions which I gained on two trips down the Colorado River through the Grand Canyon. But you see, Mr. Chairman, a lot more is at stake than the right of Americans of today and tomorrow to enjoy one of the greatest outdoor experiences available on this earth. What is at stake, I am convinced, is the integrity and inviolability of our national park system—the first, and still the greatest, park system in the world.

(The full statement of Mr. Leydet follows:)

STATEMENT BY FRANÇOIS G. LEYDET

I consider it a very great privilege, Mr. Chairman, to appear before this committee. I'll admit further that, since this is my first such appearance, I also find it a somewhat awesome experience—just as sobering, in a different way, as Hance Rapid, or Horn Creek Rapid, or Lava Falls, through which I was rowing my dory only a month and a half ago.

I suppose that my principal qualification for appearing before you is the fact that I have twice traveled through the Grand Canyon from Lee's Ferry to Lake Mead. I did it for the first time last year, and used the experience as a narrative thread in my book about the Grand Canyon, "Time and the River Flowing." And I did it again in June and July of this year. So when I decry the irreparable damage to the Canyon that Marble Gorge and Bridge Canyon Dams would do. I can borrow a phrase from Commissioner Dominy's beautifully illustrated booklet, "Lake Powell: Jewell of the Colorado," and say, "I know. I was there."

I wish I could illustrate my presentation with slides and films taken on these trips. I would show you places like Vasey's Paradise or Redwall Cavern in the Marble Gorge, which will be under almost 300 feet of water if Marble Gorge Dam is built.

I would show you the incredibly beautiful entrance to Havasu Creek—the creek of the blue-green water—which will be 80 feet underwater if Bridge Canyon Dam is built.

I would show you some of our campsites—at Soap Creek, beneath Toroweap Overlook, at Whitmore Wash, Spring Canyon, Travertine Falls—the hospitable beaches the graceful sand dunes, shaded with mesquite and tamarisk and brightened with desert primrose and mallow, and the golden glory of desert plume. These campsites will all be drowned by the reservoirs.

I would show you tracks of ringtailed cat and of bobcat, beaver cuttings, and otter slides, and a band of 17 bighorn sheep grazing by the river bank—native canyon dwellers who will probably be exterminated as the waters rise behind the dams.

I would show you our boats runing the rapids, and have you share some of the thrill, the exhilaration, the feeling of aliveness and freedom that flames in you in those brief, everlasting seconds.

At the risk of weakening my argument, I might even show you my inelegant, helicopterless run through Hance Rapids this year, where I hit a monstrous wave that sheared my left oarlock flush with the gunwale, and was forced to ride it through, still upright, thank the Lord, on one oar and a prayer. Or I might show you a picture of my wife bobbing to the surface after we upset in 75-mile rapid last year, a bit scared and sputtering but still clutching the movie camera with which she had been filming the run only seconds before.

Even so, photographs or films, no matter how beautiful, can only give you a suggestion of the reality they portray. Were I ever so eloquent, I could only hope to hint at what a living Colorado River means in the Grand Canyon. Neither pictures nor words can fill your ears with the roar of a rapid, or delight them with the cascading song of the canyon wren; they cannot fill your nostrils with the spicy scent of redbud and tamarisk; they cannot fill your body with the heat refracted from the ebony-black Vishnu schist, a rock older than life itself; they cannot fill your soul with the cumulative impact of three weeks spent in one of the most glorious places on the face of this earth, 3 weeks from which you emerge, as Walter Stegner put it so well, "single, separate, vertical, and individual in the world, part of the environment of trees and rocks and soil, brother to the other animals, part of the natural world and competent to belong in it."

You see, this is the sort of experience that will be denied to us, and to our children, and to their children throughout the generations, if these dams are built in the Grand Canyon. Do not be taken in by the Bureau of Reclamation argument that only "hardy, adventurous boatsmen" now visit the inner reaches of the Grand Canyon, and that if the dams are built thousands of recreationists will be able to see the marvels hitherto available only to us daredevils. My wife, for instance, is no daredevil: she is a 115-pound girl with a tendency toward asthma. Yet she made it through last year, despite many wettings and one dunking, and now has a story to tell, with occasional exaggerations, for the rest of her life. On this year's trip we had a honeymoon couple along, and they went into the drink on the second day out when our veteran leader, Martin Litton, got a bit careless and upset in a minor rapid just above Houserock Rapids. I fished the bride, Maxine McCloskey, out of the water but only after quite an argument: she was much less worried by the waxing roar of Houserock Rapids than by the fact that her levis were coming off.

Also this year, we found a notebook cached under an overhang in Elves' chasm which had been signed by previous boat parties. One of these included a 12-year-old child and a 61-year-old grandmother. Mack Miller, who met us with his jet boats below the last rapid and towed us to Temple Bar on Lake Mead, informed me that our party brought to 544 the number of people who had traversed the Grand Canyon in 1965, and that before the end of the year the total was expected to reach 700—including Senator Barry Goldwater and his family who made Colorado River history by portaging their boats around Hance Rapids by means of a helicopter. In other words, in 1965 alone more than three-quarters as many people will have run the Colorado through the Grand Canyon as have passed through it before in all the years since Maj. John Wesley Powell's initial traverse in 1869.

We may still be a fairly small club, but our membership is growing fast and it is open to all. It may be true, as the Bureau of Reclamation proclaims, that

many more people would see the Marble Gorge and the lower 100 miles of the Grand Canyon if the two dams were built. But what they would see would be a mutilated remnant of what we saw, and instead of the unique, vital experience had, they would know only the standardized, mechanized sort of recreation already samply supplied by Lake Havasu, Lake Mohave, Lake Mead, Lake Powell, Granby, Flaming Gorge, and Navajo Reservoirs, and others, all of them on the Colorado River or its tributaries. I suppose we could build a funicular railway to the top of Mount Everest, and institute a helicopter shuttle service to the South Pole. And probably there would be enough customers eager for such easy glory—like our so-called sportsmen who take pride in gunning down wolves or polar bears from aircraft. And wouldn't it be brave to have the truncated walls of Marble Gorge echo and reecho to the roar of your Evinrude? And to catch a big, fat, foreign trout in what once was known as Fern Glen? And to cut a figure on water skis and in bikinis over a permanently silenced Lava Falls? To use an analogy, why tie up some of our airwaves with such esoteric sounds as Mozart or Beethoven, when the great majority would rather thrill to the ululations of the Beatles?

I think that what I am trying to get across to you is what Secretary Udall had in mind when he wrote, in his preface to the booklet "Wild Rivers," "America's rivers flow deep through our national consciousness. Their courses beckoned us to explore a new continent and build a nation, and we have come to know, depend upon, and love the rivers that water our land. * * * Future generations are entitled to know the wild river heritage that has been so significant in the development of this Nation and its character. If they are to know that heritage, we must now make provision, Federal and State, to keep some of our rivers, or portions of them, wild and free, protected from uses that destroy their natural beauty and recreational desirability."

I have the greatest respect for Secretary Udall. I believe that if we ever had a Secretary of the Interior who was a sincere, dedicated conservationist, Mr. Udall is that man. I still vividly remember his speech before the 1963 Wilderness Conference in San Francisco, in which he courageously attacked the popular shibboleth that an ever more populous America will be a better America. Secretary Udall's speech was tremendously influential in deciding me to concentrate in my writing on nature and conservation, and to work for the Planned Parenthood Federation as an extracurricular activity. I am grateful to Mr. Udall for the eloquent preface he wrote to my first book, "The Last Redwoods," supporting my plea for the establishment of a Redwoods National Park.

And therefore I take no pleasure in crossing swords with Secretary Udall, as I feel I must, in this business of damming the Grand Canyon. I suspect that he has been cornered, by pressures from within his home State and from within his own Department, into supporting a project that goes against his grain. I find it a little ironic, and very sad, that the coauthor with Secretary of Agriculture Freeman of the above-quoted foreword to "Wild River" should now be championing a project to mutilate the last significant wild stretch of the Colorado River, that virile, brawling stream which through the eons has carved, and is still carving by occasional permission of the Bureau of Reclamation, the Grand Canyon.

To me, and to most Americans who have traversed the Grand Canyon at river level, the erection of Marble Gorge and Bridge Canyon Dams would be a tragedy, a desecration, an act of vandalism. Such an act could only be justified, it seems to me, by the direst necessity. Frankly, the Bureau of Reclamation's arguments have not convinced me that such a necessity exists.

The basic purpose of the Pacific Southwest water plan, or lower basin storage project, is to import 1.2 million acre-feet of water a year into central Arizona: the so-called central Arizona project. I happen to sympathize with the half facetious comment of one member of your committee—was it the gentleman from Idaho?—who held up a copy of Arizona Highways magazine on Monday and said: "This is beautiful desert country. I hope all that water doesn't spoil it." Despite my seemingly incongruous Franco-Anglo-Bostonian extraction, I love that desert myself. I feel that the spectacular arid regions of the Southwest—southern California, Arizona, New Mexico, Nevada, Utah—have an uncompromising beauty of their own which contributes mightily to the splendid richness and variety of our landscape. I rather regret that so many people agree with me on that point, to the extent that they insist on living in that desert and watering it and planting it to cotton or lettuce.

But this is probably beside the point. I am not here to testify against the central Arizona project, or the other water diversion features of the lower basin storage project. I am only here to testify against Bridge Canyon and Marble Gorge Dams. It is my contention that these dams are not needed, in any engineering sense, to get Colorado River water into central Arizona. That far from conserving water, they would waste enough through evaporation alone to fill the yearly needs of a city the size of Denver. That alternative sources of power exist or could be constructed far more quickly and cheaply than the dams. That steamplants, for instance, using the abundant and still practically untapped coal reserves of the Southwest, and producing the same peak capacity as Bridge and Marble Dams, could be built at a saving in initial cost equal to the half billion dollar price tag of Bridge Canyon Dam. That such thermal plants (or nuclear plants)could be erected close to the markets for their power, thereby obviating the need for the long, costly, wasteful, and unsightly transmission lines that would be required to bring the dams' power output to market.

I will also contend that the Bureau's economic justification of the dams is open to grave question. With your permission, Mr. Chairman, I should like to quote a paragraph or two from an article in the April issue of Fortune magazine, which states my argument more succintly and perhaps more authoritatively than I did in my book:

"A reclamation project is in essence an apparatus for the provision of cheap water. Reclamation builds a hydropower-storage dam and associated diversion structures, canals, or other waterworks. Power is marketed at rates that, by reclamation's bookkeeping, more than cover the power costs; irrigation water is provided below cost. Reclamation recovers from irrigators only a portion of the costs allocated to irrigation, and that over a period of 50 years or more, without interest. The remainder is deferred for decades, to be covered (again without interest by hydropower revenues after the power costs have been amortized. Near the Phoenix headquarters of the Salt River project, which operates the dams on the Salt and the Verde, a billboard reminds passersby that 'Electricity makes low-cost water possible.'

"Since profits on power cover losses on water, reclamation claims that the taxpayers get reimbursed (except for costs that are written off against 'nonreimbursable' aspects such as flood control or recreation). But in recent years economists at Stanford, Harvard, and elsewhere have challenged the validity of the bookkeeping that underlies this claim. Reclamation sells power in a market in which prices are high enough to yield profits to private power companies, but unlike private power companies, reclamation pays no taxes, and in computing its power costs it uses a low interest rate, currently 3 percent, well below the U.S. Government's rates on new bond issues. Some market-oriented economists argue that this use of an unrealistically low interest rate can lead to misallocation of resources.

"Among other consequences, a low interest rate loads calculations in favor of public hydropower (big capital investment, but no fuel costs) as against private steam-electric power (fuel costs, but smaller capital investment). The lower the interest rate used in the calculations, the better a big dam project looks. The same goes for any public works project for which proponents claims an economic justification. Kenneth E. Boulding, professor of economics at the University of Michigan, once put it like this:

"* * * the long-term interest rate
Determines any project's fate:
At 2 percent the case is clear,
At 3 some sneaking doubts appear,
At 4 it draws its final breath,
While 5 percent is final death."

And before we move on to other matters, may I call your attention to Congressman Saylor's remarks in the Congressional Record, "Is Power Reclamation's Paying Partner? Or Hominy Dominy Sat on the Wall." Mr. Saylor reminded the House of the fact that "in a report dated June 30, 1961, a special panel of consultants to the Bureau of the Budget recommended that the interest rate to be used in economic analysis should be in the area of 4 to 5 percent. This was at a time when yields on long-term Government bonds were 3.9 percent * * *."

These economic objections apply to both Bridge Canyon and Marble Gorge Dams, as does the esthetic argument that the dams would be fatally destructive to some of the grandest scenery to be found anywhere on earth, and that they would accomplish the very thing that President Theodore Roosevelt warned

against in a speech delivered at the rim of the Grand Canyon in 1903, when he said: "In the Grand Canyon, Arizona has a natural wonder which, so far as I know, is in kind absolutely unparalleled throughout the rest of the world. I want to ask you to do one thing in connection with it in your own interest and in the interest of the country—to keep this great wonder of nature as it now is * * * I hope you will not have a building of any kind, not a summer cottage, a hotel or anything else, to mar the wonderful grandeur, the sublimity, the great loveliness and beauty of the canyon. Leave it as it is. You cannot improve on it. The ages have been at work on it, and man can only mar it."

But there is a further objection applicable to Bridge Canyon Dam. As you know, Mr. Chairman, this dam would back water for 93 miles: through the whole 40-mile width of Grand Canyon National Monument, and 13 miles into or adjacent to Grand Canyon National Park. The intrusion of a manmade lake into the national park and monument would be, to say the least, a nonconforming use of these preserves. It would represent a violation of the National Parks Act of 1916, which states that "the fundamental purposes of the * * * parks * * * is to conserve the scenery and the natural and historic objects and the wildlife therein, and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

The Presidential proclamation establishing Grand Canyon National Monument contains no reclamation reservation of any kind. The act of Congress establishing Grand Canyon National Park does contain the following language: "Wherever consistent with the primary purposes of said park, the Secretary of the Interior is authorized to permit the utilization of areas therein which may be necessary for the development and maintenance of Government reclamation projects."

But the primary purpose of Grand Canyon National Park, or of any national park or monument, as stated in the above-quoted section of the National Parks Act, is to "conserve the scenery and the natural and historic objects and the wildlife therein, and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

A manmade lake that will drown the wildlife in 53 miles of canyon bottom, that will bury the living river under hundreds of feet of still water, that will submerge mile after mile of the most striking basaltic formations in the world, that will inundate such natural gems as Lower Havasu Creek or Matkatamiba Canyon; can hardly be found "consistent with the primary purposes of the park."

And please note further that the language of the law insists that such a structure as Bridge Canyon Dam must be "necessary for * * * Government reclamation projects." I stress the words "necessary" and "reclamation." Bridge Canyon Dam is not "neccessary" to the importation of water into central Arizona, since such importation could be engineered and subsidized by other means. It is only necessary, perhaps, to the survival of the Bureau's dam-building empire, just as that other boondoggle, Rampart Dam in Alaska, may be necessary to the Army Corps of Engineers' dam-building career.

And then I stress the word "reclamation," because I question very strongly whether the central Arizona project can really be termed a reclamation project. As testimony before this committee already has established, no new land will be reclaimed by Colorado River water imported into central Arizona. This water will only help partly to alleviate the overdraught on Arizona's ground water reserves.

Even more to the point, the whole pattern in central Arizona, as in southern California, is for increasing preemption of irrigated or irrigable lands by residential, commercial, and industrial developments. You may or may not think this a good thing, depending on your attitudes and interests. But I would call this urbanization, not reclamation, and the Grand Canyon National Park Act says not a word about any area therein being utilized for the development and maintenance of a Government urbanization project.

It seems that many of these objections were considered by the Bureau of the Budget and were influential in its recommendation that Bridge Canyon Dam be deferred for future reconsideration. But there was a very interesting reaction to the Bureau's finding. Senator Moss, of Utah, was quoted in the press as saying that he would not be surprised if a determined effort were made to keep Bridge Canyon Dam in the legislation we now are discussing. Otherwise, Sena-

tor Moss said, Utah might never persuade Congress to reconsider its rejection of Echo Park and Split Mountain Dams, both of which Congress turned down in the 1950's because they would have invaded Dinosaur National Monument.

Conservationists, and all who would defend our national park system against private or governmental invasions, won that round. Unfortunately, we do not have a knockout punch. The Bureau of Reclamation can always pick itself up off the mat and come out flailing for a project which once was defeated. The Bureau, on the other hand, does have a KO punch. Allow them to build Bridge Canyon Dam and nothing short of a well-placed hydrogen bomb will destroy that dam after we have found that the dam was uneconomic, unnecessary, prematurely obsolete, and doomed sooner or later to be choked with silt.

In an esthetic as well as an economic view, I would be just as sorry to see Marble Gorge Dam authorized as Bridge Canyon Dam. But the latter-mentioned proposal really has me worried. For if Grand Canyon National Park is not considered too sacred for mutilation by the dam builders, certainly Dinosaur will not be. And then what would stand in the way of other water and power projects of the Bureau of Reclamation and Army Corps of Engineers that would vandalize Glacier National Park, Yellowstone National Park, Grand Tetons National Park, Yosemite National Park, Kings Canyon National Park, Mammoth Caves National Park, Big Bend National Park, or Arches National Monument?

Mr. Chairman, I began my testimony with allusions to experiences and impressions which I gained on two trips down the Colorado River through the Grand Canyon. But you see, Mr. Chairman, a lot more is at stake than the right of Americans of today and tomorrow to enjoy one of the greatest outdoors experiences available on this year. What is at stake, I am convinced, is the integrity and inviolability of our national park system—the first, and still the greatest, park system in the world.

Mr. ROGERS. Thank you, Mr. Leydet. Your time has expired. There will be no time for questions.

Mr. LEYDET. Thank you, Mr. Chairman.

Mr. ROGERS. Our next witness is Dr. Daniel B. Luten, vice president, Federation of Western Outdoor Clubs.

STATEMENT OF DANIEL B. LUTEN, VICE PRESIDENT, CALIFORNIA BRANCH, FEDERATION OF WESTERN OUTDOOR CLUBS

Mr. LUTEN. Mr. Chairman, I should like to submit my statement as if read, and I should like to make two corrections in the text of my statement on page 5. The first is on the fifth line from the bottom of page 5, where I would ask you to cross out "Glen Canyon Dam," and write in "Lake Powell," and on the same line, where I would ask you to cross out "Lake Powell," and write in "Glen Canyon."

Mr. ROGERS. Without objection your statement may be so corrected. Do you desire the statement inserted in the record as though read?

Mr. LUTEN. Please. And there is a deletion from the seventh and eighth lines on page 5, to delete the phrase which says "the document so full of Biblical allusions that it is being referred to as the 'Book of Dominy.' "

Mr. HOSMER. Mr. Chairman, I am going to ask unanimous consent that the time of this witness and the remaining witnesses be allocated between the witnesses and the committee for questioning.

Mr. ROGERS. Is there objection? The Chair hears none. The subcommittee will proceed in that manner.

Mr. Luten, you may correct your statement as you desire, and it will be inserted in the record in full.

Mr. LUTEN. Thank you, sir. Then I should like to extend my statement very briefly.

Mr. ROGERS. You may be granted permission to do that without objection. You may proceed to summarize it for 5 minutes, at which time the Chair will open the meeting for questions.

Mr. LUTEN. I have first cited the opposition of the federation to the construction of Bridge Canyon and Marble Gorge Dams or any dams between Lake Meade and Lake Powell.

Next, I wish to emphasize that we have no opposition to the central Arizona project, excepting for these dams. It is our feeling that the dams have no technical, no physical relation to the project, but rather a fiscal relation. Their purpose, it seems to us, is to seal a subsidy, or perhaps it should be phrased to provide a path recognized in statute for this subsidy.

We think it would be wiser to modify the law than to modify the canyons. But I am not sure it would be easier.

The magnitude of this subsidy, put in terms of a deficit if the dams were not built, comes to a nickel a day for Arizona.

I have tried in succeeding paragraphs to persuade you that the economic argument for these dams are poor.

But next, recognizing that the issue facing us is to weigh economic against noneconomic argument, I have assayed briefly to suggest that the noneconomic arguments for retaining these canyons in their present condition are substantial and of great merit.

I have not undertaken a comprehensive approach but have focused my attention on the one subjective question—how much good do Americans derive from their landscape, specifically from the region here of great canyons.

I have been thinking about this issue through a 7-week, 12,000-mile automobile trip earlier this summer, during which my wife and I were in 32 States, and a large, uncounted number of Federal, State, and local areas. In the middle of this trip I obtained National Park Service statistics on use of the sites under the Service's jurisdiction. Very quickly one learns that use of a site cannot be identified with the good derived from it. Thus, in Great Smoky National Park, because of an erratic itinerary, in less than 24 hours we accounted for I believe 44 of the 5 million visits which will be made this year to that park.

Good is not measurable in terms of hours of recreational experience or some economic component, some guessed-at value of a man-day. It has something to do with the intensification of consciousness, with satisfaction of a human instinct for overcoming obstacles, with, in the case of our landscape, a fulfillment of our genetic background which came from wildness, and a return to solitude and wildness.

At Grand Canyon National Park I thought I could see to some degree who is benefiting and who is not by what they did, how rapidly they moved through, by what they saw, by evidences of the intensification of their consciousness.

I do not wish to claim that good comes only from the landscape. It also comes from cities. But the good which derives to the American people from these canyons will be diminished, sharply diminished, by tainting them with reservoirs.

Some visitors, I think, will get more good if the reservoirs are built, but of a sort readily available in our cities and on our other reservoirs not in short supply.

Finally in my statement I have suggested that the Bureau of Reclamation is an agency set up for the development of an empty land, and the land is no longer empty. The Bureau has, I think, done its job. The resources problems of a full land are quite different from those of an empty land, and the laws under which the Bureau operates may no longer be appropriate.

I suggest also that the Bureau might better concern itself with other problems, and have suggested three of some promise.

First, the provision of explicit pump storage facility, or of thermal powerplants, designed for peaking energy—to generate the peaking power which apparently the private utilities would rather buy than generate themselves. Second, the reclamation of strip mine lands. Third, the reclamation of used water.

Thank you, gentlemen.

(The statement of Mr. Luten follows:)

STATEMENT BY D. B. LUTEN, VICE PRESIDENT FOR CALIFORNIA OF THE FEDERATION OF WESTERN OUTDOOR CLUBS

Mr. Chairman and gentlemen of the committee, my name is Daniel B. Luten, my home is in Berkeley, Calif., and I teach geography at the University of California. I am speaking today on behalf of the Federation of Western Outdoor Clubs, an affiliation of some 40 clubs devoted to outdoor activities and to the conservation of the American landscape. These clubs have an aggregate membership of close to 45,000 American citizens living in nearly all of the States.

The federation is on record, by resolution at its annual conventions in 1963 and 1964, as opposed to construction of any dams between Lake Mead and Glen Canyon Dam, and in support of the extension of Grand Canyon National Park to include all of Grand Canyon National Monument and the Colorado River and its gorges from Lee's Ferry, just below Glen Canyon Dam, to the Grand Wash cliffs, just above the head of Lake Mead.

In this matter, the federation has simply joined with the unanimous position of American conservationists. From the point of view of conservationists, the arguments in favor of inclusion of all of this reach of the river within the park and against the construction of the proposed dams are so overwhelming that it is difficult to understand how anyone could call himself a conservationist and still advocate the dams.

Let me also note at the outset that the federation has raised no objection to the central Arizona project aside from the dams. Once the waters of the Colorado have passed through this region of our concern, the magnificent untamed scenery of the great canyons, their subsequent use seems unlikely to disturb the canyons significantly.

A great deal of concern has been expressed for the plight of the Arizona farmer and I am sure that if I were an Arizona farmer I would be out drumming up support. But let me suggest a little perspective: Among American farmers, the Arizonan is a rare bird. There are only 8,000 of him, less than 0.1 percent of the number of all American farmers, and his average net income last year was first among all American farmers, Californians being a close second. His 8,000 farms are not large, averaging only 125 acres more or less of cropland, and the total cropland of the State is only a million acres, one-tenth the cropland of the small State of Indiana. A million acres is a square of land only 40 miles on a side. Arizona's first crops are cotton and alfalfa, and Arizona's crop-support payments ove the years have about equaled Indiana's. Cotton gets more support than corn.

Let me next express my bewilderment that any of the arguments in support of these two dams, the ones in Bridge Canyon and Marble Gorge, should be given more than a moment's credence. The argument is, first, that the dams will conserve water and make it available for Arizona. This argument fails quickly, for it is conceded that the reservoirs behind them will increase the evaporation loss from the reservoirs of the river by 100,000 acre-feet annually. Mr. Dominy, earlier in this hearing, testified, I am told, that if all of the reservoirs built and planned on the Colorado were ever to become filled, then the evaporation loss would be in the neighborhood of 3 million acre-feet. This would cause a diminu-

tion in yield of liquid water about equal to the diminution of flow from the wet cycle flow on which the Colorado River compact was based to the current dry cycle. In other words, because of all this reservoir construction, there is little expectation of relief from the conditions of the current dry cycle. The Bureau of Reclamation has insured perpetuation of dry cycle conditions. Most of this reservoir construction serves no purpose in conserving the waters of the river, as has been adequately proven by W. B. Langbein and L. B. Leopold in two classical Government documents, Geological Survey Circulars 409 and 410 (1959).

The next argument is that electrical energy from the dams is needed to pump water up into Arizona. But we are also told that the energy from the dams will be sold at premium prices, for peaking service. Peaking energy is usually bought by householders; water pumping is ordinarily emphasized in off-peak hours. Apparently, the energy from these dams is to be sold at premium prices, and part of the income is to be used to buy off-peak energy for pumping. This is sensible, but energy from the dams is not being used for pumping; it is being used to generate income. No shortage of energy, current or anticipated, exists for the task of pumping.

In fact, it is quite clear that the dams are technically not a part of the central Arizona project at all. Their relation to it is purely fiscal. They are a fiscal artifact whose chief purpose is to conceal the fact, the legerdemain, of subsidy to Arizona irrigated croplands.

It is conceded they would not be attractive ventures but for the low interest rate for repayment. We are asked to believe that low Government interest rates are simply a gift, perhaps of divine origin. In fact, though, they stem from banking policy laws, the policy of tax exemption for Government obligations, graduated income tax bracket, and from the belief that no risk is involved. Even though admittedly no forfeiture is risked, this is so only because the Federal Government underwrites any risk. In fact, the American taxpayer is subsidizing Arizona agriculture just as fully as if he personally were paying off the notes for the construction costs of the central Arizona project. Since the water to be moved into Arizona under this project, 1.2 million acre-feet annually, is only enough to irrigate a quarter of Arizona's cropland, the subsidy in the construction of these two huge dams comes to about $3,000 per acre for that quarter of a million acres.

We are not, though, objecting to the movement of this water into Arizona, but only to the construction of the dams in the canyons. We suggest, if subsidy is demanded, that another way be found to hide it.

Next, we are often told that additional water is needed for the teeming new millions who seek the richness of living in the clement Southwest. And also that water is the most valuable of all resources and that it must not be denied to anyone. Let me remind you that a city man uses from 0.1 to 0.15 acre-foot of water a year, an acre of irrigated land from 3 to 5 acre-feet per year. Only a minor fraction of the Colorado River water goes into city mains. Each million acres of land withdrawn from agriculture will provide enough water, and also enough room, for 30 million urban dwellers. If Arizona's population continues to double a little faster than California's population doubles, then late in this century there will be 8 million Arizonans, almost all of them urban, to use this water. They will be able to pay for it. Water, to them, may really be a valuable resource—to the farmer it is essential, but not valuable. They may even be able to pay $25 per acre-foot for it in the river. They can pay $100 per acre-foot for it delivered and never know the difference. By the end of the century they will be numerous enough, if the current growth rate is maintained, to pay for these facilities—without the dams.

Really, although we speak of water as a valuable resource, we don't treat it that way. Scarcely any American pays for water as such; he pays only for its management, its harvest, and delivery to his doorstep. It is still a free good. Land once was also free, but as we have increased in numbers, we have become accustomed to paying for it and its fruits. Timber was once free, but now we are accustomed to paying for the right to cut it, to pay for the resource itself. Water is still free, but perhaps as we become more crowded and more demanding it, too, will have a value, will cease to be a free good. To call it dirt cheap is an understatement. Water at $25 per acre-foot is only 2 cents a ton. The superlative of cheapness is "water cheap."

Before leaving the economic side of this picture, and as a postscript to the suggestion that continued urban growth gives an easy answer to the financing of the project, I should like to comment briefly on population growth in the Southwest.

It has been rapid as all of you are aware. In the popular mind this rapid growth is thought to be recent but, California, in fact, has grown at a most surprisingly constant rate throughout the century of its Statehood, doubling its population on the average in each 18.5 years. The rate of growth is 3.8 percent per year. Arizona started later and smaller, has grown a bit faster, and also quite steadily from as early as 1880. Such long persistent growth seems to have generated an economic atmosphere where growth begets prosperity and prosperity begets growth and it would seem that if only meddlers would stay elysium would be eternal. Unfortunately, though, such growth cannot continue. When it will end we cannot say, but if California were to grow at today's rate for a century and the United States at its rate for a century, California's population would equal the national population. Thus, all Americans would live in California. So, we can say with a good deal of confidence that California's growth will not continue for a century. The most reputable forecasts suggest a substantial diminution late in the century.

In large measure the prosperity of California, and probably of Arizona, has stemmed from the ease with which they could generate credit with which to buy what was needed from the States to the East. At one time this came from gold; next from a bountiful agriculture; later it seemed to come from midwesterners who brought retirement income with them, and from tourists. Today, pensioners go to Florida, and Californians spend as much outside of California for vacations as outsiders spend in California, so that source is gone. Today the typical immigrant is not elderly and retired with the capacity to employ others, but young, recently married, with small children and needing a job. If he is also eager and able to go into debt, then he is as good an asset as a pensioner, but otherwise, no.

Throughout this growth process, land values rose, at first slowly, then spectacularly. In reecnt years, it must be suspected that California's land, once owned by its residents, comes more and more to be owned by outsiders, and that credit is being generated by such sale. But this, too, must end. All that I am getting at is that a number of wells, one after another, have yielded California's lifeblood, but that some of these have run dry and that all of them must do so in time. And in some manner, the termination of California's growth will be associated with the drying up of the last of these wells. Much the same will be true in Arizona.

The longer this sort of growth continues, the more sharply it will end. The sharper the ending, the more traumatic it will be. And the larger the population when it ends, the more difficult will be the situation. For each additional doubling of numbers before growth ends, there will be a doubling of the piper's bill. Perhaps we have had an inkling of this recently in Los Angeles.

It would be nice to suggest that you undertake to pinch off this growth by being unhelpful about supplying water to the region. However, water is about the least promising constraint because conversion from agriculture to subdivision requires no new water; there is already enough water in the region for an urban population of 50 million.

I do suggest, though, that you should be chary of drawing the trend lines of urban growth in the Southwest right off the page. Set up your amortization schedules based on urban growth, but if it fails to materialize, count yourselves lucky rather than ill fated.

I have spoken in some detail in an area of economics. Perhaps I should not have done this, because the real issue in the Grand Canyon is only half economic, and my major concern is for a resource which cannot be valued in economic terms. The resources we are talking about is not the water in the Colorado River; its disposition has already been arranged. It is the river itself, its wildness, its scenery, its esthetic values, its revelation of the earth's history—and its restless energy.

The issue is not easy for us to decide because we cannot compare the alternatives on a single basis. That is why it must be settled through a political process.

I have already indicated that the economic alternative seems to me to have little to commend it.

Now, let me say that the other alternative, the retention of the river as it is, has a great deal to commend it. It has been or will be discussed by others in some detail and I will try to avoid duplication. It is a wild river. Some of us seem to have grown afraid of wildness and insistent that all be tame. A recent, outrageous bit of propaganda issued by the Bureau of Reclamation on Lake Powell seems to treasure tameness over wildness. In passing, may I say that the brochure I refer to is full of errors and it is too bad that the Bureau did not submit

it to someone with competence in such matters for review before issuing it. Further, Mr. Dominy has said publicly that Lake Powell has enhanced the beauty of Glen Canyon. But he cannot know this, for he was not in the canyon before Lake Powell and so has no basis for a comparison.

We are told that what we need is more reservoirs, an infinity of reservoirs, for recreation, for motorboating, water skiing, regulated, tamed, synthesized, homogenized fishing. But this region already has a plethora of reservoirs. I challenge the Bureau of Reclamation to make maps of the population density of recreational use on its existing reservoirs. Even Lake Mead is not used to a tenth of its potential.

The issue is really very much one of wildness versus tameness. We must remember that, in addition to being born free, we were born wild. Most of our genetic heritage is that of a wild thing. We must be chary of too much tameness, lest too late we discover that wildness is essential to our survival.

I think I see in all humanity a pair of great forces, the one of wanderlust, the other of homesickness. The urge for adventure, the need for security. The bold spread man's tenure over the earth, but rarely left offspring. The timid reproduced the villages' populations. But new villages, though rare, came from the children of bold men. And the old, the timid villages, wasted away in strife. And so here, in each of us, are these dual urges, the balance ranging widely, some of us overwhelmed with homesickness at every turn, others always pressing for new horizons. It may be that the richest expression of American civilization provided for basic human nature is the privilege of this oscillation between city and open lands which is becoming so familiar to us in this newly mobile generation.

If this be the case, then the proper management of open land is not to regiment it, not to standardize its wildness, but to maintain a vast diversity, a diversity great enough for the full range of the spirit, from Casper Milquetoast to Daniel Boone himself, who moved to Missouri to escape the crowding when houses in Kentucky came to be 20 miles apart on center.

It should not be necessary to say more in justification. But I wish to report a few observations. I spent a day at the south rim of the Grand Canyon this summer, right in the center of the traffic jam, watching people. My purpose was to see if I could judge in some way the good which stems to Americans from the Grand Canyon. Not the use; we measure that with traffic counters, but the good. I think I learned a little about judging it. Not much of it went to the man from Florida who barreled up to the parking lot, spat over the brink, said "Ain't nothing like this in Florida," and drove off. His wife didn't even have time to get out; perhaps she was hunting for "Grand Canyon" on the check list. I doubt if the people from the flatlands who had difficulty getting near the brink could benefit much. Not until they had stayed long enough, days perhaps, either at the rim or in other steep country, for the acrophobia to wear off, was the wildness of the canyon any good to them. But as you near the head of Bright Angel Trail, the feeling of a benefit to everyone around begins to well up. Those who go down to the river, they get the most good. Those who go part way get part of it. And everyone up on the rim knows this.

But if the day comes when they go down to a dead river, a spiritless river, a river broken to harness, a river where the jet boats flash by, then the glory will have gone out of it. And another iota of the vitality of America and Americans will be lost.

These matters cannot be measured by their economic components. But they must be judged by you legislators, whose principal task, always, is to make judgments where the two sides of a question cannot be weighed in the two hands, in the two pans of a balance. If your judgment is that the resources of America are so hard pushed that there is no room for wild rivers and wild lands, that the economic component must dominate, then you are in fact and explicitly saying that the difference between the United States and the poor overcrowded lands of the earth is diminishing. Must we, then, turn to China for guidance in the management of our resources?

If you believe, instead, that we are gaining, then you must find that we do have room for wild rivers, that we are quite able to afford them, and that we cherish them.

In conclusion, I should like to suggest that the Bureau of Reclamation is an agency set up for the development of an empty land, that now it is working with a land perilously close to full, and that perhaps it is not entirely suited to this task. In an empty land, resource uses are not competitive, a single resource has a single use or perhaps not even that. The task is technical. In a full

land, there solution of competition for resources is the vexing task, technical development the easy part. The Bureau's job is done; the vein is running out.

I still see three fields in which opportunity exists, and I wish the Bureau would devote its attention to one or all of these.

The first of these is the explicit generation of peaking power. The private utilities seem reasonably willing to let the Bureau pull this chestnut out of the fire for them. Apparently, the return is not great enough to attract private capital. But I should like to see them explore this in terms of explicit pumped storage proposals rather than of proposals so complex as to defy analysis of attractiveness.

The second is the reclamation of land, not the claiming of land which has been the task thus far, but rather the reclaiming of land once fruitful but since drastically changed by our technology: the waste heaps of strip mining. Their management is not simple; it may not be wise to try to recover them for agriculture. Thus, they seem in some instances to develop into superb wildlife habitat, simply because mere people get lost in the complexity of their drainage patterns.

The third is the reclamation of polluted, of used, water. Sea water is the choice for the head-on approach to new water supplies. But while we will certainly get city water from the sea, we have at this time no prospect of obtaining irrigation water from that source. But the used water of our cities, of our industry, of our farms, all of it is less burdened with impurities than sea water. Thermodynamics suggests it to be a better starting material than sea water—but it will take more wisdom to manage it.

Mr. UDALL. Thank you, Doctor.

I am going to use my 1 minute to make some unanimous consent requests. I had intended to do it previously.

I have a similar discussion to the one Mr. Hosmer offered this morning which I prepared myself. I would ask unanimous consent that this appear in the record. Unless there is objection, so ordered.

(The statement will be found on p. 41).

Mr. UDALL. The New Mexico witnesses the other day analyzed at great length the legal situation as between Arizona and New Mexico. I have prepared a statement giving Arizona's position on these problems. I would ask unanimous consent that it appear. Hearing no objection, it is so ordered.

(The statement will be found on p. 944.)

Mr. UDALL. Finally, the other day, operating under a time limitation, I was unable to ask certain questions of Mr. Goslin when he testified. At my request he has prepared a letter answering these questions. I would ask unanimous consent that this appear following his testimony. Without objection, it is so ordered.

(The letter will be found on p. 562.)

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

Mr. HOSMER. Professor, how long was this trip?

Mr. LUTEN. Seven weeks.

Mr. HOSMER. How many miles?

Mr. LUTEN. 12,000.

Mr. HOSMER. Do you have an air-conditioning unit in your car?

Mr. LUTEN. No, sir.

Mr. HOSMER. I want to congratulate you on being consistent. I am afraid some of these other witnesses take their atmosphere with them and change nature while they are driving around in their automobiles, and object to the principle any place else.

Mr. LUTEN. I talked my wife down on this very count, Mr. Hosmer.

Mr. HOSMER. A great amount of foresight.

That is all, Mr. Chairman. Thank you.

Mr. UDALL. The gentleman from Utah, Mr. Burton, is recognized for 1 minute.

Mr. BURTON. I have no questions, Mr. Chairman.
Mr. ASPINALL. Mr. Wyatt.
Mr. WYATT. No questions.
Mr. ASPINALL. The gentleman from California.
Mr. REINECKE. No questions.
Mr. ASPINALL. Thank you very much, Dr. Luten.
The next witness is Dr. Alfred Etter, of Aspen, Colo.
Doctor, it is nice to see somebody from my own district.
Dr. ETTER. It is good to be neighbors and all that—but we don't have time to go into that, I suppose.
Mr. ASPINALL. You don't even know what my side in this matter is yet. But go ahead.

STATEMENT OF DR. ALFRED ETTER, FIELD REPRESENTATIVE, DEFENDERS OF WILDLIFE

Dr. ETTER. Mr. Chairman, I am listed here as representing the Defenders of Wildlife, and also several Colorado Mountain Club members. Actually it is the Aspen Chapter of the Colorado Mountain Club which I have assisted by delivering their material here prepared by their conservation chairman. It was her wish that this be included in the record as though read. I have given you copies of this. I am not sure——
Mr. ASPINALL. I understand—you have a statement here consisting of eight pages, is that correct?
Dr. ETTER. There are two statements, actually. There is one from the Colorado Mountain Club and one from Defenders of Wildlife. I intend to read my statement from Defenders of Wildlife and the other is to be entered into the record.
Mr. ASPINALL. Without objection, your statement will be included in the record. And you will have 5 minutes to speak, after which there will be questions.
Dr. ETTER. May I make a request. I have been here since Tuesday——
Mr. ASPINALL. The committee runs its own business, Doctor. I was not in here when that unanimous consent request was made. So proceed.
Dr. ETTER. I don't understand this position why I should be limited to 5 minutes.
Mr. ASPINALL. I was told by Mr. McFarland of the staff that the presentations were being limited to 5 minutes—is that right?
Mr. MCFARLAND. Yes, Mr. Chairman. While you were out of the room, by unanimous consent the committee agreed to split the 10 minutes, 5 minutes for the presentation and 5 minutes for questioning.
Mr. ASPINALL. This is the way that our rules call for in the first place, Dr. Etter. Our rules provide that the statement shall be filed with us 24 hours before the hearing, and then that the witness shall be permitted to orally summarize the statement. We go overboard sometimes and let persons read their statements. But we have taken too much time on these presentations.
Now your statement can go in the record as if read and you can testify to it orally, read part of it, if you wish.

Dr. ETTER. Well, I think—this is a national organization I represent. All other organizations of this caliber have been allotted an hour of a half hour and so forth. I feel that we should be also.

Mr. ASPINALL. You may proceed.

Dr. ETTER. I am Dr. Alfred Etter, a field representative of Defenders of Wildlife, a national nonprofit educational organization, having its headquarters in Washington, D.C. My home is in Aspen, Colo. My academic degrees are in botany and geology. I have served in the past as consultant ecologist with the President's Water Resources Policy Commission in 1950.

In the Defenders of Wildlife magazine, Wildlife News, for April 1965, an article appeared titled, "Grand Canyon: Reservoir of the Unknown." A copy of this is attached to this, our present statement, and it is our hope that this can be included in the record of these hearings.

Mr. ASPINALL. It will be included in the file.

Dr. ETTER. This article goes into much greater detail with regard to our position on the lower Colorado River Basin project than my brief appearance here will permit.

Why is a wildlife organization interested in this bill? Simply because concern for wildlife leads inevitably into a study of how man handles the earth. Our fates and those of animals are intertwined.

We wish to state our opposition to this project as it is drawn for the following reasons:

1. We oppose any legislation which will result in the invasion, change, or destruction of dedicated areas, such as Grand Canyon National Monument or Grand Canyon National Park, regardless of whether legal loopholes appear to exist or not.

2. We oppose any project which will destroy unique natural areas such as Marble Gorge, regardless of whether these areas have as yet been set aside or not. We do not feel that national neglect in providing protection for these areas should be used as justification for their exploitation.

3. We feel strongly that Grand Canyon, kept as it is, will serve the Nation longer and to greater advantage as a "reservoir of the unknown," and as a challenging remnant of the frontier than it will as a catchbasin for water, silt, kilowatts, and paper cups. Like the moon and Mount Everest, Grand Canyon is a symbol, not a playground.

How would you like to dream all your life about finding Mount Everest and then get up on top and find there is a TV tower on top.

4. Changes in fauna, flora, geological, and hydrological conditions would be forced upon the park and monument by Bridge and Marble Canyon Dams as a result of the desilting of the river by Marble and Coconino, resulting in the erosion of existing deposits in Grand Canyon National Park, and in the deposition of these materials at the head of Bridge Canyon Reservoir very near the mouth of the unique and beautiful Havasu Creek.

Mr. Hosmer's remark—what would be the difference in these two pictures which he showed, the one blue and the one brown—I daresay that within 13 miles of the head of the proposed reservoir, that it would be quite muddy also. I don't think you are going to deposit all this silt right where the water ceases to be flowing.

Also Mr. Udall's remark, talking about sandbars in the upper river, that they would still be there. I doubt very much if they will, because

when you take all the sediment and silt out of a river, it then proceeds to erode, and it will remove these sandbars. Going on now, picking up, No. 5—no provision is included in these bills to examine the natural history of the areas that would be drowned by the proposed dams. If the dams are built, there would be a major loss of information regarding a biologically unknown area.

6. This bill provides water allowances only for non-Federal fish and wildlife purposes. This is inconsistent with the Federal nature of this undertaking. We feel that equal allowance for Federal wildlife refuge development should be made available; and that at least one-half of the non-Federal allowances should be apportioned specifically to refuge use.

7. We object strenuously to Bridge and Marble Canyons being converted into "cash registers." We are opposed to any governmental agency being authorized to appropriate the Nation's scenic or natural heritage in order to go into business to earn money to pay off the deficit of the otherwise uneconomic ventures. There should be every reason to expect the people directly benefited by this project to make up the deficit. They have had 20 years to accumulate the necessary funds and haven't saved a cent. A trivial increase of water rates in the Phoenix area would pay the ransom on Grand Canyon.

8. This project demonstrates no concern whatever for ecological consequences. It has been described by its chief proponent as a "stopgap" measure, and it gives much evidence of being just that, yet it will probably affect the destiny of the entire Southwest from now to eternity. Detailed charts have been drawn up to show what will happen to all the kilowatts, dollars, and concrete, but no attention has been given to the effects the project will have on man, nature, and society. Some of the problems we feel have been neglected are:

A. The costs and effects associated with stopping the flow of one of the world's great rivers. What about salt encroachment in the Colorado Delta, the salinity of the Gulf of California, the interesting and unique wildlife and vegetation of the gulf and its adjacent shores and islands? How about human activities in the region? With neither sediment or water entering the gulf, how will tidal currents change the estuaries?

I think this is a very significant part of the considerations for the future.

B. The problem of increasing salinity in various sections of the river and the costs of these changes. Many factors will be working toward increased salinity if this project goes through, including: increased evaporation; increased contact of waters with saline and carbonate rocks under increased pressure; alternate percolation, solution, and leaching occasioned by changing water levels; the necessity for more frequent leaching out of soils irrigated with more saline water; increased upstream diversion of low-salt-content water out of the upper basin; increased use in the upper reaches of the watershed; destruction of salt-accumulating plants such as tamarisk, and many other factors.

C. The possibility that the construction of reservoirs in arid areas may change meteorological and hydrological conditions to the point where much less water becomes available. Sudden decreases of river flow have often been observed following construction and filling reser-

voirs. Is this just the chance advent of the prolonged drought, or is there some casual relationship? A basic ecological study of the effects of mankind's efforts to subdue the American Southwest is long overdue, and should be made before we build two new large reservoirs.

D. Basic studies on irrigation ecology, and perhaps sociology, also. It is sometimes said that it takes less silty water to irrigate a given acreage or to produce a given crop than it does clear water. Are we increasing our needs for water and/or fertility when we channel our rivers into large clarifying reservoirs? Studies on the ecology of irrigation and on the design of more imaginative, less mechanical, and less vulnerable systems of irrigation farming should precede development of projects of this size.

E. Controlling shifting land use. As water imported into the Southwest is diverted from agricultural use to urban use consumption remains about the same, but there is an increase in pollution and an accompanying decrease in flexibility of use. Agriculture permits alternatives, but municipal and industrial uses do not. Some limitations on this trend must be established if these desert societies are to remain viable. The entire Nation pays the price when agricultural land is destroyed, and yet the entire Nation is called on to subsidize this very process. This lower Colorado project provides water for urban use at far too low a price and contains inadequate provision for adjusting rate changes to changed use.

CONCLUSIONS

It should be recalled that at one time in the United States we had a bird called the passenger pigeon that numbered in the billions. Today this bird is extinct. These birds were slaughtered by the trainload in a disgusting demonstration of what man can do when he is given complete freedom in the use of a resource. We are once more at this stage in history, except that now it is our water resources that are being destroyed and recklessly exploited. Perhaps it can be argued that under the American system we are free to foul our own nests—but should the Federal Government provide the laxative? We do not feel that it is Government responsibility to design and build a project to insure the continuation of unplanned expansion and to reward improvidence and lack of foresight with a gift of the Nation's most unique treasures.

Today we have the whole fate of arid American in our hand. Are we going to develop the West to death? Or are we going to set up some kind of restrictions and guidelines on human activity such that future generations will still be able to live in a reasonably attractive and flexible situation? Defenders of wildlife feel that as an integral part of such legislation as this lower Colorado project there should be a demand that each community and State affected should publish a conservation plan in which they face the future seriously with concrete proposals for adjusting themselves to the inevitable future. Among other things, they should agree to limit urban expansion onto agricultural lands. They should direct themselves to the development of a way of life adapted to the environment in which they live, and not pattern their life after that of rain-rich areas. Present water rates in Phoenix are among the cheapest in the United States—about

on a level with those cities on the Great Lakes and on the Oregon coast. This is incredible—and ridiculous.

We suggest that the American people in each and every part of the country begin now, before it is too late and there are no alternatives, to develop a way of life which will last a thousand years. For too long we have been thinking in terms of one or two generations. People are here to stay, and more and more people will have to stay in the communities in which they are presently living or into which they are born.

We have to redesign our way of life, and not just wedge our way into the next millenium with a bulldozer and a cocktail glass. A design for arid living involves more than a patio and a grapefruit tree. It means acceptance of time-proven human adaptations to nature, as well as the devising of new adaptations. It is not necessary for everyone in the United States to live according to the same design. All of us, in whatever region we may live, will find ourselves adapting rapidly in the coming years if we want to keep the earth healthful and life worth living. These adjustments will eventually lead to interesting divergences in these United States, and may even help make from our all-too-uniform society one in which local color is restored and local ingenuity encouraged.

Since the subject of a national water commission has been discussed at these hearings, we express our opinion that, provided such a commission can take an ecological viewpoint and stimulate thought and action on these matters, it is not only desirable but essential.

Mr. ASPINALL. Any questions? Thank you very much.

Without objection, the statement of Ann Worth, conservation chairman, Aspen Chapter, Colorado Mountain Club, will be put in the record at this place.

(The document referred to follows:)

STATEMENT OF THE ASPEN CHAPTER OF THE COLORADO MOUNTAIN CLUB

If you have ever run the free and wild Colorado River down through the mysteries of its Grand Canyon you know that the Marble Gorge and Bridge Canyon Dams will destroy the heart of the Grand Canyon.

But because in our culture the esthetic values are at best only secondary to the almighty economic value, the principal reasons for our opposition to the Lower Colorado River Basin project is that the whole project is illegal, uneconomic, and seriously threatens the economic future of the Upper Basin States.

The central Arizona portion of the project is based on Arizona's being entitled to 1,260,000 acre-feet of water per year more than it is now receiving. But in fact that water is not available. Presently 2,115,000 acre-feet a year is lost through reservoir evaporation between Lee's Ferry and Mexico. Deduct this amount from the guaranteed flow at Lee's Ferry, and the net usable water is 5,385,000 acre-feet a year.

If this water is allocated to the Lower Basin States in proportion to their entitlements under the Colorado River compact and deducting Arizona's share of 750,000 acre-feet a year to be delivered to Mexico, Arizona's share is as little as 1,635,000 acre-feet a year. She now diverts 1,540,000 acre-feet a year.

Obviously the Central Arizona project including dams in the Grand Canyon cannot be justified for 95,000 acre-feet of water a year.

The flow of the Colorado River between 1930 and 1962 has been only 11,300,000 acre-feet per year and not the 15 million acre-feet per year estimated at the time the water was divided up. Although the Upper Basin States are currently using only 2,550,000 acre-feet per year and passing large surpluses to the Lower Basin States the Bureau of Reclamation estimates that the Upper Basin States will be using 5,441,000 acre-feet per year by 2020. That is about the midpoint of the plan's projected 100-year life.

The only realistic and economically feasible solution to the Southwest water problem is a nuclear-powered combination desalinization and powerplant. The President's Office of Science and Technology estimates that this could be produced by 1980, which is about the same date the lower Colorado storage project would be usable. Atomic power is much cheaper than hydro power. Water transport costs to Phoenix-Tucson would be about the same as from Lake Havasu. Best yet, the source of water would be inexhaustible.

For details of these economic facts and supporting bibliography, see the article "The Grand Canyon Dams—Are They Really Necessary," by J.R. Guadagno, May 1965, Trail and Timberline, published by the Colorado Mountain Club, Denver, Colo.

Mr. ASPINALL. The next witness will be Dr. Bruce Knight, Wasatch Mountain Club. Dr. Knight.

STATEMENT OF BRUCE KNIGHT, WASATCH MOUNTAIN CLUB, SALT LAKE CITY, UTAH

Mr. ASPINALL. Under a unanimous-consent request you have 5 minutes to make your statement and you have the balance of your time to answer questions.

Mr. KNIGHT. Absolutely. I am a little caught off guard. I thought I was coming up tomorrow.

I am Bruce Knight. I live in New York City and I was asked by the Wasatch Mountain Club of Salt Lake City, Utah, to give a statement and it is a short statement and if I have the time, could I add a few comments.

The statement is the following: The Wasatch Mountain Club of Salt Lake City opposes the construction of the proposed Bridge Canyon and Marble Canyon Dams (title III, sec. 302 of the Lower Colorado River Basin Project Act.)

Mutilation of national parks and monuments and the increasingly rare stretches of wilderness river in the United States are justifiable under only the most exceptional circumstances and for the most compelling reasons. Bridge Canyon Dam would produce a reservoir extending through Grand Canyon National Monument into the National Park. The violation of what is probably the most famous natural wonder in the United States is never mentioned nor is its value considered in the costs implied in the Lower Colorado River Basin Project Act. The construction of Marble Canyon Dam would similarly desecrate what remains of the free flowing Colorado River.

Is this sacrifice necessary? Are the reasons for these dams compelling enough to justify the invasion of a national park and a national monument? We are strongly convinced that they are not. The main purpose of the dams is the production of hydroelectric power, the sale of which eventually will gain revenue for the Lower Colorado River Basin development fund. Water itself will be lost in significant quantities through evaporation. It does not make sense to finance water preservation projects by means of projects which themselves are wasteful of water. With or without these dams the crucial water problems of the Southwest are still a long way from solution. The act itself acknowledges in title II the necessity for alternative sources.

Therefore we protest this proposed violation of the Grand Canyon. No national park, monument, or wilderness will be safe if we allow the Grand Canyon to be tampered with in this way. When our hydroelectric power resources are exhausted we will turn to other energy

sources. Let us do this with our national parks intact and some of our great rivers still flowing.

That is the end of the statement.

Mr. ASPINALL. You have about 2½ minutes to make your other statement.

Mr. KNIGHT. Two minutes and a half. I will be very brief on this, just having tried a little bit to shake down some of the many numbers that I have heard recently, and draw some conclusions that I feel inevitable. Three points here.

One, Marble Gorge and Bridge Canyon Dams are not themselves reclamation projects. They are intended to furnish money and power for reclamation projects.

Two, are these dams a sound means for achieving these objectives? Power costs have declined 1 mill in the past decade. Reasonable projections indicate power rates will decline to less than one-half of present values within the amortization period of the dams. The result would be bankruptcy.

Three, can the lower Colorado afford a false start toward solving its deepening water problem? Today already overpumping of the Arizona ground water is twice as much as the additional Colorado water provided for in this bill. In only 35 years the projected requirement for the lower basin will be 2½ times the total legal flow past Lee's Ferry. This will require long-distance pumping and desalinization, and energy far beyond what lower Colorado hydropower can provide. Both time and money will be short for a project of the necessary magnitude.

The lower basin is in no position to give charity to power-dam builders, and might be apprised of the results of the investigations proposed in title II of the bill before embarking on a hydropower project which was modern in 1919.

Mr. ASPINALL. Thank you very much. The gentleman from Arizona is recognized for 1 minute.

Mr. UDALL. You are a member of the Wasatch Mountain Club?

Mr. KNIGHT. Yes; I am.

Mr. UDALL. You now live in New York?

Mr. KNIGHT. Correct.

Mr. UDALL. Have you ever seen Grand Canyon?

Mr. KNIGHT. Yes, sir.

Mr. UDALL. Have you been down the river?

Mr. KNIGHT. I have.

Mr. UDALL. You have given us a lot of figures here in the last few minutes on power production. Do you have any training or experience in the field of electrical utility ratemaking or electrical utility economics?

Mr. KNIGHT. I am a nuclear physicist. I have worked in atomic energy for 4 years.

Mr. UDALL. That is all I have.

Mr. ASPINALL. The gentleman from California.

Mr. HOSMER. We had a witness tell us that controlled nuclear fusion is just around the corner to produce power for about 3 or 4 mills.

Mr. KNIGHT. Pardon?

Mr. HOSMER. Do you know anything about that? Have you a way of controlling nuclear fusion?

Mr. KNIGHT. We were also told that nuclear fission was just around the corner 10 years ago, and today I believe some of it is burning in the wall socket right now, which was not true 10 years ago. Nuclear fusion is intangible. The moment it comes, all bets on these feasibility surveys are off.

The generation costs of power will be virtually nothing when this happens.

Mr. HOSMER. Every year it is 10 years off, isn't it?

Mr. KNIGHT. What I am saying is that this was the statement about nuclear fission, and I was pointing out that that statement was not entirely correct.

Mr. HOSMER. What?

Mr. KNIGHT. Fission is much closer today than it was 10 years ago.

Mr. HOSMER. I know that. I am asking you about fusion, controlled fusion.

Mr. KNIGHT. Next year if someone has a profound idea.

Mr. HOSMER. Who?

Mr. KNIGHT. I say if someone has a profound idea on nuclear fusion, they might start building plant next year.

Mr. HOSMER. Next year will almost be 10 years ahead and today they are still saying 10 years ahead, are they not?

Mr. KNIGHT. I don't believe anyone would be reckless enough to make a projection of that variety.

Mr. ASPINALL. The gentleman's time has expired. The gentleman from Utah.

Mr. BURTON of Utah. I am interested in this statement of the Wasatch Mountain Club. I have climbed some of those mountains. The Wasatch Mountains are mostly in my district and I have left my name in the tin cans that the Wasatch Club has left on a few of them, too. But I can't understand why they wouldn't be knowledgeable enough and come down out of the clouds long enough to write their Congressman on this. Why would they have a member of the organization from New York come down and present their statement?

Mr. KNIGHT. I am here because the chairman of the Physics Department at the University of Utah had to go back west because of commitments to classes. So far as writing their Congressmen is concerned, I don't know how many of them have or have not.

Mr. BURTON of Utah. Well, I wonder—what was your name, sir?

Mr. KNIGHT. My name is Bruce Knight.

Mr. BURTON of Utah. Mr. Knight, I wonder if you are prepared to state the position of the Wasatch Mountain Club of Salt Lake City, Utah, regarding Echo Park Dam?

Mr. KNIGHT. I believe the club was very young when the Echo Park controversy came up. The organization has grown very rapidly in the time since.

Mr. ASPINALL. The time of the gentleman has expired. The gentleman from Oregon.

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

Mr. ASPINALL. The gentleman from California.

Mr. REINECKE. I would like to clarify Mr. Hosmer's question. When do you feel fusion will provide electrical energy?

Mr. KNIGHT. My personal best guess, 1990.
Mr. REINECKE. 1990?
Mr. KNIGHT. Yes.
Mr. REINECKE. Thank you.
Mr. ASPINALL. You have still got about a minute left. Are there any other questions? Thank you very much, Dr. Knight.
The next witness is Mr. John McComb, Southern Arizona Hiking Club.
Mr. McComb.

STATEMENT OF JOHN McCOMB, SOUTHERN ARIZONA HIKING CLUB

Mr. MCCOMB. Mr. Chairman, I would like to have my statement entered in the record as if read and I would like to make a few additional comments.
Mr. ASPINALL. Without objection the statement of Mr. McComb will be printed in the record and he will be allowed to comment for 5 minutes, if he wishes, as part of his oral presentation.
Mr. MCCOMB. Like Dr. Ricker, I have hiked in much of the Grand Canyon. On three separate occasions I have been in parts of the canyon which will be flooded if the proposed dams are constructed. In my personal opinion much would be lost if this were to happen. Almost everyone I have known who has hiked in the Grand Canyon considers a night spent on the sandbar beside a rapid to be among their most memorable experiences.
Most young people and many older ones cannot afford boat trips, but almost all can afford and many are physically able to walk in the wilderness area such as the Grand Canyon. As a graduate student major in hydrology at the University of Arizona I am more aware of most of the seriousness of water problems in Arizona. I hope in the future I may be qualified to help solve this problem.
I also hope that water may be imported to central Arizona without further disturbing any of the Grand Canyon.
Thank you.
Mr. ASPINALL. Maybe we will save some time here. Mr. Udall.
Mr. UDALL. How long have you lived in Arizona?
Mr. MCCOMB. Six years with the exception of 1 year when I lived in California.
Mr. UDALL. When you hiked in the Grand Canyon did you go down the trail from the south rim?
Mr. MCCOMB. I have been on that trail; yes.
Mr. UDALL. What in your opinion is the difference here? You want no tampering with the Grand Canyon as is and yet I would suppose that you don't advocate doing away with that trail. This is a man-made object which scars the face of the canyon.
Mr. MCCOMB. Well, I realize that there is some tampering. You must make a decision, of course, when the amount of tampering is too much. At some point it becomes too much and perhaps a little bit more is all right with you but I am sure in some point even you wouldn't want——
Mr. UDALL. What is the difference between the 100 miles of roads along the rim which give people a highway view of the Grand Canyon and a water highway for 13 miles along a small piece of the edge of the canyon?

Mr. McComb. I think the highway does less damage to the natural environment than 13 miles that would be in the canyon part itself, but, of course——

Mr. Udall. Have you seen Lake Powell?

Mr. McComb. Yes; I have.

Mr. Udall. Do you think this is ugly? Would you say Lake Powell is ugly?

Mr. McComb. At the present time I don't think it is ugly. I have hiked in the area before Lake Powell. I have never had the opportunity or finances to make a trip on the lake.

Mr. Aspinall. The gentleman from California.

Mr. Hosmer. Mr. McComb, you talk about the tourists coming from Europe, foreign countries, to see the Grand Canyon.

Mr. McComb. Yes.

Mr. Hosmer. And the inference from your statement is that from their vantage point that they use, that if the Bridge Canyon Dam were built, they would see nothing but a lake, you didn't mean that.

Mr. McComb. Not nothing but a lake. But in some of the vantage points, Toroweap Overlook, you would see an artificial——

Mr. Hosmer. Probably 1 in 10,000 who go to anyplace else come from Europe or anyplace else.

Mr. McComb. I am not sure of the figures.

Mr. Hosmer. The amount of people that don't see it——

Mr. McComb. I have not seen the figures.

Mr. Hosmer. This lake is some 30 miles away from those vantage points.

Mr. McComb. The most commonly used ones; yes.

Mr. Hosmer. Yes.

Mr. Aspinall. The gentleman from Utah.

Mr. Burton of Utah. I yield to the gentleman from Arizona.

Mr. Udall. Let me nail this down. Can you tell me a single established road, established trail, viewpoint, or overlook in Grand Canyon National Park from which any tourist or visitor would even know the lake exists if Bridge Canyon Dam were built?

Mr. McComb. Not that I know of in the Grand Canyon National Park. In Grand Canyon National Monument there is at least one.

Mr. Udall. I will only say to you as I said to the other Arizona witness, I respect your sincerity. I think you do your State a disservice. Time will tell whether you are right or I am right on this subject but I do appreciate your sincerity.

Mr. Aspinall. The gentleman from Oregon.

Mr. Wyatt. I have no questions.

Mr. Aspinall. The gentleman from California.

Mr. Reinecke. Is the Toroweap overlook the one above Lava Falls?

Mr. McComb. Yes, it is.

Mr. Reinecke. Thank you. I just wanted to check that out.

Mr. Aspinall. Thank you very much, Mr. McComb.

(The document referred to follows:)

TESTIMONY BY JOHN MCCOMB IN OPPOSITION TO AUTHORIZATION OF BRIDGE CANYON AND MARBLE CANYON DAMS, LOWER COLORADO RIVER BASIN PROJECTS, AUGUST 30, 1965

Mr. Chairman, my name is John McComb. My home is in Tucson, Ariz. I am appearing in behalf of myself and the Southern Arizona Hiking Club, which has more than 200 members, most of whom also live in Tucson.

Members of this club, including myself, spend a great deal of time hiking in the Grand Canyon. I certainly feel more at home there than I do at this hearing. We are opposed to the construction of the Bridge Canyon and Marble Canyon Dams primarily because they would destroy a part of the unique natural beauty which now exists within the Grand Canyon.

The Grand Canyon does not end at the boundaries of the national park. In fact, many of the finest scenic areas and opportunities for wilderness recreation, such as Kanab Creek, Deer Creek Falls, Redwall Cavern, and Vasey's Paradise, are outside both the Grand Canyon National Park and Monument.

I have traveled over much of the West and one thing that has particularly impressed me at the Grand Canyon is the high percentage of tourists from foreign countries. It is on the "must see" list for almost all these persons who visit the Western United States. Many countries have areas of rugged alpine beauty comparable to our Rocky Mountains or North Cascades, but there is only one Grand Canyon. These foreign tourists did not come to see an artificial lake.

Recreation use of this Grand Canyon wilderness is increasing very rapidly. In the past 12 months the Southern Arizona Hiking Club has conducted 3 trips into various parts of the canyon, in which more than 35 different individuals participated. Many persons would consider these trips fairly rugged physically, but few would say that they were expensive. I am confident that the average cost was less than $5 per person per day.

As residents of Arizona, we are well aware of the critical water problem which faces us at this time. However, we hope that this problem may be solved without destroying much of the living river which is such an important part of the Grand Canyon.

Thank you for this opportunity to appear at this hearing.

Mr. ASPINALL. My witness list shows that for tomorrow morning, we have Joe Penfold representing the Isaak Walton League, S. M. Brandborg, representing the Wilderness Society; Jerry Lobel of Scottsdale; Robert Jasperson, and Stephen G. Svendsen of California.

If there are any other witnesses here, let me have their names.

All right. The committee now stands adjourned.

That is a rollcall. The committee stands adjourned until tomorrow morning immediately following the meeting of the full committee.

(Whereupon, at 3:50 p.m., the subcommittee was adjourned, to reconvene on Wednesday, September 1, 1965, immediately following the meeting of the full committee.)

H.R. 4671 AND SIMILAR BILLS TO AUTHORIZE THE CONSTRUCTION, OPERATION, AND MAINTENANCE OF THE LOWER COLORADO RIVER BASIN PROJECT, AND FOR OTHER PURPOSES

WEDNESDAY, SEPTEMBER 1, 1965

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

The subcommittee met, pursuant to other business, at 10:04 a.m., in room 1324, Longworth House Office Building, Hon. Walter Rogers (chairman of the subcommittee) presiding.

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

It is the intention this morning of the Chair to recognize the three witnesses whose time has been limited to 10 minutes each. Mr. Jerry Lobel. Is he present? The Chair will recognize you at this time.

STATEMENT OF JERRY LOBEL, SCOTTSDALE, ARIZ.

Mr. LOBEL. Thank you, sir.

Mr. ROGERS. Under unanimous consent request, the committee is operating under a procedure that 5 minutes will be allowed for your presentation and then 5 minutes more for questions and answers.

Mr. LOBEL. Thank you very much.

Mr. ROGERS. You may proceed, Mr. Lobel.

Mr. LOBEL. Thank you very much.

I am just going to make a summary presentation today. I would like my written statement to be included in the record plus some additions and supplementary information I hope to add later before the hearings close.

Mr. ROGERS. Without objection the statement you presented, Mr. Lobel, will be included in the record the same as if read in full and you may submit the additional information to the subcommittee and it will be received under the rules of the subcommittee subject to inclusion in the record or the file, whichever you prefer.

Mr. LOBEL. Thank you very much.

My name is Jerry Lobel. I am a resident of Scottsdale, Ariz. I have lived in the Southwestern United States for over 20 years. I am attending these hearings as a private, informed citizen, who is keenly interested in the outcome of these extremely important meetings.

My interest in these hearings is that I stake my future in Arizona upon the same things that other citizens do, one of those being an adequate water supply.

The reason why I am attending these hearings is that frankly I do not believe that Marble or Bridge Canyon Dams can possibly help relieve Arizona's water problems. I do believe that the water problems attacked by the central Arizona project need solving as soon as possible.

However, it is almost a certainty that the construction of these dams in the Grand Canyon will move us further away from and not closer to a solution. In addition, the dams would partially destroy one of the world's most scenic wonders.

I would like to state my arguments in support of the above conclusions in the following order. First, new dam legislation for the Grand Canyon would violate a trust to the American people.

2. Bridge and Marble Canyon Dams will not solve the water problem attacked by the central Arizona project.

3. Bridge and Marble Canyon Dams are not economically competitive ventures.

4. Alternative solutions to Southwest water and power problems are not being given adequate attention.

5. There is need for more confidence in American scientists and industry.

First of all, as to the new dam legislation violating a trust to the American people. I have heard the argument stated here in the last few days regarding the opinions that various laws enacted in the past—National Park Act is one of them—would not be violated if these dams are built. Frankly, I don't agree with this in any form for the reasons stated in my paper.

There is great scenic value in the bottom of the Grand Canyon. To cover this with 300 feet of water I think will destroy this value no matter how you want to define scenic value.

I feel that we cannot possibly improve upon the grandeur or the heart of the canyon with this water, covering it with water.

The esthetic values and principles used to guide the original protective legislation I believe are as important today if not more so than when this legislation was first enacted. Worst of all, I think that we are about to add more precedents to the undermining, to those things which have already started to undermine our National Park Act.

Mr. Udall in the past several days has presented a number of photographs for us to look at of how—what he calls beautiful pictures, scenic value of existing dams built in national parks. We have all seen these photographs and I haven't heard much objection to them. Frankly, I object, and I think that they were unfair in the manner they were presented because they showed only a few miles of reservoir. They did not show the 50 or 60 or 70 miles of reservoir that would be involved in the case of Bridge Reservoir. In other words, the pictures we saw showed only a—just the dam, 4, 5, 6, 10 miles of reservoir.

Bridge, however, would extend many miles through the Grand Canyon and at least 13 miles into the park.

Mr. ROGERS. You have consumed 5 minutes, Mr. Lobel. Mr. Aspinall is recognized for questions.

Mr. ASPINALL. Who is your employer, Mr. Lobel?

Mr. LOBEL. General Electric, Computer Department, Phoenix, Ariz.

Mr. ASPINALL. That is all I have.

Mr. ROGERS. Mr. Hosmer?

Mr. HOSMER. Mr. Lobel, do you feel that this committee ought to base its legislation on secondhand newspaper accounts?

Mr. LOBEL. I hope not, sir.

Mr. HOSMER. Well, that is in essence what you have offered the committee in your section on scientific competence, and so forth.

Mr. LOBEL. If I may answer your question just a second, I have read these articles. I have a briefcase full of them. I have also looked at who have attended, the names of the people who have attended these hearings in the past week. I have looked for technical experts. I have locked for the opinions, for instance, of people from the Park Service, people from the Outdoor Recreation Bureau. I haven't any testimony from men that might have been called into the hearings to testify and——

Mr. HOSMER. Do you realize——

Mr. LOBEL. I don't know whose opinion——

Mr. HOSMER. Do you realize this committee has been in the water desalting business since at least 1950?

Mr. LOBEL. Pardon me, sir?

Mr. HOSMER. Do you realize that this committee has been in the water desalting business since 1950?

Mr. LOBEL. I see.

Mr. HOSMER. Do you also realize that at least two of the members of this committee are senior members of the Joint Committee on Atomic Energy and fully informed as to progress in that field?

Mr. LOBEL. I did not know that.

Mr. HOSMER. I hope it gives you a little more confidence as to the competency of this body to judge the value of these things and I want to assure you that we are not going to rely on newspaper accounts, whether they come firsthand or secondhand through witnesses.

Mr. ROGERS. The time of the gentleman has expired.

Mr. Haley.

Mr. HALEY. No questions, Mr. Chairman.

Mr. ROGERS. Mr. Skubitz.

Mr. SKUBITZ. I have no questions.

Mr. ROGERS. Mr. Baring?

Mr. BARING. No questions.

Mr. ROGERS. Mr. Burton?

Mr. BURTON of Utah. No questions.

Mr. ROGERS. Mr. Wyatt?

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

Mr. ROGERS. Mr. Hansen?

Mr. HANSEN. I appreciate the gentleman making the trip here and the testimony he has given. I have no questions.

Mr. ROGERS. Thank you very much.

Mr. White.

Mr. WHITE of Texas. I have no questions.

Mr. ROGERS. Thank you very much, Mr. Lobel, for your testimony.

Mr. LOBEL. Thank you very much.

(The statement of Mr. Lobel follows:)

SUMMARY OF STATEMENT BY JEROME LOBEL

Mr. Chairman and gentlemen of the committee, my name is Jerome Lobel. I am a resident of Scottsdale, Ariz. I have lived in the Southwestern United States for over 20 years. I am attending these hearings as a private informed

citizen, who is keenly interested in the outcome of these extremely important meetings.

The opinions I am about to state are strictly my own and in no way reflect those of my employer.

My primary reason for testifying at this hearing is that I do not believe that building Marble and/or Bridge Canyon Dams can possibly help relieve Arizona's water problem. I do believe that the water problems attacked by the central Arizona project need solving as soon as possible. However, it is almost a certainty that the construction of these dams in the Grand Canyon will move us further away from, not closer to, a solution. In addition, the dams would partially destroy one of the world's most scenic wonders.

I will state my arguments in support of the above conclusion in the following order:

1. New dam legislation for the Grand Canyon would violate a trust to the American people.
2. Bridge and Marble Canyon Dams will not solve the water problem attacked by the central Arizona project.
3. Bridge and Marble Canyon Dams are not economically competitive ventures.
4. Alternative solutions to southwest water and power problems are not being given adequate attention.
5. There is need for more confidence in American scientists and industry.

1. New dam legislation for the Grand Canyon would violate a trust to the American people

Without a doubt, one of the most important scenic assets belonging to the citizens of the United States and Arizona will literally go down the drain if either Marble or Bridge Canyon Dam is built.

We cannot improve upon the scenic grandeur of the bottom or heart of the Grand Canyon by covering it with over 300 feet of water (if Bridge is built). The esthetic values and principles used to guide the original protective legislation are as important today (if not more important) than when the legislation was first enacted.

Yes; times and population figures have changed. But we need this great canyon wilderness more than ever before—not less.

I believe that legislation like the National Park Service Act and the Grand Canyon Park Act should be respected. The areas in the park that would be submerged in the case of Bridge Canyon Dam are not needed for any Government reclamation project.

Worst of all, violation of these laws will undermine the recreation foundation of all future Americans. After all, if the Grand Canyon falls, then why should Yellowstone, the Grand Tetons, Yosemite, Gacier, or Big Bend be invulnerable?

Now is the time to seriously consider the devastating effects of the new dam legislation. I am sure that time will prove that adding that part of the canyon outside of the park to the existing park would be a far better piece of legislation than the authorizing of two unnecessary dams.

2. Bridge and Marble Canyon Dams will not solve the water problems attacked by the central Arizona project

As an Arizonan, with a personal stake in the future of my State, I am in favor of the central Arizona project. The only qualification I make is that the success of the project is contingent upon acquiring more water for central Arizona—not more dams in the area of the Grand Canyon.

Tying Grand Canyon dams to the water distribution problem has added complications. For example:

(*a*) The reservoirs behind the new dams will waste considerably more water than before.

(*b*) Existing reservoirs (Lakes Powell, Mead, and Havasu) will be able to handle water storage requirements for many years, so why add more reservoir capacity at this time?

(*c*) Revenue for transporting water to central Arizona does not have to come from hydroelectric power generated by dams built in the Grand Canyon. There are other and better sources of both power and revenue.

3. Bridge and Marble Canyon Dams are not economically competitive ventures

A standard method for evaluating a large capital investment is to compare the costs and/or returns (or advantages) of alternative investments with those of the first or initial proposition.

It is also standard procedure to examine the investment and its alternatives over a reasonable time interval.

I have seen a number of reports that have made this type of comparison using nuclear and/or fossil fuel as alternative solutions. The result of most of the calculations that I have seen indicates that power to be generated at Bridge and Marble Canyon Dams would not be competitive with either of the other two power sources, if all factors such as water losses and power interchange possibilities are considered.

4. Alternative solutions to Southwest water and power problems are not being given adequate attention

(*a*) Peaking power (for revenue purposes) does not have to come from new dams in the Grand Canyon. Alternatives include:

(1) Atomic power stations and existing hydro.

(2) Fossil fuel plants and existing hydro.

(3) Combinations of the above, including existing hydroelectric dams.

(Why cannot power developed for pumping purposes be used alternately for satisfying new peaking power requirements during the heavy load hours?)

(*b*) A relatively small direct personal tax (for the water used) might be less expensive from both a short- and long-range viewpoint.

(*c*) Maybe changes in existing laws should be made so as to permit more irrigation in areas closer to major water supplies.

(*d*) Improved methods of storing water underground in order to decrease both evaporation and water table losses should be given more attention.

5. There is need for more confidence in American scientists and industry

The problem seems to be that we are willing to project our future water and power needs (on an "if" basis), but not our rate of progress with technological improvements resulting in reduced cost of nuclear and fossil fuel power and desalinization.

Performance standards upon which much of the proposed legislation is based are in many cases too conservative:

Major water distribution changes from States with coastlines to States without coastlines will occur as the cost of desalinization decreases.

As an example, I recently read an article that states:[1] "The goal of the sea water desalting program in the Department of the Interior is to reduce the processing cost to 30 cents per 1,000 gallons. This goal has not been reached. But if it ever is reached, it means that the cost of desalted sea water would be more than $98 per acre-foot at the oceanside plant site."

Three weeks later I read an article[2] quoting Nobel Prize winner Dr. Willard F. Libby of UCLA:

" 'It looks as if we can make fresh water out of sea water economically, using atomic power.'

"And, not only will it cost 15 cents per thousand gallons, Dr. Libby believes that the atomic water plant can produce electricity for about 2½ to 3 mills per kilowatt hour * * *

" 'Atomic power is now economically feasible * * * it won't be long before atomic power will be competitive anyplace on earth.' "

Another article[3] published more recently contains the following information: "Nuclear power has, in short, become a straight business proposition. * * * Today it is coming home to all the utilities, in over half the United States where the atom is already on a competitive footing with fossil fuels. * * * What brought about this transformation? In part it may have been the usual 'cultural lag' between an event and the acceptance on a broad scale of its consequences."

I would like to call attention to the fact that the last two articles referred to are not projecting 25 or 35 or 45 years into the future. We are apparently so close to reality in both cases that it seems hard to believe.

In conclusion, I would like to state once again that, as an Arizona citizen, I am extremely concerned about the water problem in my State. I believe that the solutions to these problems are close at hand. Neither Marble nor Bridge Canyon Dams should be part of the soltuion, however. There are no real ad-

[1] Rich Johnson, president, Central Arizona Project, in the Arizona Daily Star, Apr. 21, 1965.

[2] State Press, Arizona State University, May 21, 1965.

[3] Francis I. du Pont & Co., Investornews, "Nuclear Power Industry," August 1965.

vantages to be gained from the dams. There are many disadvantages, the three foremost being:

(1) Irrevocable damage to the Grand Canyon;

(2) The fact that, of all the important revenue alternatives, Marble and Bridge are the weakest with little or no chance of success;

(3) The dams will not contribute to the solution of Arizona's water problems.

Thank you very much for your attention and for the opportunity to be heard today.

Mr. ROGERS. The next witness scheduled is Mr. Stephen G. Svendsen, Belmont, Calif. Mr. Svendsen, are you present? Does anyone know where Mr. Svendsen is? He has a statement.

Now, Mr. Robert Jasperson. Is he present?

Mr. JASPERSON. Yes, sir.

Mr. ROGERS. Mr. Jasperson, it is my understanding you want to be recognized if possible after the other two witnesses, Mr. Penfold and Mr. Brandborg.

Mr. JASPERSON. That is correct, sir, if I may.

Mr. ROGERS. Why did you want that belated recognition? Is there any particular reason?

Mr. JASPERSON. No very compelling reason. My father was going to come down and watch the hearings. He isn't here yet. It isn't a legal——

Mr. ROGERS. When will he be here, Mr. Jasperson?

Mr. JASPERSON. I expect him within a half hour or so.

Mr. ROGERS. I think we can work it out to let him be present while you are here to testify. Nice of you to state why you requested this.

Our next witness, then, will be Mr. William Zimmerman. Did you want to insert a statement, Mr. Zimmerman?

STATEMENT OF WILLIAM ZIMMERMAN, JR., REPRESENTING TRUSTEES FOR CONSERVATION

Mr. ZIMMERMAN. I have given the committee a statement.

I asked to be deferred the other day because I wanted to give an opportunity to these out of town people to be heard.

Mr. ROGERS. I see. Suppose, Mr. Zimmerman, we recognize you for 10 minutes under the rules that are prevailing at the present time and insert your statement the same as if it had been read.

Mr. ZIMMERMAN. Do you want me to do it now?

Mr. ROGER. Yes. Right now is fine.

Mr. ZIMMERMAN. Mr. Chairman, members of the committee. I want to confine my oral presentation——

Mr. ROGERS. First, Mr. Zimmerman, let me say this: Without objection your written statement filed with the committee will be included in the record the same as if it had been read in full and you may proceed to summarize it.

Mr. ZIMMERMAN. Thank you very much.

I want to speak only to two points. First is the legal point, and I think that it has not been brought to the committee's attention that there are two sentences in the pending bill which seem to me to be contradictory.

On page 6 of H.R. 4671, there is a sentence that reads:

This act shall not be construed to authorize any diversion of water from either Bridge Canyon or Marble Canyon Reservoirs except for incidental uses in the immediate vicinity.

It seems to me that that language in effect says that water impounded by these dams may not be used for irrigation. The sentence that follows immediately thereafter makes the construction of Bridge Canyon Dam consistent with the Grand Canyon Act. So in one sentence, as I read this bill, you are told that you may not use the water for irrigation and in the second sentence you are told that by fiat of the Congress this becomes a reclamation project.

I want to speak only about one other point and that is about the peaking—the problem of peaking capacity. If the information which has been supplied to your committee by the Department is correct, the potential coal-fired power in this area runs into the thousands of megawatts. The letter which Mr. Saylor submitted for the record indicates that on Indian land alone, the various power companies contemplate the construction of plants which will produce 5,500 megawatts.

May I call your attention to the fact that these two dams will produce about 2 million kilowatts, 2 million kilowatts against a total of 5,500 megawatts.

I submit that no power company is going to consider peaking capacity apart from its overall plan of operation. The power companies have throughout the country various other forms of peaking power. Peaking power is not limited to hydro. It may be diesel. It may be coal. It may be gas. It may be other fuels.

I think in the total picture of the southwest area, the power that will be generated by these two plants, if they are built, is infinitesimal. It is a puny part of the whole problem. And I suggest that the peaking capacity which is talked about for these two plants is not significant in the total power problem of the Southwest. That is quite aside from the fact that the steamplants, the coal plants, are estimated to produce power at a lesser cost than the power that would come from these two hydroplants.

Those are the two points, Mr. Chairman, that I would like to emphasize apart from my formal statement.

Mr. ASPINALL (now presiding). The gentleman from Florida.

Mr. HALEY. I don't believe I have any questions, Mr. Chairman. I want to welcome the gentleman before the committee this morning.

He is a distinguished citizen, and when we get into Indian affairs, I always enjoy talking to him.

Mr. ASPINALL. The gentleman from California.

Mr. HOSMER. I want to join in welcoming Mr. Zimmerman. He has been before us many times and has been very helpful whether I have agreed with him or disagreed with him or agreed and disagreed in part.

One thing I would like to ask you, Mr. Zimmerman. As a conservationist, I have difficulty reconciling your suggestion that we take coal, a natural resource that is not replaceable, and consume it, instead of using the power of falling water which is a constantly regenerating natural resource. It just doesn't seem good conservation to me for you to make that suggestion.

Mr. ZIMMERMAN. Well, that is not an easy one to answer, Mr. Hosmer. You might well say, as I think you are saying, that we ought to leave all the coal in the ground and not use it.

Mr. HOSMER. No. I am not stating that but I am stating when we do have an alternate source, good conservation practice would be

to use that to the extent reasonably possible in lieu of taking fuels which we know are limited in amount and will become in short supply. Therefore, future generations will suffer.

Mr. ZIMMERMAN. My real answer is that there isn't adequate power in these hydroplants that are in contemplation.

Mr. ASPINALL. The time of the gentleman has expired. The gentleman from Nevada.

Mr. BARING. No questions.

Mr. ASPINALL. The gentleman from Kansas.

Mr. SKUBITZ. I have no questions.

Mr. ASPINALL. The gentleman from Arizona.

Mr. UDALL. I just wanted to concur in the good things that have been said about Mr. Zimmerman. He is an old friend and it gives me a great deal of sorrow to be on the opposite side of this issue.

Mr. ASPINALL. Off the record.

(Off the record.)

Mr. ASPINALL. The gentleman from Utah.

Mr. BURTON of Utah. No questions.

Mr. ASPINALL. The gentleman from Oregon.

Mr. WYATT. I have no questions.

Mr. ASPINALL. The gentleman from California for 2 minutes to finish his questions.

Mr. HOSMER. I think this is sufficient.

Mr. ASPINALL. Thank you very much, Mr. Zimmerman. I join with all the rest of my colleagues not only in welcoming you to this hearing but thanking you for the cooperation you have given us for many years.

Mr. ZIMMERMAN. Thank you very much.

(The statement of Mr. Zimmerman follows:)

STATEMENT OF WILLIAM ZIMMERMAN, JR.

My name is William Zimmerman. I appear today as representative of Trustees for Conservation, a nonprofit organization with headquarters in San Francisco. At the outset I wish to make clear my position, which is, I believe, substantially the same as that of other conservation groups. We are not opposed to the central Arizona project, or to the southwest water and power project, or to the Lower Colorado River Basin project, as outlined in these various bills now before you, provided that certain conditions are met.

We believe that the bills before you are defective and deceptive. We believe further that the central Arizona project, or the Pacific Southwest water and power plan, or the smaller project for the Lower Colorado River Basin, as in H.R. 4671, are feasible, without the construction of any more dams in the Colorado River. We are unalterably opposed to the construction of Bridge Canyon and Marble Gorge Dams, or any other dams in the Grand Canyon. We oppose the authorization in the bills before you on three grounds, which I call, for simplification, moral, legal, and economic.

First let me consider the moral issue. You members of the committee, and other Members of the Congress, are the keepers of the Nation's conscience. This canyon is not the property of Arizona. The Grand Canyon is the property of the Nation, and in a broader sense, of the world, for it is one of the wonders of the modern world. Although it is the product of millions of years of prerecorded time, it is one of the great scenic attractions of the modern world. Tourists who come to the United States from all corners of the globe, want to see three or perhaps four focal points: New York City; the Grand Canyon; Yellowstone Park; San Francisco or Los Angeles. Quite aside from the international fame of the Grand Canyon, quite aside from the fact that it probably brings more tourist dollars to Arizona than any other attraction, the fact that this wonder is in Arizona should stimulate in the citizens of that State a determination to keep that attraction undefiled.

Perhaps this moral issue is not debatable. Are there only two kinds of people in the United States, those who attach a dollar sign to everything, to every activity; and those who are starry eyed, or bird watchers, or seekers for four-leaf clovers, or others who believe that there are values in life which the dollar cannot buy? Are we living in an era when engineers, whether they are road engineers, reclamation engineers, or Army engineers, prevail over every other group of citizens? For most people in the United States standards and criteria are different from what they were in 1900, or perhaps in 1905.

But not for the reclamation service, for they say, to me if not to you, that they are still following the dictates of Congress as laid down 60 years ago, in the Reclamation Act. Even then, as has been mentioned several times in these hearings, the man who may be said to have invented or coined conservation, Theodore Roosevelt, urged that the Grand Canyon be left as it is. Man can change it but he cannot improve it. Reference has also been made in the course of these hearings to the fight over the Echo Park Dam and the battles of the wilderness. I suspect that these two will look like skirmishes in the bush when the American public really becomes aware of the plans to put dams in the Grand Canyon.

We confront today a strange fact, that the President of the United States and Mrs. Johnson are leading a national effort to preserve natural beauty, and even in places to restore natural conditions where these have been damaged or destroyed. At the same moment the administration, through the Secretary of the Interior and the Bureau of the Budget, is giving its active support to a plan which will change for all time one of the great natural wonders of the world. This issue, members of the committee, is the first of the four major decisions you must face.

Second, I suggest that there is a legal question which your committee must consider. Although this text is already in the record in more than one place, for your convenience I wish to read part of the Grand Canyon Act:

"Whenever consistent with the primary purposes of said park, the Secretary of the Interior is authorized to permit the utilization of areas therein which may be necessary for the development and maintenance of a Government reclamation project."

In this sentence the significant phases are three: (1) "Consistent with the primary purposes;" (2) "necessary for the development;" and (3) "Government reclamation project." Secretary Udall has made an administrative determination as to the first phrase. He has said that the construction of these dams is not inconsistent with the primary purposes of said park. I regret that I cannot agree with the Secretary. Water behind Bridge Canyon, at normal operating stages, would be 644 feet deep; at Marble Gorge, 295 feet. Not only would the bottom of the Grand Canyon itself be flooded out for many miles, but so, also, would be many of the side canyons. I am unable to agree that such a change is consistent with the primary purpose of the act: to keep the park in its natural state.

As to the second significant phrase, "necessary for the development," various witnesses have indicated that the analysis of the Bureau of the Budget makes it clear that Bridge Canyon is not necessary for the development and maintenance of a Government reclamation project. Further, I suggest that the authors of the pending bills were aware of this fact.

Please refer to H.R. 4671, page 6, beginning at line 4. The sentence reads: "this Act shall not be construed to authorize any diversion of water from either Bridge Canyon or Marble Canyon Reservoirs except for incidental uses in the immediate vicinity." These words say to me that the waters impounded by these two dams are not to be used for a reclamation project. Yet in the very next sentence, beginning on line 7, the Congress is made to say that the construction of Bridge Canyon Dam is consistent with the Grand Canyon Act of February 26, 1919. Obviously the drafters of these bills, even though they were working in the Department of the Interior, were aware of the inconsistencies of the Department's position, and in these two sentences passed the buck to the Congress.

Before argument arises, let me concede at once that this Congress has the right and the power to amend or reverse the findings of previous Congresses, just as the next Congress may alter the findings of the present Congress. I merely point out that the authors of this bill, regardless of the thousands of words of testimony already given, have confessed in this language that this is not a reclamation project so far as these dams are concerned, but that by congressional fiat it must be made a reclamation project so that Secretary Udall may declare it consistent with the Grand Canyon Act. My purpose is to say that if the Congress should

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approve the construction of these dams, either now or in the dim hereafter, it should understand the Department's dilemma. And so should the American people.

Now I come to the third major issue which your committee must resolve—the economic problem. Perhaps this issue should be split into two parts, water and power, but for my purposes this is one issue. Is it sound policy to spend a billion dollars, more or less, on facilities which will produce not a single drop of additional water for Arizona, but will on the contrary increase evaporation from the river by 100,000 acre-feet or more? It is generally admitted that the expenditure of the moneys authorized in the pending bills will yield no additional water. The present proposal, which ignores the fact that water outside of the Colorado Basin must be found, is deficient. In the last Congress, the Interior Department informally submitted a comprehensive report, on which hearings were held by the Senate Committee on the Interior. This initial plan as it was called, asked for an authorization of $3,216 million, of which $1,704 million was proposed for immediate authorization. This "immediate" request included $511 million for Bridge Canyon project, $239 million for Marble Canyon, and $527 million for the central Arizona project. The initial plan also called for the importation of 1,200,000 acre-feet from northern California, which happens to be the exact amount of water to be diverted for the central Arizona project. After reviewing the facts, Secretary Udall summed up the situation: "It is evident, therefore, that the future quantities of water to be available in the Colorado River will not be adequate to meet even present commitments and immediate future demands in the Pacific Southwest."

And this year, only last week, Secretary Udall looked at the facts as he saw them last year, for he said (p. 465) "if we go to a second stage, if we have an import program, I think that Bridge very definitely has to be in the picture." What the Secretary is not saying, but is certainly implying, is that if the Congress approves the pending bills, the Department will be back with a request for Bridge Canyon and the other items which make up the total of $3,216 million.

Your committee, in my judgment, should not act on the pending bills until you know what the Department and the administration intend after these bills, in some amended form, are enacted. Surely last year's total of $3,216 million was not drawn out of thin air. I do not question Secretary Udall's answer to Representative Foley several days ago (p. 508). Mr. Foley asked the Secretary if a decision has been made by the Department that the Columbia River should be diverted to meet the needs of the Colorado River Basin. Secretary Udall's reply was that: "My answer to that, of course, Congressman, is a categorical 'No.' As a matter of fact, there are no studies available on which any judgment can be formed on that in the terms of alternatives." Nevertheless in the last Congress the Department had available enough "studies" to ask for a total authorization of more than $3 billion.

My view is that the source of imported water, whether from the Columbia or from the ocean, has no bearing on the necessity for these two dams under consideration. The tragedy of the present crisis, as I see it, is that no one has proposed what appears to a layman the obvious first step: stop building dams and import water to replace the water which is being mined. Commissioner Dominy admitted somewhat reluctantly under questioning from Representative Reinecke, that the total loss of water by evaporation, if all of the dams on the Colorado were filled, including Bridge Canyon and Marble Gorge, would be about 3 million acre-feet. This is more than Arizona's entitlement of water in the Colorado River. Surely something is wrong in a program which has this result. It is time for the Bureau of Reclamation to develop a plan for the storage of water underground, instead of a plan for the evaporation of water behind concrete dams and the mining of water remaining underground.

Finally, I come to the second half of the economic problem: alternative sources of power. Last year, in his testimony before the Senate committee, Secretary Udall suggested that within 10 years, perhaps before these two dams were functioning, they might be obsolete because of the development of nuclear power. Even without regard to nuclear power, which members of the committee may regard as a speculative possibility, I call attention to the vast coal resources of this Southwest area which are available or under contract for the development of thermal power. As stated in a letter from the Bureau of Indian Affairs, which Representative Saylor has submitted to this committee, "the total of installed and proposed capacity of powerplants directly related to the use of Indian lands * * * is 5,575 megawatts." In addition to the leases and applications on Indian lands, the Department has before it in one form or another applications

for other lands which will result in the construction of plants producing at least 10,000 megawatts. When I first saw these figures I could hardly believe my eyes. The two dams authorized by these bills will supply 2,100,000 kilowatts. The development scheduled by the power companies in this southwestern area amounts to something between 15,000 and 18,000 megawatts. In this situation, if the Department's figures are to be believed, the power from the two dams which we oppose is negligible, whether it is called the base power or peaking power.

Finally, I must refer to the difference in cost between thermal power as calculated by the power companies and hydropower as reported by the Bureau of Reclamation. Even Commissioner Dominy now forecasts thermal power at 3 or 4 mills, or even lower, while power from these hydroplants will be selling for 6 mills. No doubt some power company will be willing to buy peaking power at this high price, which will not materially affect overall costs, but the fact that power produced by these dams can be sold does not justify their construction. I respectfully urge that no testimony has been submitted to your committee which proves that the construction of these dams is necessary. It may be true that power revenue from them would result in lower costs to irrigators, domestic and industrial users. I have no special objection to a subsidy to the people of Arizona, but I urge that the Congress authorize the subsidy in some way other than revenue from power developed by two objectionable dams.

Mr. ASPINALL. The next witness is Mr. Svendsen.

Is he here yet?

The next witness, then, will be our good and helpful friend, Joseph Penfold, representing the Izaak Walton League of America. The acting chairman of this committee has said many, many times that no one has been more effective and more helpful in trying to get workable, satisfactory programs for the users of our public land areas, and especially the coordination of those uses, than Joe Penfold as he works for those who are interested in the protection of scientific, ecological, and other values as well as the recreation uses of the areas concerned.

Joe, it is good to see you.

STATEMENT OF JOSEPH W. PENFOLD, CONSERVATION DIRECTOR OF THE IZAAK WALTON LEAGUE OF AMERICA

Mr. PENFOLD. Thank you very much, Mr. Chairman. It is always a pleasure as well as a privilege to appear before this committee which has been so mightily helpful in the whole outdoor recreation and conservation field, at least over a period of my own knowledge. We are constantly grateful to you.

I am W. J. Penfold, conservation director of the Izaak Walton League of America, a national organization of citizens concerned with natural resources conservation. Mr. Chairman, with your permission I am going to skip through a good bit of my statement so as to highlight what few points seem to me to be essential but I would like——

Mr. ASPINALL. Without objection the entire statement will be printed in the record as if read and Mr. Penfold will be permitted then to present any additional material he wishes to. Would you like to be advised when you have used 10 minutes. (See p. 895 for statement.)

Mr. PENFOLD. Yes, sir.

Mr. Chairman, I put in the entire language of the resolution adopted by our convention last June in Cody, Wyo. I will not take the time to read it. It is very much to the point.

Then I have included a few paragraphs to indicate the procedure which the Izaak Walton League follows in the adoption of a policy

position such as this. Then a couple of paragraphs in which I tried to indicate the objectivity which we have tried to apply to the study of this particular project.

The purpose of all this verbiage, Mr. Chairman, hopefully is to satisfy the committee that Izaak Walton League has not adopted its position of opposition on the Bridge Canyon and Marble Canyon Dams frivolously or without consideration of the stakes involved, nor was it adopted merely out of emotion. It would be ridiculous, of course, to say that emotion was not involved because if the beauty and grandeur of our great national park system when threatened did not stimulate a great surge of emotion for its protection, then surely that system has failed of its purpose or we are a most stolid and insensitive people.

The policy of the league for the preservation of the national park principle is not new. It has been a basic purpose of the league from the beginning. When the league studies and evaluates proposals such as the one now before you, it must at the same time and as a matter of course reexamine and reevaluate once again its own traditional policies. This the league convention did at Cody and without contrary vote determined that we shall stand firm in our position.

In all of this I am sure the Izaak Walton League is not alone in this manner of approach to policy and position. It will be noted, Mr. Chairman, that the league resolution addresses itself to one portion of the project, opposing authorization of Bridge Canyon and Marble Canyon Dams.

It expressed no opposition to the central Arizona project nor to providing Arizona with opportunity to make beneficial use of Colorado River flow to which it is entitled under law. There is a powerful principle of equity involved in this and we doubt that anybody would want to see that principle breached.

In reaching the position of opposing the two main stem dams, we had to consider several highly important questions, and to satisfy ourselves that we had correct answers to them. Among them were these:

1. Would Bridge Canyon and Marble Canyon Dams and Reservoirs damage the Grand Canyon? We found that they would.

2. Would the dams and reservoirs impinge on the Grand Canyon National Park and Grand Canyon National Monument? They would.

3. Would the impact on the national park and monument be consistent with the primary purposes of these two national park system units? Clearly, it would not be.

4. Are the dams necessary to the central Arizona project? Clearly they are not.

The facts and the logic providing these answers have been amply detailed by other witnesses, so we shall not burden the record with their repetition. Suffice it to say that in our judgment the arguments against the two dams and for the protection of the Grand Canyon and its national park system units are convincing.

If the two main stem dams were to reclaim any land or to bring water to water-short areas, and if this water were wholly necessary to economic and social survival of an area, our position would be modified on that premise. But this is not the case, and such a claim cannot conscientiously be made. On the contrary, the two dams would be

solely for the generation of power, to pump water from an existing reservoir on the main stem into Arizona's Central Valley, and for sale to pay the bulk of the costs of the lower basin project. Alternate sources of power are available at equivalent or even lesser costs in the long run—from coal, oil, gas, or nuclear energy.

In this connection, Mr. Chairman, I think we can understand the concern of the upper basin States that new hydroplants in the lower basin would be a constant temptation to the Bureau of Reclamation to keep the cash registers ringing at the expense of upper basin development.

The dams are not needed for flood control, or for river regulation. Matter of fact, it looks as if the main stem of the Colorado may already be overdeveloped—unless very sizable imports can be made from other regions more abundantly supplied with water. Moreover, the dams would result in an average loss through evaporation of 100,000 acre-feet or thereabouts. Perhaps 100,000 acre-feet is not very much, but it is substantially more than the export from upper tributaries of the Colorado into the Arkansas drainage which was a prime consideration in authorizing the $150 million Fryingpan-Arkansas project a few years ago.

It seems to us, Mr. Chairman, that there are a considerable number of basic principles involved in the proposal now before the committee, among them:

The principle of the Colorado River compact and its division of Colorado River flow between the upper and lower basins; the principles stemming from the Supreme Court decision upon which Arizona bases its hopes for the central Arizona project; the principle of prior rights which the legislation recognizes in providing that in water-short years the holders of perfected rights shall receive their entitlements first with shortages to be borne by the central Arizona project; the principle of the Mexican water treaty commitment, which is a national rather than a sectional obligation, thus placing the burden on the general taxpayers of the country to pay the costs involved in fulfilling this commitment.

The caution expressed as to sources of water which might be imported to the Colorado Basin relate as well to the principle that the water would have to be surplus to the projected needs of the exporting region.

Such principles as these are not to be breached, Mr. Chairman, or the whole structure of western water law, precedent, and custom could well collapse and chaos result. Surely, no program of the dimensions of the Southwest project will be authorized by the committee except as it can be developed within overriding principles.

Very simply, Mr. Chairman, we believe the national park principle is of the same order. If that principle is breached, not because of dire necessity but for expediency and convenience, we can hardly anticipate that the national park system will long endure.

We respectfully urge the committee to accept the national park principle along with the other principles of law and equity in determining how this project can justify and properly go forward, and to exclude from it the objectionable dams in the Grand Canyon.

We would also request, Mr. Chairman, and I think I speak for other organizations, that perhaps the record can be kept open for a little

period because some questions have been developed during the course of these hearings in the last few days and I think perhaps we might be able to furnish information that would be helpful to the committee if the record is kept open.

Thank you, sir.

Mr. ASPINALL. The record will be kept open for not less than 10 days and such material as you may wish to send may be sent to us and it will be examined to see whether or not it should be put in the record or the file according to the rules of the committee, depending upon the judgment of the chairman of the subcommittee and the ranking member of the minority.

Mr. PENFOLD. Thank you.

Mr. ASPINALL. Is that all of your——

Mr. PENFOLD. That is all, sir.

Mr. ASPINALL. Approximately 3½ minutes for every member of the committee. The Chair recognizes the gentleman from Nevada.

Mr. BARING. No questions, Mr. Chairman.

Mr. ASPINALL. That makes it 4 minutes. The Chair recognizes the gentleman from California, Mr. Hosmer.

Mr. HOSMER. Mr. Penfold, isn't the Izaak Walton League really aiming not so much at these 13 small miles on the river in Grand Canyon National Park but toward just setting up a solid defense on all national park areas in its opposition here?

Mr. PENFOLD. I don't think it could be stated quite that simply, Mr. Hosmer. Certainly our concern is with the entire national park system of which, of course, the Grand Canyon is a part and a very important part.

Mr. HOSMER. I get the feeling, however, that the so-called invasion here is so meager and in such a remote area that reasonable conservationists really aren't worried about that but as if they want to set up a defense of the whole park system and using this as a vehicle to try to establish a principle or a fighting force or something.

Isn't there at least some of that?

Mr. PENFOLD. Well, Mr. Hosmer, I have heard the expression used that it would only be a peripheral invasion, and it is kind of cutting off a few of your toes. It is peripheral damage and if you wear shoes, nobody knows it.

No. We are dedicated to the protection of each national park unit as well as to the park system as a whole.

Mr. HOSMER. Really, your using the particular analogy you did brings up that you don't disfavor the central Arizona project. You just don't want the dam. You just want to cut out the body of the thing and leave nothing but the appendages.

Mr. PENFOLD. Well, I don't think that this is the case. Obviously from my statement we don't think that this is the case. The water can be brought into the Central Valley of Arizona without building either Bridge Canyon or Marble Canyon dam.

Mr. HOSMER. Let's assume that there is an alternative. We can get a bucket brigade down there or coal fired plants. That central Arizona project is not the only thing the bill envisions. It envisions some rather substantial importations of surplus water into the basin to take care of a very desperate need and that is going to take power, going to take money, that these dams are calculated to provide.

If your objection goes to this necessity, it must be satisfied as well.

Mr. PENFOLD. Well, I think that the hope for import of water from other regions is going to require something else, let's say a new interstate compact of some sort, which is not provided in the legislation and I haven't heard it proposed yet.

Mr. HOSMER. But title II of the legislation does provide for studies on importation, not just academic studies but studies looking forward to the actual construction of works to do this and encompassing such agreements as may be necessary, but this plan is a broad one for the seven-State area to lift itself up out of the desert, it is bogged into and restoring its lifeblood.

Mr. ASPINALL. The time of the gentleman has expired. The gentleman from Arizona.

Mr. UDALL. Mr. Penfold, I join with the chairman in his comments about your contributions to the national welfare and I applaud you for what you have done and I regret that I am in sharp disagreement with you.

On page 5 of your statement you say if this water were wholly necessary to economic and social survival, and so on, but this is not the case and such a claim cannot be conscientiously made. I do make such a claim and I think I am conscientious about it.

It seems to me that you have to accept one of three things. Either Arizona and the Southwest are going to be severely damaged and our economy is going to be threatened and dried up, or secondly, you have to put the Government in the business of constructing thermal plants which all the various witnesses have suggested here and which I don't think is going to come about, or third, you have to accept water in 13 miles of the Grand Canyon National Park along the boundary, about 90 feet deep which, as I said yesterday, in this room would be about 3 inches relatively. As between those three alternatives, I can't see how reasonable people can say that any but the alternative of building the dams and giving Arizona and the Southwest the water is reasonable.

Mr. PENFOLD. Mr. Udall, I would say first of all that my statement does not say what you referred to. It is speaking of the dams and the dams are not going to put water in the central Arizona project.

Mr. UDALL. The dams are going to give us the money to put the water there.

Mr. PENFOLD. That is right.

Mr. UDALL. And we can't go out in the street with a tin cup and get the money to put the water into Arizona. We have to have money to do it.

Mr. PENFOLD. Well, Mr. Udall, the Federal Government, at least in TVA, has built thermal plants and I gather that a very considerable portion of the power in the TVA now is thermal power.

Mr. UDALL. Yes, and there isn't a single dam in the Bureau of Reclamation today that is operated by anything but water and it will be over the dead bodies of several of my colleagues in this committee that you ever put the Bureau of Reclamation in the steamplant business.

We are told atomic energy is coming any minute now. Or wait another 30 years until we get atomic energy and then you will have your water in Arizona. One of the witnesses yesterday, an atomic physicist, when asked to pick a time, said 1990.

Mr. PENFOLD. Well, I certainly would not pit myself against an atomic physicist. I sure wouldn't.

Mr. UDALL. Well, I have used up more than my time. I recognize your sincerity and I hope you respect mine.

Thank you, Mr. Chairman.

Mr. PENFOLD. Well, of course I do.

Mr. ASPINALL. You still have half a minute.

The gentleman from Utah.

Mr. BURTON of Utah.. I have no questions, Mr. Chairman.

Mr. ASPINALL. The gentleman from Texas.

Mr. WHITE of Texas. I yield my time to the chairman.

Mr. ASPINALL. The chairman yields it back to the gentleman from Arizona, if he has some further questions.

Mr. UDALL. Well, if I thought I could convert Mr. Penfold to our cause in 2 minutes I would make an attempt, but I don't think I can, Mr. Chairman.

Mr. ASPINALL. That isn't the purpose of this hearing, of course. The purpose of a hearing before Congress is to take testimony and then we do our own analyzing of that. We are not going to convert Joe Penfold. He is going to love you just the same whether you do or not.

The gentleman from Oregon.

Mr. WYATT. I have no questions to Mr. Penfold.

Mr. ASPINALL. The gentleman from Idaho.

Mr. HANSEN. No questions, Mr. Chairman.

Mr. ASPINALL. I would like to ask a couple of questions. How many members are there in the Izaak Walton League of the United States?

Mr. PENFOLD. Approximately 50,000, 51,000, something of that sort.

Mr. ASPINALL. Do you have that membership broken down by States?

Mr. PENFOLD. Yes, we do, except in so-called member at large. Most of our membership is in local chapters, Mr. Chairman, we do have membership at large which is somewhere in the neighborhood of 1,500 and I don't have a breakdown.

As far as I know, there is not a breakdown except where a magazine is published and under the second-class mail privileges, they have to go out by States.

Mr. ASPINALL. I am addressing a letter to the organizations for which representatives have testified here before this committee asking for the number of their membership and the breakdown by States so that we do get information or the matter of how large these national organizations are in their scope.

The letter will come to you later on.

Mr. PENFOLD. Fine. We will be happy to furnish the information.

Mr. ASPINALL. Unless there is objection, the information along with that received from other organizations will be included at this point in the record.

(The information is summarized in the following table:)

Memberships of National Conservation Organizations by States

	The Izaak Walton League of America [1]	Sierra Club (by regions) [2]	National Parks Association [3]	The Wilderness Society [4]	The Conservation Law Society of America [5]	Federation of Western Outdoor Clubs [6]	National Audubon Society [7]
Alabama	115	Atlantic, 1,670 (includes Alabama, Connecticut, Delaware, Florida, Georgia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, South Carolina, Vermont, Virginia, and West Virginia).	120	100			210
Alaska	189		48	200			64
Arizona	11	Riverside, 675 (includes Arizona and southeastern California).	343	300			366
Arkansas	40		75	100			236
California	1,634	California, 23,915 (excluding eastern area)	5,923	5,800	142	[8] 36,600	6,425
Colorado	1,450	Rocky Mountain, 256 (includes Colorado, Kansas, Nebraska, North Dakota, Oklahoma, South Dakota, and Wyoming).	626	600	6	1,800	326
Connecticut	21		835	1,000	8		2,459
Delaware	2		443	100	1		304
District of Columbia	79		511	600	29		214
Florida	461		670	500	2		2,491
Georgia	182		319	200			348
Hawaii	1	No chapter	56	100		150	36
Idaho	21	Pacific Northwest, 702 (includes Idaho, Montana, Oregon, and Washington).	82	100	2	75	62
Illinois	3,572	Great Lakes, 757 (includes Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, and Ohio).	2,435	1,500	5		2,172
Indiana	5,546		613	400	3		841
Iowa	9,233		378	300	1		419
Kansas	47		334	300			497
Kentucky	8		126	100			268
Louisiana	5	No chapter	180	200			262
Maine	3		116	200	1		1,502
Maryland	2,408		595	500	5		723
Massachusetts	472		1,372	1,300	2		412
Michigan	386		1,199	1,000	2		1,538
Minnesota	2,752		530	600	3		1,016
Mississippi	1	No chapter	130	100			108
Missouri	76		655	500	1		803
Montana	11		195	400	3	300	126
Nebraska	2,128		201	100			557
Nevada	2	Toiyabe, 368 (includes Nevada, Utah and northeastern California).	63	100	2		74
New Hampshire	7		125	200			285
New Jersey	64		1,364	1,200			2,378

Footnotes at end of table.

Memberships of National Conservation Organizations by States—Continued

	The Izaak Walton League of America [1]	Sierra Club (by regions) [2]	National Parks Association [3]	The Wilderness Society [4]	The Conservation Law Society of America [5]	Federation of Western Outdoor Clubs [6]	National Audubon Society [7]
New Mexico	87	Rio Grande, 224 (includes New Mexico and Texas)	213	200	1		115
New York	954		2,889	3,300	21		7,173
North Carolina	22		279	200			291
North Dakota	214		67	100			73
Ohio	2,993		1,527	1,100			1,935
Oklahoma	555		301	100	1		232
Oregon	1,667		490	400	6	2,450	342
Pennsylvania	1,644		1,656	1,400	4		2,633
Rhode Island	5		88	100	1		173
South Carolina	1		102	100			269
South Dakota	2,187		159	100			58
Tennessee	22	No chapter	261	300	3		271
Texas	19		319	500	1		1,259
Utah	4		101	100	1	250	91
Vermont	7		81	100			586
Virginia	5,892		436	500	4		305
Washington	88		798	800	3	6,040	580
West Virginia	1,424		105	100			173
Wisconsin	1,340	John Muir, 169	534	600			1,296
Wyoming	305		64	100			64
Others, not by States		252		800			
Outside United States	4		285	300			658
Total	50,363	30,109	31,327	29,900	264	46,420	46,069

[1] Information supplied by J. W. Penfold, conservation director, the Izaak Walton League of America, Sept. 13, 1965, included all members of local chapters and all members at large within their respective States for the 1964 calendar year.

[2] Information supplied by Hugh Nash, editor, Sierra Club bulletin, Sept. 16, 1965; represents membership as of May 31, 1965.

[3] Information supplied by Mrs. Katharine W. Bryan, business manager, National Park Association, Sept. 20, 1965, for the 1964 calendar year.

[4] Information supplied by Stewart M. Brandborg, executive director, the Wilderness Society, Sept. 24, 1965, represents membership approximations (to the nearest 100) for the 1964 calendar year.

[5] Information supplied by Robert W. Jasperson, general counsel and executive secretary, the Conservation Law Society of America, Sept. 29, 1965, for the 1964 calendar year.

[6] Information supplied by Mrs. James S. Hughes, secretary, Federation of Western Outdoor Clubs, Oct. 8, 1965; represents current membership figures.

[7] Information supplied by Charles H. Callison, assistant to the president, National Audubon Society, Oct. 22, 1965, represents individual memberships as of Sept. 30, 1965, exclusive of affiliated organizations whose memberships are not included.

[8] Includes the entire membership of the Sierra Club.

Mr. ASPINALL. What was the position that the Izaak Walton League took on the matter of Echo Park?

Mr. PENFOLD. Well, as I recall, that was a long time ago. We opposed the dams in Dinosaur National Monument.

Mr. ASPINALL. What was the position you took upon the matter of Curecanti, Crystal, and the Morrow Point?

Mr. PENFOLD. We did not oppose them.

Mr. ASPINALL. But you did offer some suggestions as far as the maintenance and protection of fish and wildlife; did you not?

Mr. PENFOLD. Yes, we did.

Mr. ASPINALL. What was the position that you took on the matter of Rainbow Bridge in Glen Canyon area.

Mr. PENFOLD. Well, we certainly—we certainly supported the language in the upper Colorado storage project that stated that Rainbow Bridge was going to be protected.

Mr. ASPINALL. Have you been to the Rainbow Bridge area since the reservoir was partly filled?

Mr. PENFOLD. I am sorry to say, Mr. Chairman, that I wasn't even there before.

Mr. ASPINALL. Then I can't ask you the next question.

May I say that your presentation this morning was in keeping with your past cooperation, and your statement of the adoption of the resolution in Cody in the June meeting, of course, was in keeping with the usual consideration that you give to these matters.

Does anyone else have a question of Mr. Penfold?

Thank you very much.

Mr. PENFOLD. Thank you, sir.

(The statement of Mr. Penfold follows:)

STATEMENT OF J. W. PENFOLD OF THE IZAAK WALTON LEAGUE OF AMERICA

Mr. Chairman, I am J. W. Penfold, conservation director of the Izaak Walton League of America, a national organization of citizens concerned with natural resources conservation. We appreciate the privilege of appearing before this committee to present our views.

The league at its 43d annual convention in Cody, Wyo., last June, adopted unanimously the following resolution:

"DAMS ON LOWER COLORADO RIVER

"Whereas the Grand Canyon National Park and Grand Canyon National Monument comprise one of the world's most remarkable scenic climaxes, are keystones in the national park system, and are recognized throughout the world as symbols of America's far-visioned national park policy; and

"Whereas proposals are now before Congress to construct two dams on the Colorado River—one at Marble Canyon above the park which would change the river regimen through the Grand Canyon, and one at Bridge Canyon which would create a reservoir flooding through the monument and into the park, inundating or damaging for all time vital elements and phenomena of this unique and inspiring region; and

"Whereas such invasion would be clearly adverse to the purposes of the monument and park, would serve no direct reclamation purpose, and would flout President Theodore Roosevelt's admonition to the American people: 'I want to ask you to do one thing in connection with the Grand Canyon in your own interests and in the interest 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'; and

"Whereas the policies of the Izaak Walton League of America and the principles of the national park system hold that the purposes of national parks and monuments are for conserving areas of unique scenic, ecologic, geologic, historic, and related natural values unimpaired for the benefit of all the people and such in-

vasion, if permitted, would carry an awesome threat to the very foundations of the national park system; and

"Whereas the proposed Bridge and Marble Canyon Dams would in no way contribute to the water needs of the Southwest, but are conceived solely for the purpose of producing hydroelectric power to finance a water supply project elsewhere in the region; and

"Whereas coal, shale oil, and atomic energy offer alternative sources of electric power for the area: Now, therefore, be it

"*Resolved by the Izaak Walton League of America in convention assembled this 19th day of June 1965, at Cody, Wyo.*, That it opposes construction of dams at Bridge Canyon and Marble Canyon on the Lower Colorado River, or any other regimentation of the Colorado River between Glen Canyon Dam and Hoover Dam which would have similar impact upon the national park and the national monument."

For the information of the committee it might be useful to outline the procedures followed by the league in adopting such policy positions.

The league's resolution committee is appointed a year in advance of conventions and consists of the chairmen of the various national resource committee—public lands, fisheries, wildlife, agricultural land and resources, pollution, river basins, conservation education, etc.

Any member in good standing is eligible to submit a resolution for consideration. Most resolutions, however, originate in the resource committees or are submitted by State divisions of the league following adoption through similar procedures at that level.

All resolutions are studied by the resolutions committee, edited, and combined when several are submitted with similar objectives, as was the case in this instance. They are then duplicated and distributed to all league State divisions and local chapters for study and to permit local unit to send delegates to the annual convention who have been instructed on the position to take with respect to each proposed resolution.

The resolutions committee has an almost continuous open meeting throughout the convention to hear comments, suggestions, arguments pro and con from individual delegates, or perhaps, whole delegations. During this period the resolutions are worked up into the form in which they are presented to the entire convention for action at its final session. The resolutions are subject to amendment from the floor, and ultimately are rejected or adopted by the convention as a whole.

It might be useful to point out that the league has tried diligently to approach the Lower Colorado River Basin project objectively. For example, the league every year holds an informal meeting of the many members in attendance at the annual North American Wildlife and Conservation Conference, which is the largest gathering of professional and lay persons from the broad spectrum of wildlife, fisheries, recreation, and conservation interests. We arranged the league get-together at the 1964 conference at Las Vegas as an open meeting to which all were invited. We had a key official of the Department of Interior as the featured speaker to discuss fully the lower basin proposal. I believe this may have been the first public opportunity for the January 1964 proposal to be so discussed. We had an overflow audience, and the discussions were lively.

At the same conference we were also instrumental in providing the opportunity for a large number of people from all parts of the country to fly over Hoover Dam, Lake Mead, the Bridge Canyon Dam site, and the areas of Grand Canyon National Park and Monument which would be affected by project proposals. In this, of course, the Bureau of Reclamation and the Arizona Game and Fish Commision were most helpful and cooperative—they provided the planes and the guides.

From our discussions at that time and subsequently with the Arizona fisheries people we were much impressed with the plans for a series of small fishing lakes as part of the project. Their value would be tremendous. We are disturbed that the Bureau of the Budget asks that they be eliminated from the plan.

During the year 1964 and first half of 1965 much material concerning the Lower Colorado River Basin, its water shortage crisis and proposals for its alleviation were distributed to league leadership or through the league magazine to the entire membership.

The purpose of this verbiage, Mr. Chairman, hopefully, is to satisfy the committee that the Izaak Walton League has not adopted its position of opposition to the Bridge Canyon and Marble Canyon Dams frivolously or without consideration of the stakes involved, nor was it adopted merely out of emotion. It would

be ridiculous, of course, to say that emotion was not involved. If the beauty and grandeur of our great national park system when threatened did not stimulate a great surge of emotion for its protection, then surely that system has failed of its purpose, or we are a most stolid and insensitive people.

Policy of the league for preservation of the national park principle is not new. It has been a basic purpose of the league from the beginning. When the league studies and evaluates proposals such as the one now before you, it must at the same time and as a matter of course reexamine and reevaluate once again its own traditional policies. This the league convention did at Cody, and without contrary vote determined that we shall stand firm in our position. I am sure that among conservation societies the Izaak Walton League is not alone in this manner of approach to policy and position.

It will be noted, Mr. Chairman, that the league resolution addresses itself to one portion of the proposed project, opposing authorization of the Bridge Canyon and Marble Canyon Dams. It expresses no opposition to the central Arizona project nor to providing Arizona with opportunity to make beneficial use of Colorado River flow to which it is entitled under law; there is a powerful principle of equity involved in this and we doubt that anyone would wish to see that principle breached.

In reaching the position of opposing the two main stem dams, we had to consider several highly important questions, and to satisfy ourselves that we had correct answers to them. Among them were these:

1. Would Bridge Canyon and Marble Canyon Dams and Reservoirs damage the Grand Canyon? We found that they would.

2. Would the dams and reservoirs impinge on the Grand Canyon National Park and Grand Canyon National Monument? They would.

3. Would the impact on the national park and monument be consistent with the primary purposes of these two national park system units? Clearly, it would not be.

4. Are the dams necessary to the central Arizona project? Clearly they are not.

The facts and the logic providing these answers have been amply detailed by other witnesses, so we shall not burden the record with their repetition. Suffice it to say that in our judgment the arguments against the two dams and for the protection of the Grand Canyon and its national park system units are convincing.

If the two main stem dams were to reclaim any land or to bring water to water-short areas, and if this water were wholly necessary to economic and social survival of an area, our position would be modified on that premise. But this is not the case, and such a claim cannot conscientiously be made. On the contrary, the two dams would be solely for the generation of power, to pump water from an existing reservoir on the main stem into Arizona's Central Valley, and for sale to pay the bulk of the costs of the lower basin project. Alternate sources of power are available at equivalent or even lesser costs in the long run—from coal, oil, gas, or nuclear energy.

The dams are not needed for flood control, or for river regulation. Matter of fact, it looks as if the main stem of the Colorado may already be overdeveloped—unless very sizable imports can be made from other regions more abundantly supplied with water. Moreover, the dams would result in an average loss through evaporation of 100,000 acre-feet or thereabouts. Perhaps 100,000 acre-feet is not very much, but it is substantially more than the export from upper tributaries of the Colorado into the Arkansas drainage which was a prime consideration in authorizing the $150 million Fryingpan-Arkansas project a few years ago.

It seems to us, Mr. Chairman, that there are a considerable number of basic principles involved in the proposal now before the committee, among them:

The principle of the Colorado River compact and its division of Colorado River flow between the upper and lower basins; the principles stemming from the Supreme Court decision upon which Arizona bases its hopes for the central Arizona project; the principle of prior rights which the legislation recognizes in providing that in water-short years the holders of perfected rights shall receive their entitlements first with shortages to be borne by the central Arizona project; the principle of the Mexican Water Treaty commitment, that this commitment is a national rather than a sectional obligation thus placing the burden on the general taxpayers of the country to pay the costs involved in fulfilling the commitment. The caution expressed as to sources of water which might be imported

to the Colorado Basin relate as well to the principle that the water would have to be surplus to the projected needs of the exporting region.

Such principles as these are not to be breached, Mr. Chairman, or the whole structure of western water law, precedent and custom could well collapse and chaos result. Surely, no program of the dimensions of the Southwest project will be authorized by the Congress except as it can be developed within overriding principles.

Very simply, Mr. Chairman, we believe the national park principle is of the same order. If that principle is breached, not because of dire necessity but for expediency and convience, we can hardly anticipate that the national system will long endure.

We respectfully urge the committee to accept the national park principle along with the other principles of law and equity in determining how this project can justly and properly go forward, and to exclude from it the objectionable dams in the Grand Canyon.

Mr. ASPINALL. Now, Mr. Jasperson, is your father in the room yet?

Mr. JASPERSON. Yes, sir.

Mr. ASPINALL. Fine. Then you are recognized for 10 minutes.

STATEMENT OF ROBERT W. JASPERSON, EXECUTIVE SECRETARY, THE CONSERVATION LAW SOCIETY OF AMERICA

Mr. JASPERSON. I thank the committee for its courtesy.

Mr. ASPINALL. Five minutes for questions.

Mr. JASPERSON. Mr. Chairman, I am Robert W. Jasperson, lawyer, admitted to practice in Montana and California, and I am the general counsel of the Conservation Law Society of America which has its headquarters in San Francisco.

If I may, I would like to briefly summarize my statement and ask that my statement be submitted as if read for the record.

Mr. ASPINALL. Without objection the statement of Mr. Jasperson will be received, printed in the record as if read and the article which is attached thereto, "Grand Canyon and the Law" by Mr. Jasperson, will be put in the file.

Hearing no objection, so ordered.

(The document referred to will be found in the files of the subcommittee.)

Mr. ASPINALL. Now, Mr. Jasperson, you have 5 minutes to summarize.

Mr. JASPERSON. As I mentioned, I just briefly will summarize my points in my statement and then expand it if I may, since these points have already been covered concerning the clause in the Grand Canyon National Park Act saying that the dam should be consistent with the primary purposes of the park, and other witnesses have pointed out that these dams would not be consistent with these purposes, and furthermore, that the reclamation project be necessary for that purpose and as other witnesses have pointed out at great length, the necessity for this, for these projects, has not been shown.

One point that has not been covered, and I refer to it in my article which is attached to the statement, is the fact that the national monument, Grand Canyon National Monument, would be flooded for a distance of approximately 40 miles along the river and the proclamation of President Hoover setting aside the Grand Canyon National Monument makes no reference to the Bridge Canyon Reservoir or other reclamation projects.

I realize there is a letter from Mr. Allbright but that was following the proclamation and could not override the proclamation of the President of the United States.

Furthermore, as I pointed out in my statement, there has been no invasion of the national park system by a major reservoir. Of course, there was the Hetch Hetchy Reservoir authorized by the Raker Act in 1913 but that was prior to the enunciation by Congress of the principles by which the national park system should be governed and that was in the Grand Canyon National Park—excuse me—the National Park Act of 1916.

It is also true that Glacier National Park in Montana has a reservoir on its eastern side. However, the enabling act for the Glacier National Park provided that the Bureau of Reclamation could enter for reservoir purposes where necessary.

However, in that legislation there was no provision wherever consistent with the primary purposes of the park.

The same thing is true of Rocky Mountain National Park. The Bureau of Reclamation was permitted to enter but no qualification such as is found in the Grand Canyon National Park legislation.

Therefore, we feel that there has been no violation of this governing principle laid down by Congress for the conduct of the national park system and we feel that Congress should continue with its longstanding purpose of granting adequate protection to the national parks.

In conclusion, I would like to point out that the Conservation Law Society has as members approximately 150 lawyers around the United States who would, if there was some way it could be done, if the committee could listen or consider other legislation or other points of view for enabling water to be brought to the central Arizona plateau, that we would be quite happy to work on such legislation in any manner that we could so that the park principle could be protected and such other forms of power generation as have been mentioned such as nuclear fusion and fission, and incidentally, nuclear fusion is now a reality, not in the future, as there are many nuclear fission plants around the country.

I think the witness was referring yesterday to nuclear fusion not being feasible until 1990, but there are possibilities for legislation in which private power could be utilized perhaps by such measures as tax relief or low interest rate loans from the Government or perhaps completely public power could be used in conjunction by working with the desalinization program of the Federal Government or by direct construction by the Federal Government of nuclear or steam powerplants.

Mr. ASPINALL. Your 5 minutes have expired.

Mr. JASPERSON. Thank you, Mr. Chairman.

Mr. ASPINALL. Thank you for a very clean-cut statement.

Mr. Udall.

Mr. UDALL. Sir, I respect your legal expertise but we in Arizona get a little bitter about your legal interpretation of this 1919 act. Senator Hayden at that time was most anxious that Arizona's rights be protected and we thought he had made a record that would even have permitted a dam in the park, not just the Bridge Canyon Dam in this bill 57 miles below Grand Canyon National Park but a dam in the park itself which we are not asking for today. But we are now told

by lawyers who exercise brilliant hindsight and brilliant analysis of this congressional language 40 years later that this is a hollow and meaningless proviso which gave Arizona nothing. We feel we have been misled.

You say the purpose of the park is to preserve the scenery but anything that changes one rock or one foot of the river bed changes the scenery and therefore was not contemplated by the 1919 act.

Mr. ASPINALL. The time of the gentlemen has expired.

Mr. UDALL. I simply say to you I don't agree with you.

Mr. ASPINALL. The gentleman from California.

Mr. HOSMER. I notice your society is located in the Mills Building. Are you connected with the Bar Association of the State of California, in any way, shape or form?

Mr. JASPERSON. No.

Mr. HOSMER. 150 lawyers—of all the lawyers in the country, that isn't a very large number indicating interest in conservation, is it?

Mr. JASPERSON. We just were organized less than 2 years ago and we are expanding and hope to have a larger membership eventually.

Mr. HOSMER. Why do you ignore the provision in the act establishing the Grand Canyon providing for reclamation use?

Mr. JASPERSON. Well, there is this additional phrase, "wherever consistent with the primary purposes of the park." In addition, when then Congressman Hayden was discussing this on the floor of the House, he was asked about this provision to permit the Bureau of Reclamation to enter and he replied, yes, that these dams could be built if it can be done without disturbing the primary purposes of the park. He said that in the Congressional Record.

Mr. HOSMER. And you feel that the 13 miles does that?

Mr. JASPERSON. Not only the 13 miles but also the 40 miles in the monument.

Mr. HOSMER. What is the rationale of your suggestion of desalting plants? We will have to desalt ocean water. How could that be more effective than taking water that is already fresh and transporting it into this Arizona basin?

Mr. JASPERSON. But they also generate power, as I understand the desalinization——

Mr. HOSMER. They also consume the resources of uranium and AEC tells us in a study report to the President that we simply do not have enough uranium resources to last beyond 1990.

Mr. ASPINALL. The time of the gentleman has expired. The gentleman from California.

Mr. Burton.

Mr. BURTON of California. I would like to welcome you here, Mr. Jasperson. I represent the area where the Mills Building is located. I enjoyed your statement.

Mr. JASPERSON. Thank you, sir.

Mr. ASPINALL. The gentleman from Kansas, Mr. Skubitz.

Mr. SKUBITZ. I have no questions.

Mr. ASPINALL. The gentleman from Texas.

Mr. WHITE of Texas. I have no questions.

Mr. ASPINALL. The genleman from Utah.

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

You answered part of my question or one question that I had and that was when was this Conservation Law Society formed. It was formed less than 2 years ago?

Was it formed for the primary purpose of combating this project?

Mr. JASPERSON. No, sir. We have perhaps six or eight conservation groups that are my clients, you might say, and this is just one of the projects.

We were formed in November of 1963 and I was first asked to comment on this about April or May of 1964.

Mr. BURTON of Utah. I see.

Mr. JASPERSON. Save the Redwoods League of California, is one of our prime clients.

Mr. BURTON of Utah. In reading over your memorandum that was prepared for this book, "Time and the River Flowing," you make a great point of this language "whenever consistent with the primary purposes of said park." I suppose that this is a matter of interpretation not so much a matter of legalistic talk, but I can't see why putting a little stretch of river or lake in a park is not "consistent with the primary purposes" because in my view, a park is there for enjoyment of the people and so they can have access to the scenery.

We build roads into national parks, establish campsites. We have to allow gas stations and lodges. These are "consistent with the primary purposes of a park."

Mr. JASPERSON. I agree.

Mr. BURTON of Utah. Is this going to make the Grand Canyon Park, if authorized, even more accessible?

Mr. JASPERSON. But in this case the Colorado River is one of the prime natural objectives of the park and one of the purposes of Park Service is to allow people to enjoy in their natural state the objectives therein.

Mr. ASPINALL. The gentleman from Oregon.

Mr. WYATT. Mr. Jasperson, I would like to first inquire, is your membership limited to lawyers?

Mr. JASPERSON. No, sir. Any interested person, interested in the field of conservation, could be a member.

Mr. WYATT. You mentioned that you have 150 lawyers who are members. Is this your full membership or what is your full membership?

Mr. JASPERSON. About 300, sir.

Mr. WYATT. About 300, and are you a paid executive secretary of the organization?

Mr. JASPERSON. Yes, sir; I am.

Mr. WYATT. I would like to ask you this, for your reaction to it, Mr. Jasperson. On page 3, at the bottom of your statement, you say that the fact that the Federal Power Act exempts national parks and monuments from licensing authority for such dams granted to the Federal Power Commission, you hold that statement out for evidence of the fact that Congress has looked with disfavor upon power dams within the national parks. Now, couldn't you take the fact that the Federal Power Act does exempt national parks from the licensing authority, couldn't you argue the other way and say that by implication, Congress views with favor creating dams in national parks.

I mean just from this one fact?

Mr. JASPERSON. I don't believe so, sir, in that we are concerned with dams for power generation here in the case of the Grand Canyon. They would be used purely for that purpose. That is why I am emphasizing that. That is the sense of Congress.

Mr. ASPINALL. The gentleman from Idaho.

Mr. HANSEN. No questions.

Mr. ASPINALL. Thank you very much. Thank you, Mr. Jasperson.

Mr. JASPERSON. Thank you sir.

Mr. ASPINALL. If I were your father I would be proud of you.

Mr. JASPERSON. Thank you, sir.

(The statement of Mr. Jasperson follows:)

STATEMENT ON BEHALF OF THE CONSERVATION LAW SOCIETY OF AMERICA, BY ROBERT W. JASPERSON, GENERAL COUNSEL

Mr. Chairman, the Conservation Law Society of America is a nonprofit organization created to strengthen, through the application of law, the defense of the public interest in public lands.

Attached to this statement is a reprint of a legal memorandum originally prepared for inclusion in the book "Time and the River Flowing: Grand Canyon," by Francois Leydet. The article considers the intent of Congress in providing protection for the national park system, with particular reference to its intent concerning reclamation projects that would affect the Grand Canyon National Park. My conclusions may be summarized as follows:

The Grand Canyon National Park Act of 1919 provided for the administration and protection of the park subject to the provisions of the act establishing the National Park Service 3 years before. That act defines the fundamental purpose of the national parks and monuments to be to conserve the scenery and the natural and historic objects and the wildlife therein, and to provide for the enjoyment of the same in such manner and by such means as will leave them National Park Service 3 years before. That act defines the fundamental purpose as applied to Grand Canyon National Park would be undermined by the pending legislation to authorize construction of the Bridge Canyon and Marble Canyon Dams.

Section 7 of the Grand Canyon Act, while making no reference to any specific dam or reservoir site, does provide: "That whenever consistent with the primary purposes of said park, the Secretary of the Interior is authorized to permit the utilization of areas therein which may be necessary for the development and maintenance of a Government reclamation project." But the dams now proposed cannot be considered consistent with the primary purposes of the park. The Bridge Canyon Reservoir, flooding the lower reaches of the Grand Canyon within the park and monument, would destroy the living river as a natural object entitled to protection, and within the park itself would replace with debris and fluctuating mudflats the scenic values of the river flowing between canyon walls. Wildlife habitat would be destroyed by this reservoir and would be severely impaired upstream within the park by Marble Canyon Dam. Power drawdowns at Marble Canyon would cause an erratic streamflow inimical to wildlife and potentially dangerous to users of the river for recreational purposes in its natural state.

The qualifying phrase in section 7 of the act, "whenever consistent with the primary purposes of said park," was recommended by the then Secretary of the Interior to bring the section in harmony with other provisions of the bill. The committee reports of both Houses approved of this language and it was incorporated in the legislation. The enabling legislation for certain of the other national parks, by contrast, provides approval for utilization of damsites necessary for reclamation projects, but without restriction by any qualifying language such as the above.

Furthermore, the Grand Canyon Act speaks of utilization of areas that may be necessary for the development and maintenance of reclamation projects. The basic function of a reclamation project is to provide water for irrigation. The proposed reservoirs will not only fail to increase the amount of water available from the Colorado River for irrigation purposes, but will actually cause a decrease in the quantity and quality available because of the effects of evaporation and seepage. Thus, the reservoirs do not conserve water for reclamation purposes.

While it is asserted that the hydroelectric power will go into a basin account to reduce the cost to farmers of water lifted to the central Arizona Plateau, it does not follow that the dams are actually necessary for the generation of this lifting power. As other testimony has shown, thermal plants can provide the desired generating capacity sooner and more economically. That Congress has on other occasions looked with disfavor upon power dams within national parks, is emphasized by the fact that the Federal Power Act exempts national parks and monuments from the licensing authority for such dams granted to the Federal Power Commission.

In summary, these proposed dams are not necessarily reclamation projects consistent with the primary purposes of Grand Canyon National Park. Furthermore, no invasion of the national park system by a major reservoir has occurred under legislative authority since Congress enunciated the principles governing that system. If Congress wishes to be consistent in its longstanding purpose to provide adequate protection for the national parks and monuments, the dams proposed for construction within the Grand Canyon should not be authorized.

Mr. ASPINALL. When we started the hearing, Mr. Svendsen for some reason or other wasn't present in the room. I understand he is here now. We shall listen to you. Our procedure—usually when we set a time and we call for a witness, we expect him to be present, but if you had some reason for not being here——

Mr. SVENDSEN. My apologies, sir.

STATEMENT OF STEPHEN G. SVENDSEN, BELMONT, CALIF.

Mr. Chairman, members of the committee, my statement is quite short. I would like to read it.

My name is Stephen Svendsen, native of Pennsylvania, resident of San Mateo County, Calif. I am employed as a deputy sheriff. I have no property holdings or business interest affected by the Colorado River. I am appearing as an individual interested in the wise development of our natural resources.

I am grateful to Congressman Johnson, who, with the support of other members of this committee, made possible the Trinity, Shasta, and Whiskeytown Reservoirs. I and my friends have spent many pleasant hours at both Shasta and Trinity Lakes.

Fishing the lower Colorado River has been one of my very special enjoyments. I am familiar with the changes resulting from Hoover, Davis, and Parker Dams. Now there are miles of clear water that provide some of the finest aquatic recreation in the Southwest. I have no firsthand knowledge of the river as it was before these dams, but I have discussed the matter with those who have this knowledge and each has expressed their approval of the changes.

Well, the flood and the mud are gone, and Bureau proposes two more dams to complete the developments. I am not an engineer and will not parrot engineering conclusions; but from a layman's point of view it appears that hydroelectric power is not obsolete as the critics of Marble and Bridge Canyon Dams have proclaimed. My personal investigation has revealed a number of private utilities still seeking to develop hydropower sites. I find it difficult to believe that they are willing to invest millions of dollars in a method of production soon to be discarded.

In case you are wondering what prompted me to examine this dispute in detail, it all started when I read an article in a Sierra Club bulletin. I became suspicious when I read statements like the one I quote:

These reservoirs would be inaccessible to boaters because there would be no roads to serve them.

How do they build such dams without roads? There are no Bureau of Reclamation reservoirs that I know of that deny the public access. They also printed another article which I thought gave dams an undeserved appellation. It referred to them as "concrete tombstones." The State of Arizona has depicted in the very middle of its State seal just such a likeness. Concrete dams are hardly tombstones for the Pacific Northwest. A travel brochure that boasts 17 national parks and monuments in Arizona quotes:

> You must cross a solid expanse of natural wonders interspersed with achievements of man.

The human achievements referred to were concrete dams and they are indeed worthwhile and greatly to be acclaimed human achievements. I have been impressed, as many other sightseers, to take the tour at Hoover Dam.

Why do lower basin States propound two more dams if they will evaporate the amount of valuable water their opponents contend? Could it be such evaporation has been magnified beyond fact? And isn't it true that the water that now passes through to Lake Mead evaporates even to a greater degree since it is not confined to an inner gorge, but flows to an expansive lake?

I expect most of you have received many letters from constituents who have been stimulated by the preservationists. I have discussed the issue with several hundred people. Many of them were uninformed. They thought these dams would fill Grand Canyon National Park to the brim. I also learned that the zeal of many preservationists had far outrun their knowledge.

It has been suggested that nuclear power be used to run electrical generators—oh, how I recall the great roar when the Pacific Gas & Electric Co. started to build one just north of San Francisco. Danger from earthquakes was not the sole reason against it; in fact, I believe the major reason was that the cooling system would change the whole ecology of the surrounding seashore. The Sierra Club who was leading this chorus now has the temerity to suggest such experiments be conducted along the Colorado River.

A problem exists with lobbyists who represent extremist groups. These lobbyists have little consideration for the mass of people in the middle. I liken these groups to, as the saying goes—are like scissors keen, cut not themselves, but what's between.

Now as to the effect of these dams on Grand Canyon National Park. I have hiked miles over several of its many trails. It was magnificent. With 13 miles of slack water the impact of this reservoir would be minimal. I think it would still be magnificent.

A landslide could fill the inner gorge to the same extent as Bridge Canyon Dam. This is not impossible for eternity has never been kind to the productions of time. Would the opposition still lament the rising water or would it now be a natural wonder?

I am sure this committee has many able people to correctly interpret the law concerning the legality of constructing Bridge Canyon Dam.

This is a matter where I do not think the truth is shown as black or white but lies somewhere in between.

I just want to say in closing that as one of those who values and appreciates the multiple-purpose benefits of reclamation development, I view with alarm the attitude of some people who subordinate the national interest for a few.

Thank you, Mr. Chairman, for giving me this opportunity to express my views.

Mr. ASPINALL. Mr. Udall?

Mr. UDALL. Sir, I think your statement has more good sense and judgment in it than anything I have heard in the last 3 or 4 days and I congratulate you for coming here and presenting it. You said you read the Sierra Club Bulletin. You are not a member of that organization, are you?

Mr. SVENDSEN. Yes; I am.

Mr. UDALL. And for how long have you been a member?

Mr. SVENDSEN. Approximately 6 years, maybe 7.

Mr. UDALL. I thank you very much for a real contribution to these hearings.

Mr. ASPINALL. The gentleman from California?

Mr. HOSMER. Sheriff Svendsen, I don't know why you were late but I am sure glad you finally made it.

Thank you.

Mr. ASPINALL. The gentleman from California, Mr. Burton?

Mr. BURTON of California. No questions.

Mr. ASPINALL. The gentleman from Kansas, Mr. Skubitz?

Mr. SKUBITZ. No questions.

Mr. ASPINALL. The gentleman from Utah, Mr. Burton?

Mr. BURTON of Utah. Sheriff, I want to commend you on a fine statement. It is refreshing to hear the other point of view. Thanks for coming.

Mr. ASPINALL. The gentleman from Oregon?

Mr. WYATT. I have no questions.

Mr. ASPINALL. The gentleman from Idaho?

Mr. HANSEN. No questions; I do appreciate your statement.

Mr. ASPINALL. Thank you very much for a very clear statement.

The next witness and last witness will be our very good friend and coworker, Mr. S. M. Brandborg, executive director, the Wilderness Society.

While Mr. Brandborg is taking the stand, I will say I remember, as most of you do, his predecessor, Howard Zahniser, a lovable fellow and the most gracious and cooperative fighter that anybody ever had.

STATEMENT OF STEWART M. BRANDBORG, EXECUTIVE DIRECTOR, THE WILDERNESS SOCIETY

Mr. BRANDBORG. Thank you, Mr. Chairman.

I am Stewart M. Brandborg, executive director of the Wilderness Society, a national citizen organization of over 32,000 conservation-minded members with its headquarters at 729 15th Street, NW., in Washington, D.C. The Wilderness Society's long-time, broad purpose is to increase the knowledge and appreciation of wilderness, wherever found, and to see established enduring policies and programs for its protection and appropriate use.

I would ask permission, Mr. Chairman, that the text of the article, "Attack on Grand Canyon," by William Bradley, as published in the Wilderness Society's magazine, the Living Wilderness, the winter 1964–65 issue, be placed in the record following my testimony.

Mr. ASPINALL. Without objection. This will not be able to go into the record, Mr. Brandborg, it will have to be placed in the file.

(The document referred to will be found in the subcommittee files.)

Mr. ASPINALL. Are you going to read all of your statement?

Mr. BRANDBORG. I would, if I could have your permission. As I understood it yesterday, I was to have 30 minutes. I hope that I can be much more succinct and brief and not require that.

Mr. ASPINALL. I understand that that is possible. Go ahead.

Mr. BRANDBORG. I would also like, Mr. Chairman, to submit for the committee files the new Sierra Club volume, "Battle for Yosemite," by H. R. Jones. This provides an excellent backdrop in its treatment of the controversy over the Hetch Hetchy project in Yosemite National Park, a backdrop for the issues that are being faced here today.

Mr. ASPINALL. Without objection, it may be received.

(The documents referred to will be found in the subcommittee files.)

Mr. BRANDBORG. The society's interest in the bills before this committee to authorize the Lower Colorado River Basin project has centered on the consideration of the impact upon park and wilderness lands of the proposed Marble Gorge and Bridge Canyon projects. We are also concerned about the proposed Hooker project that would be authorized by this legislation, the reservoir of which would extend, as we understand it, into the Gila Wilderness Area of New Mexico. In our study of these proposals we have been keenly aware of the critical water needs of States in the Lower Colorado River Basin, and it is our hope that these may be met with alternative projects and programs that do not impinge upon the wilderness lands of either the national park system or the national wilderness preservation system.

Congress, in enacting the Wilderness Act, has recognized that the greater part of the wilderness which remains in our country today is found in national forest wilderness and primitive areas, the wildlife refuges and wildlife ranges, and the national park system. These are areas which have been set aside administratively or through action of Congress for preservation of certain wilderness and wildlife values and outstanding scenic, historic, and natural features.

Congress has established procedures in the Wilderness Act which permit designation of areas of wilderness in each of these Federal jurisdictions for addition to the National Wilderness Preservation System. It also has established a national policy for the protection of wilderness, in the words of the act, "for the American people of present and future generations" and—

> for the use and enjoyment of "wilderness area" in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character * * *

Within the Grand Canyon of the Colorado, and the boundaries of the Grand Canyon National Monument and Grand Canyon National Park, are extensive wilderness lands which are subject to review under the act's procedures for placement in the wilderness system upon the authorization of Congress. There seems to be little question that a major part of the vast wild land areas within these two units of the park system can qualify as wilderness under the Wilderness Act's definition and that they are worthy of such preservation in perpetuity as a part of the National Wilderness Preservation System.

Anyone who has seen the Grand Canyon, who has read about it, or who has even seen pictures of it, is aware of its inspiring and spec-

tacular features. Even in this period of technological advance and impressive feats in outer space, it continues to hold its own as one of the geological "wonders of the world," an awesome product of the natural forces that through a period of thousands of years have given it such impressive characteristics.

These forces have left it, until now, essentially unmarked and unimpaired by man and in keeping with the act's definition of wilderness "affected primarily by the forces of nature." There are few units of wild land in our Nation today which offer a richer variety of what the Wilderness Act describes in its definition of wilderness as features of "ecological, geological, * * * scientific, educational, scenic, or historical value."

In this connection, we would urge the committee to draw upon the resources of the Government by calling as witnesses representatives of the National Park Service, the Bureau of Outdoor Recreation, the Fish and Wildlife Service, the Geological Survey, the Atomic Energy Commission, and the Federal Power Commission, to testify upon the impact of the two dams proposed for construction in Grand Canyon and the feasibility of alternatives that have been recommended during these hearings.

The many testimonials to the incomparable features of the Grand Canyon, including the excellent book by Francois Leydet, "Time and the River Flowing," presented to this committee during these hearings and that are already recorded both in our literature and on film, need not be elaborate. The Leydet book provides an excellent basis for evaluating the great sacrifice to park values that would be inflicted by Bridge Canyon and Marble Gorge Dams. More important than attempting to add to this documentation at this time is to determine whether we in this Nation are going to respect the sanctity of those lands which, like the Grand Canyon National Monument and Grand Canyon National Park, have been set aside in their unspoiled and natural state to be preserved for some special purpose within our wildlife, national park, and wilderness systems.

The same consideration must also apply in the case of determining the impact of the proposed Hooker Reservoir upon the Gila Wilderness Area in New Mexico. Established in 1924, this was the first wilderness area to be set up within the national forests. Now, as part of the National Wilderness Preservation System, the Gila is one of our most widely known national forest wilderness areas. Infringement of the Hooker Reservoir upon this area must be avoided if the National Wilderness Preservation System is not to be violated. We strongly urge that this dam be designed and located to prevent any encroachment upon this unit.

We are encouraged by the action of the Bureau of the Budget in requesting that consideration of the authorization for the Bridge Canyon project be postponed. We would urge that this committee delete both the Bridge Canyon Dam and the Marble Gorge Dam from the bills which it has before it, as well as all related facilities that would impinge upon the natural and unspoiled features of the Grand Canyon of the Colorado. Certainly one of the most striking of these natural features is the Colorado River itself, the waters of which have been the principal force through thousands of years in shaping the canyon.

The argument that damming the river at Marble Canyon will not

affect either the park or the monument will not stand up if we consider the effects of such an impoundment upon the natural flows and temperatures of the river as it passes through the Grand Canyon gorge. The unnatural and wide fluctuations of the dammed stream, with resulting deposits of debris and silt, would destroy the river's shorelines and their animal and plant communities, and would mar the magnificent rock faces of the canyon where they rise as sheer expanses from the water's edge. The wild character of the Grand Canyon cannot be preserved if Marble Gorge is built.

The Bridge Canyon project would also destroy natural flows and levels of the river in addition to flooding the river and tributary canyons of Grand Canyon National Monument and the lower 13 miles of the Colorado River within the national park. The claim that impoundment of the river at Bridge Canyon will not detract from the wilderness and scenic qualities of the Grand Canyon is without basis. Such a reservoir, even though confined and constructed within the lower walls of the canyon, will destroy some of the most important natural features of the free flowing Colorado, as it is now found, its shores and the lower canyon within both the national monument and the national park. It becomes obvious, in view of this serious impact, that the development of the Grand Canyon with dams and related facilities cannot be carried out in a manner that is consistent with the primary purposes of the park as required in the 1919 act establishing Grand Canyon National Park.

Beyond these considerations, and more basic than arguments that are developed by those who rationalize the intrusions of dams and water development projects within both the Grand Canyon and the Gila Wilderness Area, are the precedent-setting implications of these proposed projects. Their authorization would clear the way for further serious violations of our national park system and our National Wilderness Preservation System, and would open the question as to whether we in this Nation shall honor earlier dedications of lands that have been set aside for preservation for future generations of Americans.

If Congress now authorizes dams and other nonconforming developments in these units of the national park and national wilderness systems, it will open the door to a host of proposals for development within many of the dedicated national parks and national monuments, the wildlife refuges and ranges, and wilderness lands both within the wilderness system and in the national forest primitive areas, and in other protected areas.

It is important that we recognize this as a matter of principle which underlies our national policies for the preservation and protection of all park, wildlife, and wilderness lands. If we are unable now to respect the dedications which have been made within the relatively short span of a few decades in this century, we can expect to find ourselves in the position of having to justify similar encroachments for many purposes other than those for which these units were established and set aside. In each instance the end result will be the same: the sacrifice of irreplaceable land areas and losses that are irrevocable.

In conclusion, I would emphasize again that the Wilderness Society is very much aware of the critical water needs of people in the Lower Colorado River Basin. We are deeply concerned about these

and we would wish to encourage any alternate programs to meet these requirements without the construction of facilities within the Grand Canyon or the Gila Wilderness Area that violate the integrity of the national park system and the national wilderness preservation system.

I very much appreciate the opportunity to present these views to the committee. Thank you.

Mr. ASPINALL. I think this is your first appearance in your new official position, is it not?

Mr. BRANDBORG. I think I have been here on behalf of some of the earlier park bills, earlier in the year. Certainly this is my first appearance before you and I welcome the opportunity.

Mr. ASPINALL. You are a very good successor to the job. There are approximately 2½ minutes for questioning for each member. The Chair recognizes the gentleman from Arizona, Mr. Udall.

Mr. UDALL. I will reserve my time, Mr. Chairman.

Mr. ASPINALL. The gentleman from California.

Mr. HOSMER. Mr. Brandborg, is there any requirement for membership in the Wilderness Society, other than paying dues?

Mr. BRANDBORG. I think an interest in wilderness is a requirement. But essentially the payment of $5 dues fee—$3 if the person is a student—is the principal requirement.

Mr. HOSMER. Are you a paid official of the society?

Mr. BRANDBORG. Yes, I am.

Mr. HOSMER. Does the society have annual meetings?

Mr. BRANDBORG. Yes, it does.

Mr. HOSMER. Any other meetings?

(Mr. Brandborg shakes head in negative.)

Mr. HOSMER. When was the last one?

Mr. BRANDBORG. Within the last 3 weeks, the meeting of the Wilderness Society's governing council was held in Colorado.

Mr. HOSMER. The governing council, you say?

Mr. BRANDBORG. Yes.

Mr. HOSMER. But not the society itself?

Mr. BRANDBORG. The governing council is responsible for the business of the society.

Mr. HOSMER. I am asking about the society itself, not the governing council. Does it have any annual meetings?

Mr. BRANDBORG. The governing council has the annual meeting for the purpose of conducting the society's business.

Mr. HOSMER. The membership?

Mr. BRANDBORG. The 32,000 members beyond those who belong to the governing council you are inquiring about, is that right?

Mr. HOSMER. Yes.

Mr. BRANDBORG. The members participate in meetings of our governing council as they did at Durango 2 weeks ago. They participate in our field trips and in the frequent meetings we have with our membership in various communities across the country. But they do not meet as a total membership with the council at these annual meetings.

Mr. HOSMER. Is it not a fact that you have never polled your membership relative to the recommendation you have made on their behalf for the deletion of Bridge and Marble Canyon Dams and the elimination of the Hooker Reservoir?

Mr. BRANDBORG. A letter that went out a few weeks ago to our members asked for an indication from them as to what issues facing conservation groups today were of primary importance in their judgment. A large part of our membership indicated through their response to this question that the proposal for dams in the Grand Canyon was of great interest to them and that they wished the society to oppose these projects.

Mr. HOSMER. Well, now, let us wait a minute.

Mr. UDALL (presiding). The time of the gentleman has expired.

The gentleman from Kansas, Mr. Skubitz.

Mr. SKUBITZ. I ask unanimous consent to yield my time to Mr. Hosmer.

Mr. UDALL. Granted.

Proceed.

Mr. HOSMER. How many replies did you receive to this letter?

Mr. BRANDBORG. I cannot answer that. Upon my return to the office from Durango I saw a number of answers my secretary had. We received an impressive response.

Mr. HOSMER. Was it a ballot?

Mr. BRANDBORG. No.

Mr. HOSMER. It was not a ballot. They were just asked the question what they were interested in.

Mr. BRANDBORG. This was a note added to our communication, asking in effect what issues in the conservation arena were of primary concern to the individual member who received this communication.

Mr. HOSMER. Yes, but they were not asked about Bridge and Marble Canyon Dams as such, were they? And they were not asked about the Hooker Reservoir as such, were they?

Mr. BRANDBORG. Not specifically, but we mentioned as a postscript to this letter that the hearings had been announced as scheduled by this committee. Word of the hearings was received almost as the communications went out.

Mr. HOSMER. They were not completely informed as to what the issue was, were they?

Mr. BRANDBORG. Our members were informed about this issue in our magazine, the Living Wilderness, which had been mailed earlier. I have submitted a copy for placement in the record——

Mr. HOSMER. As put out by the paid officials of the organization in that bulletin form?

Mr. BRANDBORG. The article was prepared by Dr. Richard Bradley, who is a member of the society, but certainly not a paid official. He did this independently without remuneration from the society.

Mr. HOSMER. You would not fairly characterize that article as a viewpointless expression of the issue, would you? The pros and cons?

Mr. BRANDBORG. As far as I know, the presentation is consistent with the facts as they have been presented to the society, its membership, and the council.

Mr. HOSMER. That is the difficulty in this whole arrangement. People put out one set of facts that support their preconceived notions and do not give the members of these organizations an opportunity to find out what the project is all about. I get letters about flooding of Glen Canyon, Grand Canyon, and all of the rest of these

things. I think your organizations have some kind of responsibility to handle this thing with facts and not as a great emotional whipsaw to keep the organization in being.

Mr. UDALL. The genteman's time has again expired.

The gentleman from California, Mr. Burton.

Mr. BURTON of California. Mr. Brandborg, I think you made a fine statement and it is good to have you testify before this committee. Your position, I am sure, reflects a majority view, of the people that belong to your organization.

Mr. HOSMER. Will the gentleman yield?

Mr. BURTON of California. I would not be surprised if there were dissenting voices, but I also am quite confident that it does reflect the majority view.

I do yield the balance of my time to my distinguished colleague from California, Mr. Hosmer.

Mr. HOSMER. I wanted to assure my genial colleague from California on the record that if I said anything of a political context that offended him, I apologize.

Mr. BURTON of California. Not at all. I think your point was well taken. Ofttimes it is not helpful to us when organizations' positions are represented when in fact only the executive group has taken a position.

On the other hand, I suspect most of the testimony we get with respect to most organizational positions does reflect the majority's opinions of those organization's members.

Mr. BRANDBORG. Mr. Burton, may I comment in response to that statement?

The organizations to which you refer, the national and local conservation organizations of this country, would find it physically impossible to take each of these issues to their constituencies, their membership. In a case like this one, where the issue is so clearly presented, whether we are going to violate the national park system, I doubt that the members, to say nothing of the governing council of the society, would retain me as a paid employee if I were not to protest the proposals for these two projects within Grand Canyon National Park and Grand Canyon National Monument.

Mr. BURTON of California. We are not in disagreement on that.

Mr. BRANDBORG. I do understand, Mr. Burton, that you were helping to clarify my point, and I appreciate this. Thank you.

Mr. UDALL. The gentleman's time has expired.

The gentleman from Utah?

Mr. BURTON of Utah. I wish to say I appreciate your statement and the time all of the people participating in these hearings have put in on this. I think it is going to be helpful. I think I can fairly say I do not know what my position will be on the final bill. I suppose it depends on what the final bill is and what it contains.

One observation that I would like to make on why I have been interested in the testimony of various conservation groups: It seems to me that they go a little bit too far. I think that perhaps your statement does, too, Mr. Brandborg. Taken at face value, you would think that if these dams are to be built, the whole national park system would come tumbling down like London Bridge.

Also, I think it has been represented here by some of the witnesses we have had, that you draw the impression that Grand Canyon is going to be filled to the brim and wiped out as a tremendous scenic attraction. I am a son and a native of the West and a sportsman and hiker. I have always enjoyed these activities and I certainly want to see that my little boy has an opportunity to do it, too. But I think that we can have dams and we can also have wilderness systems and national parks and monuments, both. I am not clearly convinced in my own mind that this is really going to be a devastation of what I regard as one of our greatest areas, an area that I have visited many times and hiked its trails. It seems to me that like Glen Canyon, an area that I have also been in before and after, this might be an asset to this area rather than a detraction.

That is just a general comment I have. Maybe you would like to respond to it.

Mr. BRANDBORG. I would, Mr. Burton. I very much appreciate your comment. I think it is an obligation of national organizations such as mine to be responsible in offering testimony, in recognizing the need for development of the water storage facilities within our arid Western States. We recognize that some lands which we have must be put to a variety of uses within a multiple-use context—but not all lands.

Mr. BURTON of Utah. I appreciate that statement concerning multiple use.

Mr. BRANDBORG. This is vitally important. I recognize also, if I may complete the thought——

Mr. UDALL. The gentleman's time has expired.

The gentleman from Oregon, Mr. Wyatt?

Mr. WYATT. I yield all but 30 seconds of my time to the gentleman from Utah.

Mr. BURTON of Utah. I would like to have the witness continue.

Mr. BRANDBORG. Thank you. We recognize also that those lands which have been dedicated to a wilderness purpose, for preservation as a part of our national park system or wildlife refuge system, or other uses, must be protected from here on out as the growing demands upon land increases, as our populations increase. There may be a time in the distant future when we have to use some of the areas within these dedicated units. But we feel that right now is not the time to let the gates down.

We feel that violation of the park system by the authorization of these two dams in the Grand Canyon would represent a very serious and dangerous precedent that would bring about in the near future a serious threat to other units of the national park system, as well as elsewhere within the wilderness system.

Mr. UDALL. Will the gentleman yield?

Mr. BURTON of Utah. Yes; I yield to my colleague.

Mr. UDALL. This statement has been made over and over again that construction of these dams violates the national park system. Marble Canyon is 12 miles out of a national park system or monument or anything else. How do you justify the statement that Marble Canyon Dam violates the national park system?

Mr. BRANDBORG. Because of its impact upon the wilderness, the wild quality of the canyon itself, Mr. Udall. The environment as it is now is greatly influenced by the presence of that river. The river has

made it what it is, in fact. To tamper with that river at this stage would be a serious violation of the park system.

Mr. UDALL. The gentleman from Oregon has his 30 seconds remaining.

Mr. WYATT. Mr. Brandborg, I, too, have not made my mind up. I have a special interest and that is to protect my people in the State of Oregon and the Northwest against their future water needs which are yet to be determined. I am interested in the total membership of your society. If you stated it, I missed it.

Mr. BRANDBORG. Approximately 32,000.

Mr. WYATT. I have no further questions. Thank you very much.

Mr. UDALL. The gentleman from Idaho.

Mr. HANSEN. Mr. Chairman, I have been most interested in this and testimony of other witnesses. I commend the interest they take, coming long distances to testify before us. Sometimes it appears that they receive rough treatment, at other times, kind treatment. But the information is appreciated. I, like the gentleman from Oregon, like things about this bill, believing in multiple use and other things for the development of the West. I like to see this sort of development go through, but I also have the responsibility of taking care of my people. When one basin begins to come into other basins, and we start interfering with this natural situation, I, too, have qualms and I think we are going to have to sit down and discuss this seriously.

I have no further comment, Mr. Chairman, but I would like to yield what balance of my time there is to the gentleman from Utah.

Mr. BURTON of Utah. I thank the gentleman for yielding to me. I would like to make one other comment. It is that I suspect those of us who live in the West enjoy these parks and scenery probably 10 times as much—I am speaking of frequency, not esthetically as people elsewhere. We probably get an opportunity to utilize these facilities much more than our brethren in the East. We appreciate them and love them, but I am sure you can understand our position, too. I think it was Aldous Huxley's book, "The Brave New World," where they set aside a section out in the West where no further developments were allowed and the natives were not further educated. This was set aside as a sort of preserve where everybody from all over the country could come and study us in our native habitat and surrounded by our spectacular scenery. We want to make sure scenery is not desecrated, that our children have the same opportunity we have. At the same time, we want to have fair development, fair progress, too.

Mr. BRANDBORG. As a native westerner, a native of Idaho and from Montana, I share these concerns. I think some of us who have been raised and educated in the West do not know how much of these priceless assets are concentrated in our Western States.

Mr. BURTON of Utah. When these landlocked people come back here to the East and cannot find a mile of public beach to relax on, we kind of think these gentlemen back here are poor advisers to us.

Mr. UDALL. The gentleman's time has expired.

Mr. Brandborg, I would only say to you that I respect your sincerity and congratulate you on an effective presentation here. It has been my privilege as a member of this committee to fight many battles with you and if I have to in this instance, fight one against you. But you are a very able adversary and operate very effectively for your organization. It is a pleasure to have you before this committee.

It is a disappointment to me, as I said this morning, when I told my story, I respect your great courage, but I only question your judgment. I thought when the Bureau of the Budget said "Let us defer Bridge Canyon," we would have peace on this. Here all we have left is Marble, which we simply have to have for the central Arizona project, completely outside of the National Park. But with the conservation organizations, it is all or nothing. They said, "we won out on Bridge, we will now move in on Marble." There is no way of getting together on these things. Some of us might feel if we have to fight a battle with you, if there is no give in any direction, we may as well go for both of them in this instance, because they are so important to the development of the Southwest.

I can only express the regret that having won one great battle down at the Bureau of the Budget, you are not willing to rest on your oars at this point.

Mr. BRANDBORG. Mr. Udall, we have great respect for you as a conservationist. We are sincerely hopeful that alternatives can be developed that will give Arizona and the lower Colorado River States the water that they need. I feel that it is unfortunate that this legislation which is before us today does not take into consideration some of these possible alternatives. I think this would put us on a more realistic plane and I do wish on behalf of the society to make clear that we are sympathetic with the needs of your State and the region and we do wish to see a way out of this dilemma that we are faced with here today.

Mr. UDALL. I thank you very much for those sentiments. That is one of the kindest things that has been said about me during the last week. I appreciate it.

All time has expired. We thank you for coming.

Mr. BRANDBORG. Mr. Chairman, could I extend one invitation to the members of the committee?

Mr. UDALL. Yes.

Mr. BRANDBORG. We have at the Wilderness Society offices a copy of the recently completed Glen Canyon film. This shows the impact of the rising waters of the reservoir upon the canyon and we would like to make this available to members of the committee at some future opportunity. May I ask that I might submit——

Mr. HOSMER. What did you say it was, a film?

Mr. BRANDBORG. Yes.

Mr. BURTON of Utah. On Glen Canyon?

Mr. BRANDBORG. Yes. May I ask that I have the privilege of submitting some additional data for the record in support of my statement?

Mr. HOSMER. Reserving the right to object, Mr. Chairman, I think that the witness should know and anybody who reads these records should know that this committee has been as diligent as it possibly can be in actually getting out to these sites like Glen Canyon, Bridge Canyon, Marble Canyon, taking a look at them so that we are not legislating in a vacuum of personal experience.

Mr. UDALL. Without objection, you will have that privilege, and subject to their meeting the requirements of the committee, they will go into the record or the file.

This concludes the schedule of witnesses before the subcommittee. Before we adjourn, the chairman of the full committee has asked me

to make a number of unanimous-consent requests. I will list them all en bloc:

That Mr. Alex Radin, who was scheduled as a witness and could not be here, have liberty to file his statement to be submitted as though read in full. I am told Mr. Radin is a member of the board of directors of the Citizens Committee on Natural Resources, and he wrote a rather extensive letter to the citizens committee on this legislation. Without objection, that will be made a part of the record with his statement.

(The statement and letter referred to follow:)

STATEMENT OF ALEX RADIN OF AMERICAN PUBLIC POWER ASSOCIATION

My name is Alex Radin. I am general manager of the American Public Power Association, a national service organization representing more than 1,200 local publicly owned electric systems, primarily municipally owned utilities, in 45 States and Puerto Rico. The association's offices are located at 919 18th Street NW., Washington, D.C.

The Colorado River is the lifeblood of many thousands of people throughout the Colorado River Basin. Taken together, existing and planned dams on the Colorado constitute a system for conserving and utilizing water resources for the entire Pacific Southwest. They provide power, flood control, water storage, streamflow control, and distribution of water for irrigation, municipal and industrial uses, silt control, recreation, and fish and wildlife conservation. The components of the basin system do not all provide the same services or to the same degree; indeed, they are not designed to do so. On the contrary, they supplement and complement each other in a carefully planned fashion.

The Bridge Canyon and Marble Canyon Dams are proposed new components to the system. Bridge Canyon Dam would provide power, water storage, and silt control. Its powerplant would be thoroughly integrated with Glen Canyon and Marble Canyon Dams both hydraulically and electrically. Marble Canyon Dam would provide power, storage for regulation of Glen Canyon releases, silt control, recreation, and would be directly related to Glen Canyon cyclical regulation.

An essential component of Bridge Canyon and Marble Canyon Dams is the power-generating capability of these projects which could provide substantial revenues—not only for repaying the reimbursable costs of the Bridge Canyon and Marble Canyon Dam projects themselves, but also for a development fund financing facilities to make maximum use of existing water in the region and for obtaining additional water supplies for the area.

Earlier this year, members of our association voted during our 22d annual convention in Los Angeles, Calif., to endorse S. 1019, by Senator Kuchel of California, and identical legislation introduced in the House—including H.R. 4671 and companion bills.

This policy resolution, endorsed unanimously by our membership, reads as follows:

"Whereas Arizona and California have compromised their differences over the waters of the Colorado River, more than 40 years of controversy; and

"Whereas this compromise is embodied in S. 1019, 89th Congress, introduced by Senator Kuchel of California and in identical bills introduced in the House by all 3 Arizona Congressmen and by 33 California Congressmen; and

"Whereas S. 1019 would authorize the construction of the central Arizona propect for the relief of the serious water shortage in central Arizona, by the importation of Colorado River water under safeguards for the protection of existing projects in Arizona, California, and Nevada; would authorize an investigation of the necessity of importing water from outside the drainage basin of the Colorado River to alleviate shortages in the Upper and Lower Colorado River Basin, and to meet the burden of the Mexican Water Treaty; would require that if water is to be imported into the Colorado River Basin from sources outside that drainage basin, the President shall first find that such sources are adequate to supply such importations without adverse effect upon the satisfaction of the foreseeable water requirements of any State from which such water is imported; would authorize construction of a high Bridge Canyon Dam and powerplant and Marble Canyon Dam and powerplant; would direct that power be disposed of in accord-

ance with reclamation law; would create a development fund for the utilization of Lower Colorado River Basin power revenues to assist in financing solutions of the water shortages in that basin; and to assist the areas of origin in meeting their water requirements; and

"Whereas S. 1019 and its House counterparts embody the principal features of the proposal of Secretary of the Interior Stewart Udall for a Pacific Southwest water plan: Now, therefore, be it

"*Resolved*, That the American Public Power Association recommends enactment of S. 1019, 89th Congress, and its House counterparts."

Adoption of this resolution by representatives of municipal utilities, irrigation and power districts, and other local public agencies operating electric systems throughout the Nation reflects the growing conviction among our members that water resource problems are national problems, not merely local, statewide, or even regional problems.

The region's growing demand for power

Power available from the development of the Lower Colorado Basin will serve Arizona, southern California, and southern Nevada directly; its influence will extend broadly over the area referred to as region VIII by the Federal Power Commission, which encompasses most of Arizona, Nevada, and California.

Region VIII is in the midst of a tremendous population explosion. Southern California, which now has a population of about 10 million people, is expected to have 30 million people by the year 2000. The Phoenix metropolitan area which had about a half-a-million people in 1958 is expected to reach two and a half million by the year 2000.

FPC projections indicate that overall per capita energy demand will grow in a spectacular fashion. In southern California and central Nevada, the per capita demand will increase from the current average of 4,200 kilowatt-hours per annum to over 10,000 by 1990. In Arizona, the per capita demand will increase from 8,300 kilowatt-hours per annual to 14,200. In region VIII from 1965 to 1980 the total peak demand for power will increase from about 20 million kilowatts in 1965 to 52 million kilowatts in 1980.

To meet the demand of this region for electrical power, generating capacity must be expanded from the current 23,000 megawatts to over 50,000 megawatts by 1980. The Bridge Canyon and Marble Canyon Dams would contribute about 2,000 megawatts to the additional generating capacity that is required.

By 1990 the need for peaking power will reach approximately 19,000 megawatts. The market for peaking power, if the power outputs of Bridge Canyon and Marble Canyon Dams were to be sold for that use, greatly exceeds the generating capacity of the two dams. There is more than sufficient demand in region VIII for the peaking power that would be produced at these dams. Interregional interconnection offers further potential markets outside the Southwest.

Potential benefits from hydroelectric sources

Hydroelectric energy can be used to generate baseload power. Where large amounts of hydroelectric power are available, this technique may be very economical. In the Colorado Basin, available hydroelectric power can satisfy only a small portion of the total energy demand even with full development of the basin's hydroelectric potential. Hydroelectric power should be employed as peaking only when its unique technological characteristics can be used to advantage. Hydroelectric power has substantial technological advantages over other possible sources of peaking power because hydroelectric plants can be started quickly and brought to capacity load in a very short period of time.

At the request of Commissioner of Reclamation Floyd Dominy, the Hughes Aircraft Co. conducted a benefits analysis of Bridge Canyon Dam and Marble Canyon Dam. This company's study states (p. 4–12) that, "A brief reconnaissance was made of several privately owned electric utiilties * * *. It was indicated that peaking power could be sold to these utilities for about 11 mills per kilowatt-hour." The Bureau of Reclamation estimates that peaking power from Bridge Canyon and Marble Canyon Dams will be sold for about 6 mills per kilowatt-hour. The Hughes study on page 4–14 further states, "* * * by proper operation, it should be possible to generate substantially more revenue from the dams than is currently included in estimates of their financial feasibility. Power can be sold at a rate considerably in excess of the 6 mills per kilowatt-hour if sold as peaking power. Thus the financial analysis of the Bridge Canyon and Marble Canyon Dams as presented by the Department of the Interior is extremely conservative."

In view of the historic role of Federal power in this region, and in recognition of the fact that power produced from the lower Colorado River project will be marketed under reclamation law, every effort should be made to insure that preference customers are given a full opportunity to share equitably in the benefits of hydro peaking capacity—directly or indirectly.

Economic and financial analyses of lower Colorado River project

The Budget Bureau has expressed its opinion that authorization of Bridge Canyon Dam should be deferred to enable the Federal Government to weigh scenic consideration against the need for additional power and revenues for the basin development fund.

Even though the request has been made to defer action on the Bridge Canyon Dam, we feel its cost-benefit ratio and the future demands for power suggest that this project be made an integral part of the Lower Colorado River Basin. The effects of Bridge Canyon Dam would be minimal to the scenic grandeur of the Grand Canyon. We feel that deferring action on this aspect of the project on the ground of destroying esthetic values is not justified.

In the Pacific Southwest water plan, which included Bridge Canyon Dam, the benefit-cost ratio was 2.3 to 1, amortized over a 100-year period. The interest rate for financial payout of interest-bearing components was figured at 3 percent; this rate of interest is now 3.22 percent which would slightly reduce the benefit-cost ratio but would still make the project economically attractive.

The estimated cost of the Lower Colorado River Basin project, excluding Bridge Canyon Dam, is $812 million.

Marble Canyon features	$239,000,000
Central Arizona unit	526,000,000
Water salvage and recovery programs	42,000,000
Recreation and fish and wildlife developments	5,000,000
Total	812,000,000

These initial works would produce benefits estimated at $91,800,000 annually compared with estimated annual costs of $41,800,000. The overall benefit-cost ratio based on a 100-year payout period with an interest rate of 3.22 percent is 2.2 to 1. The ratio based on a 50-year payout period is 2 to 1.

Irrigation water in the central Arizona project would be sold at an average rate of $10 per acre-foot while municipal and industrial water would be priced at an average of $50 per acre-foot. Commercial peaking power from Marble Canyon at 35 percent plant factor has been estimated to return, as an average over the payout period, $10 per kilowatt and 3 mills per kilowatt-hour of energy.

In addition to returning all reimbursable costs within 50 years, including $184 million of financial assistance to the repayment of irrigation costs of the central Arizona unit, with the above rates, sale of power and water would result in the accrual of surplus revenues of $481 million in the development fund by the year 2025. Through the year 2047, the end of the payout period of the initial phase of the Pacific Southwest water plan, the accrual of surplus revenues in the development fund would aggregate $1,266 million.

The keystone of this project is a concept of regional water resources development financed by an overall basin account. Hydroelectric plants will provide the necessary revenues to underwrite the pumping plants, aqueducts, reservoirs, pipes, and conduits that make water available. Without these hydroelectric plants the plan is totally infeasible and impossible of accomplishment.

From the standpoint of accepted tests of economic and financial feasibility, the Lower Colorado River Basin project represents an exceptionally sound investment. Further, it lays an impressive financial foundation for works to develop the water supply of the Colorado River Basin for the future.

Esthetic values not damaged

In 1919, when Grand Canyon National Park was created by an act of Congress, the necessity for multiple use was anticipated, requiring the balancing of water development and park preservation values.

Accordingly, the following language was included in the act:

"That whenever consistent with the primary purposes of said park, the Secretary of the Interior is authorized to permit the utilization of areas therein which may be necessary for the development and maintenance of a Government reclamation project * * *."

In the debate in the House at that time, Arizona's Senator Carl Hayden, then a representative, expounded the purpose of this amendment as follows:

"The provision contained in the bill would authorize the Secretary of the Interior, when consistent with the primary purposes of the park—that is, not to impair the scenic beauty—to allow storage reservoirs to be constructed for conserving the water of the Colorado River for irrigation purposes."

Furthermore, as the Bridge Canyon Dam and Reservoir relate to Grand Canyon National Monument, which was established with its present boundaries by Presidential proclamation on December 22, 1932, there is the following letter of January 11, 1933, from Horace M. Albright, then Director of the National Park Service, to Dr. Elwood Mead, then Commissioner of Reclamation:

"As I see it, the Bridge Canyon project is in no way affected by the Grand Canyon National Monument proclamation * * *. 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."

Thus, we have this evidence of long-range recognition, extending back to the days when the National Park and Monument were created, that ultimately there would be a reclamation project that would affect the park and monument.

It has been claimed that if reclamation projects are constructed within national parks, a dangerous precedent may be established which will threaten the unaltered appearance of all our national parks. This argument is misleading. There are at least four precedents, that I am aware of, for combining reclamation projects and national parks.

1. Jackson Lake Dam is within Grand Teton National Park. It stores water for the Minidoka reclamation project, providing irrigation for 1,162,000 acres of land in southern Idaho. Although the park was created after the dam was built, this is recognition by Congress that a reclamation project may complement a national park.

2. The reclamation reservoir behind Sherburne Dam is almost entirely within Glacier National Park. In this instance the park was created first. The Milk River project which it serves provides irrigation for 120,000 acres around Havre, Mont.

3. The Lower Two Medicine Dam also is in Glacier National Park. This is a Bureau of Indian Affairs operation for the benefit of the Black Feet Tribe. While it was washed out last year, it is now being rebuilt by the Bureau of Reclamation.

4. Fontana Lake forms the boundary for miles of Great Smoky Mountains National Park and provides 248 miles of shoreline. It was built by TVA for power generation and flood control.

No one has asserted that Grand Teton, Glacier, or Great Smoky Mountains are less majestic because of these dams. To the contrary, an argument can be made that their beauty and usefulness have been greatly enhanced.

Some contend that Bridge Canyon Dam would flood the inner gorge. If a dam could be built big enough to flood the inner gorge the stored water would solve the water problems of the Pacific Southwest for centuries. Nobody advocates this solution to our water problem. The fact is that with the Bridge Canyon Reservoir over 99 percent of the park will remain in its natural condition. The Colorado River forms the northwest boundary for the Grand Canyon National Park and serves as the southern boundary for most of the Grand Canyon National Monument. Bridge Canyon would back water up the Colorado for 93.8 miles, and the last 13 miles at the head of the reservoir would form the park boundary. Hence, the water impounded by Bridge Canyon would not back up into the park or throughout the monument. Nor can it be considered to flood this area. For instance, the normal level of the river at the extreme northwest boundary of the park with Bridge would be raised by only 90 feet, and this added depth would decrease to nothing 13 miles upstream. The canyon wall of the inner gorge at this point is 1,200 to 1,500 feet above the river bed. Furthermore, this stretch of river is inaccessible by normal means and cannot be seen from any viewpoint on the canyon rim within the park. A stretch of 104 miles of natural river will remain between the headwaters of Bridge Canyon Dam and the Marble Canyon Dam. This 104 miles of natural river will include about 91 miles within the boundaries of Grand Canyon National Park. The same matchless and unaltered view will be available from the north or south rims. The same muleback trips or long ardous foot descent and climb will be possible and in no way deteriorated or impaired.

The National Park Service reports that from 1955 to 1963, 1,300 persons made the boat trip through the Grand Canyon and viewed the area where Bridge Lake would be if Bridge Canyon Dam were constructed. The building of the two dams would increase the accessibility to this part of the river. The National Park Service estimates that 150,000 persons would be able to visit the area annually. A boating trip headed downstream from Marble Dam would enjoy 104 miles of live river and about 54 miles of beautiful still water surrounded by red sandstone cliffs. The beauty of the Bridge Canyon Reservoir would be comparable to that of Lake Powell and Flaming Gorge. Making this area accessible to interested persons is certainly consistent with the national park program. Creating a lake with the beauties of Flaming Gorge and Lake Powell is certainly not inconsistent with the objectives of the national park program.

We do not feel Bridge Canyon Dam or Reservoir would impair the natural beauty of the Grand Canyon. If this is the reason the Budget Bureau has suggested it be deferred, we do not feel this is a substantial cause to delay its authorization. For this reason we urge the committee to consider approval of Bridge Canyon at the time it considers Marble Canyon Dam.

Questions involving diversion of water

In general, I believe the legislation has been drafted carefully in order to give assurance that the areas of water surplus will be protected. However, in order to assure areas outside the Colorado Basin that their water needs will be protected, not only on a State basis but on a regional basis. I would like to suggest a minor change in the bill. In section 304(b), appearing at line 25 on page 8 of the bill, the President is empowered to make a judgment that importation of water does not have an adverse effect upon water resources of any State. I suggest this be changed to read "* * * to supply needed quantities without adverse effect upon the satisfaction of the foreseeable water requirements of any State and area of origin from which such water is imported into the Colorado River system." It has been pointed out that, while importation of the water of the Snake River into the Colorado Basin could be judged feasible with respect to the water needs of Idaho, the role of the Snake as a major tributary of the Columbia makes it essential that the President, in making a judgment, consider also the water needs of the entire Columbia Basin.

We are hopeful that the desalting of sea water will provide an economic source of water necessary to supplement the flow of the Colorado. In connection with the studies by the Secretary of the Interior, which would be authorized by section 201 of title II of the bill, we would recommend that the Secretary give full attention to the possibility of large-scale combination water and powerplants, which show great promise as a future source of low-cost electricity as well as water supply.

A dual-purpose plant could provide baseload electric generating capacity to complement the peaking energy available from future hydroplants on the Colorado River, thus producing 24-hour electricity to the preference customers of the Colorado Basin. Increasing emphasis upon peaking capacity at Federal hydro projects threatens to injure those municipal, rural co-op, and other consumer-owned utilities which are entirely dependent upon the Federal Government for their bulk power supply.

An engineering study of a proposed combination nuclear power-water desalting plant in southern California, released last month by the Interior Department, indicated that water can be produced at costs ranging from 22 to 30 cents per thousand gallons from a 150 million gallons-per-day desalting plant, using heat from a 1.8-million-kilowatt nuclear powerplant. While this water cost is high in terms of irrigation water costs at the present time, it is said by the engineers to be close to what southern California expects to be paying for natural fresh water within the next 5 years.

The members of our association believe that the water needs of the West can be met through cooperation of the water users of all areas involved, and through proper guarantees to areas outside the Lower Colorado River that they will not be deprived of their necessary water supply because of the development proposed in this legislation.

There has been a sincere effort on the part of the sponsors of this legislation to protect the Upper Colorado River Basin States as well as those States which may be called upon to provide surplus water in the future for importation into the Colorado basin.

It may be possible to tighten up the assurances to the upstream States and the Pacific Northwest in the language of the legislation, and I hope that the

subcommittee will look with favor upon proposals to specify in detail the guarantees asked by the upper basin States and the Pacific Northwest.

In providing for studies of water imports from other basins, in the Pacific Northwest and elsewhere, I hope that the committee will provide in the final bill that all of the prospective water and hydropower needs of the area of origin will be taken into account before any water diversion can take place, and that the needs of the entire Columbia River Basin will be considered in connection with any diversion from any tributary of the Columbia.

With these assurances written into the pending bills, I hope that the subcommittee will report the Lower Colorado River Basin project legislation favorably, including Marble and Bridge Canyon Dams, and that the Congress will act with dispatch to approve this legislation.

It has been pointed out that it will be some 10 years from date of authorization before a single drop of water flows into the water-short areas of central Arizona. The need is critical, and will become more so in the immediate future.

AMERICAN PUBLIC POWER ASSOCIATION,
Washington, D.C.

DEAR CONSERVATIONIST: The undated letter which was circulated recently by the Citizens Committee on Natural Resources on the subject of the Lower Colorado River Basin project contains a number of statements which I believe are exaggerations or do not accord with the facts.

The statements in Dr. Gabrielson's letter to which I take exception, and my comments on these statements, are as follows:

1. "The Bureau of Reclamation, a powerful agency within the U.S. Department of the Interior, wants to build two massive dams, Bridge Canyon and Marble Canyon, in the Grand Canyon of Colorado."

In addition to the adjectives "powerful" and "massive" which serve to color this statement, the overall impact of the sentence is to suggest that the Bureau of Reclamation seeks to construct these projects as a bureaucratic scheme to advance the interests of that agency, without foundation in need or outside support.

This is not the case. Construction of a reclamation project in this area was anticipated in 1919, when Grand Canyon National Park was created by act of Congress. The National Park Service specifically indicated its acceptance of the Bridge Canyon project in connection with the creation of the Grand Canyon National Monument in 1932.

Secretary of the Interior Stewart Udall, a vigorous conservationist, has urged construction of Marble Canyon and Bridge Canyon Dams, and the Johnson administration has endorsed immediate authorization of Marble Canyon. Construction of the Lower Colorado River Basin project is supported by Senators and Representatives from affected States. Numerous private and public groups in the Southwest have actively advocated initiation of this plan, the basic elements of which have been known for the past 25 years.

Need for these projects has been repeatedly demonstrated. Population growth in the Southwest is outstripping surface and ground-water supplies in this region, and impoundment and conveyance are for the foreseeable future the most economically efficient method for removing this imbalance.

It does not seem to me to be fair to characterize the Lower Colorado River Basin project as the product of an empire-building agency. This project is rooted in a need and a demand, and the role of the Bureau of Reclamation has been to prepare a plan which will provide a satisfactory solution.

2. "Marble Canyon Dam, although 12½ miles upstream from the Grand Canyon National Park, would despoil the first of the spectacular series of Grand Canyon gorges."

As you point out, Marble Canyon would be located well outside the boundaries of Grand Canyon National Park. Whether it would "despoil" areas outside the park is certainly subject to differing opinions. However, experience in similar situations elsewhere has indicated that, in the view of many visitors, existence of a large reservoir enhances rather than injures the former environment.

3. "It (Marble Canyon) would forever alter the natural 'river flowing' which through inconceivable ages, carved this most beautiful, most revealing exhibit of the earth's geological history."

The "natural 'river flowing'" was, of course, altered many years ago, although this sentence would seem to indicate that construction of Marble Canyon would create a unique condition. Furthermore, even with construction of both Marble Canyon and Bridge Canyon, more than 91 river miles between the two projects would remain undisturbed within the park, which contains 104.7 river miles of the Colorado.

4. "Bridge Canyon would create a 93-mile-long reservoir that would flood the inner gorge throughout the Grand Canyon National Monument and for 13 miles into the national park."

The Colorado River forms the northwest boundary for the Grand Canyon National Park and serves as the southern boundary for most of the Grand Canyon National Monument. Bridge Canyon would back water up the Colorado for 93.8 miles, and the last 13 miles at the head of the reservoir would form the park boundary. Hence, the water imponded by Bridge Canyon would not back up "into" the park or "throughout" the monument. Nor can it be considered to "flood" this area. For instance, the normal level of the river at the extreme northwest boundary of the park with Bridge Canyon would be raised by only 90 feet, and this added depth would decrease to nothing 13 miles upstream. The canyon wall of the inner gorge at this point is 1,200 to 1,500 feet above the river bed. Furthermore, this stretch of river is inaccessible by normal means and cannot be seen from any viewpoint on the canyon rim within the park.

5. "These dams, either or both, would save no water, nor add any to the already overdeveloped Colorado. On the contrary, they would waste water through evaporation."

The total Lower Colorado River Basin project is designed to accomplish two purposes: (*a*) to permit conveyance of Colorado River water to water-short areas and (*b*) to finance feasible importation of additional water from other sources to supplement existing supplies. The potential gains in added water through importation would far exceed estimated evaporation losses, which are minimal.

6. "Their (Marble Canyon and Bridge Canyon) sole purpose is to produce hydroelectric power which the Government would sell to subsidize the central Arizona irrigation project, despite the fact that modern fuel burning plants can produce cheaper power than either of the proposed dams."

Over 90 percent of the total cost of the project will be repaid by water and power users. Power will bear the brunt of the burden. Electricity generated at Marble Canyon and Bridge Canyon will be marketed as "peaking" power. Hydroelectric stations are, as you know, particularly well adapted for this use. Neither atomic nor coal-burning plants can produce peaking power as cheaply. Fuel-fixed plants, on the other hand, are most economically used as sources of baseload energy. By blending these two types of generating facilities, the least expensive power can be obtained and the entire region will benefit.

7. "Let's not permit the world's greatest scenic wonder to be mutilated."

"Mutilated" is an emotional word which is hardly consistent with the facts in this case. Existence of the reservoirs will likely expand significantly access to and enjoyment of this area. The National Park Service has reported that during a 9-year period from 1955 to 1963 only 1,300 people made the rigorous boat trip necessary to visit the area which would be affected by Bridge Canyon. As the Senate Committee on Interior and Insular Affairs has pointed out: "On the other hand, the dam (Bridge Canyon) will open this small segment of the park to large numbers of people (estimated by the National Park Service, 150,000 annually) who will want to take boat trips on the fjordlike reservoir and see the incomparable scenery of the Grand Canyon. In the committee's view it does no violence to the 'wilderness concept' which this committee vigorously espouses, to permit this unique opportunity to the public at large to glimpse at firsthand the matchless splendor of this most magnificent of American scenic treasures."

I am sure you are aware that construction of these two dams would set no precedent with respect to the combining of reclamation projects and national parks.

Jackson Lake Dam is within Grand Teton National Park. It stores water for the Minidoka reclamation project, providing irrigation for 1,162,000 acres in southern Idaho. Although the park was created after the dam was built, this is recognition by Congress that a reclamation reservoir and a national park can live together.

The reclamation reservoir behind Sherburne Dam is almost entirely within Glacier National Park. In this instance the park was created first. The Milk River project which it serves provides irrigation for 120,000 acres around Havre, Mont.

Then there is Lower Two Medicine Dam, also in Glacier National Park. This is a Bureau of Indian Affairs operation for the benefit of the Blackfeet Tribe. While it was washed out last year, it is now being rebuilt by the Bureau of Reclamation.

In the East there is Fontana Lake which forms the boundary for miles of Great Smoky Mountains National Park and provides 248 miles of shoreline. It was built by TVA for power generation and flood control.

I do not believe it can be asserted that Grand Teton, Glacier, or Great Smoky Mountains are less majestic because of these dams. To the contrary, an argument can be made that their beauty and usefulness have been enhanced.

On the basis of the above information, plus material you have received from the Citizens Committee on Natural Resources and other sources, I hope you will weigh carefully whether or not the construction of the Lower Colorado River Basin project is in the national interest.

Sincerely,

ALEX RADIN,
General Manager.

Mr. UDALL. Also, statements or letters from Anga Bjornson from Piedmont, Calif.

Mr. BURTON of Utah. Is it possible to identify the interests of these people, or are they just citizens?

Mr. UDALL. This apparently is just a citizen. A letter from the California Power Users Association; a letter from the National Wildlife Federation; a letter from the Sport Fishing Institute, a letter from the Feather River Project Association, the California Farm Research and Legislative Committee; a statement by Paul S. Taylor, of Berkeley, Calif.; the Illinois Audubon Society; the Colorado Mountain Club, and the National Reclamation Association.

Mr. BURTON of California. These statements will be put in the record as if read in full?

Mr. UDALL. Under the committee rules, they do not all qualify for this purpose, but most of them do. Mr. McFarland has instructions on this from the chairman of the full committee. Most of them will qualify.

Mr. HOSMER. I make a reservation along that line, too. I think it has never been a policy of this committee to very broadly print as though read statements of people who have not actually been in the committee room. I hope that the unanimous consent request of the chairman will reflect that.

Mr. UDALL. It does.

Mr. HOSMER. And that this will be carried out in printing this.

Mr. UDALL. This was the request in my instructions from Chairman Aspinall.

Mr. HOSMER. I withdraw my reservation.

Mr. BURTON of California. Dr. Taylor's statement is of interest to me and I hope it will be printed.

Mr. UDALL. It will be printed in the record.

Also, there is a letter from the Izaak Walton League of America, the Colorado Division of Izaak Walton, the Colorado White Water Association, the Atlantic Chapter of the Sierra Club, a letter from the Wildlife Management Institute, and a statement from the Colorado Federation of Women's Clubs. With the understanding that has been discussed and the reservations of the gentleman from California,

Mr. Hosmer, and the gentleman from California, Mr. Burton, these will be received in the record.

Mr. HOSMER. A further reservation, Mr. Chairman. The understanding that in cases where documents are cumulative, such as I submitted a number of documents the other day from official organizations of California, that in appropriate cases, the documents be placed in the file and reference to them made in the record.

Mr. UDALL. The gentleman is a guardian of the taxpayers' interests and this will be understood in the various requests I made. We do not want to run the printing bill up too high, but at the same time, we want a complete record of these proceedings. I am sure that is understood by the members.

(The statements referred to follow:)

PIEDMONT, CALIF., *August 25, 1965.*

Hon. WAYNE ASPINALL,
Chairman, Interior Committee,
Washington, D.C.

MY DEAR CONGRESSMAN ASPINALL: I thank you for the telegram announcing change of date of the committee hearing to August 30, 1965, when I am to appear before the members. I regret that I shall not be able to appear on that date and I ask for the privilege of having my views presented to your committee in writing.

The first point I wish to make is that I am not satisfied with regard, to agreement between landed interests in Arizona and southern California about division of water. I am not willing to regard that agreement, as a justification for authorizing a lower Colorado Basin project.

My second point: In my opinion a more serious proof is the failure of the U.S. Department of Interior to require faith in the observance of the reclamation law's provisions controlling water, monopoly, and speculation.

First: I doubt that the text of H.R. 4672 is so written as to assure the closing of loopholes to circumvention in the lower Colorado Basin project itself. I therefore propose that you add the following sentences to 501(a).

"Nothing herein shall be deemed to exempt large landowners from application of acreage limitation provisions of Federal reclamation laws and such provisions shall be enforced by the Secretary of Interior without exemption. Such provisions also shall be applied and enforced without exception in connection with all water service contracts entered into pursuant to the authority granted the Secretary under section 405(a) of this Act."

Second: Authorization of lower Colorado Basin project should be postponed until such times as the Department of Interior decides to enforce the excess lands provision that has been allowed to go unenforced for 50 years in Arizona and about 30 years in southern California.

Third: The Department of Interior should also be required to revise its proceedings for excess land divestitures in order to accomplish purposes of the reclamation laws instead of frustrating them.

Unless Congress and the Department of Interior abide by the reclamation law rather than circumventing it, the Department's appeals for authorization of new projects, carrying the long subsidies of reclamation laws can only be regarded as presented under false colors.

This abandon of National Department policy by the Department of Interior is nothing less than shocking.

Please print my statement in the record of the hearing.

Sincerely,

ANGA BJORNSON.

CALIFORNIA POWER USERS ASSOCIATION,
Berkeley, Calif., August 9, 1965

Hon. WAYNE N. ASPINALL,
Chairman, House Interior and Insular Affairs Committee.
Hon. WALTER ROGERS,
Chairman, Irrigation and Reclamation Subcommittee.

DEAR CONGRESSMEN ASPINALL AND ROGERS: The California Power Users Association opposes legislation to authorize the Lower Colorado River Basin project

(H.R. 4671 through H.R. 4706 and H.R. 9248) unless assurance is given that acreage limitation provisions of Federal reclamation law will be strictly enforced. Such provisions are included in all authorizations for western water conservation projects, but in many cases they are ignored or evaded.

The central Arizona project was rejected by Congress in 1949 on the ground among others, that excess land provisions of reclamation law controlling water and land monopoly and speculation in the benefits from public subsidies had never been enforced in Arizona and apparently never would be enforced there (as charged and documented by Representative Donald Jackson).

The Interior Department ruled last December 20 that owners of excess land in the Imperial Valley, Calif., who get federally subsidized water from the Reclamation Bureau's All-American Canal will have to conform to acreage limitation provisions of Federal law. The formal opinion, rendered by Solicitor Frank J. Berry, reversed an informal 1933 ruling that exempted land in the Imperial Irrigation District from acre limitation. Although this ruling was made 7 months ago, to date we have seen no evidence of enforcement.

Reginald L. Knox, chief counsel of the Imperial Irrigation District, pointed out that if the Interior Department is correct in its decision to end nonenforcement in Imperial Valley, the excess land law "also applies to all areas receiving water from the Colorado River, including land in the Metropolitan Water District which supplies water to some extremely large holdings on the coast" where nonenforcement is widespread. (Imperial Irrigation District News, February 1965, p. 1).

Attempts to enforce acreage limitation for the Di Giorgio holdings near Delano, Calif., are being nullified by failure of the Bureau of Reclamation to live up to the letter of the law. Land intended for family-type farm is being sold to corporations and speculators under arbitrary rules devised by the Bureau. When the land was first placed on sale last December, no family-type farmers bid because the prices were set too high—from $1,600 to $1,900 an acre after Di Giorgio successfully protested more realistic appraisals. (One wealthy farmer with adjacent land put in a bid.) On July 15 the land was opened to partnerships, corporations, and other legal entities with any number of acres providing the land is not in the Delano-Earlimart Irrigation District. (The legality of this is open to question.) Bidders to date include a large fruit corporation which applied for a parcel priced at $236,000, and a San Francisco shipping executive and his wife who seek adjoining parcels of 160 and 140 acres "as an investment"—in other words, for "speculation."

We can cite numerous other examples of failure to properly enforce the acreage limitation laws, leaving room for widespread evasion.

For example, the Interior Department is spending nearly $500 million (cost of San Luis dam and reservoir, canals, and distribution system) to bring water to the 500,000-acre Westlands Water District in central California. The land in the district is presently assessed at around $23 million. In other words, the Federal Government is spending over $1,000 an acre to improve land presently assessed at less than $45 an acre. This huge expenditure of taxpayers' money is being made without first requiring that owners of excess land sign contracts to dispose of their excess holdings. More than 75 percent of the land in the Westlands District is "excess acres." Largest landholder is the Southern Pacific Railroad with 120,000 acres. Secretary Udall says he will require landholders to sign recordable contracts when the water is ready for delivery. What if they refuse to sign. The Federal Government will be left holding the bag. Loopholes in present contracts between the Westlands Water District and the Bureau of Reclamation raise doubt that acreage limitation will ever be enforced there. This will result in a bonanza for present landowners.

It is difficult to justify expenditure of taxpayers' money for huge subsidies to private landowners for reclamation of agricultural and urban lands unless the owners are required to observe the monopoly and speculation controls prescribed by law. We therefore want assurance that such controls will be enforced on the Lower Colorado River Basin project before endorsing such legislation.

We request that this statement be included in the hearing record.

Very truly yours,

WALTER PACKARD, *Chairman.*

CALIFORNIA POWER USERS ASSOCIATION,
Berkeley, Calif., June 21, 1965.

Hon. WAYNE ASPINALL,
Chairman, House Interior Committee,
Washington, D.C.

DEAR CHAIRMAN ASPINALL: The executive board of the California Power Users Association on June 11 unanimously approved the following resolution which opposes congressional authorization of any portion of the Pacific Southwest water plan unless assurance is given that acreage limitation provisions of Federal reclamation law will be enforced.

Whereas the central Arizona project, rejected by Congress in 1949 on the ground, among others, that excess land provisions of reclamation law controlling water and land monopoly and speculation in the benefits from public subsidies had never been enforced in Arizona, and apparently never would be enforced there (as charged and documented by Representative Donald Jackson (95 Congressional Record 10126ff); and

Whereas the central Arizona project is again being presented to Congress for authorization in S. 1019, H.R. 4672, and other bills; and

Whereas the Imperial Irrigation District has pointed out through its chief counsel, Reginald L. Knox, that nonenforcement is widespread on large southern California landholdings served under the Boulder Canyon Act, viz., if the Interior Department is correct in its recent commendable decision to end nonenforcement in Imperial Valley, Calif., the excess land law "also applies to all areas receiving water from the Colorado River, including land in the metropolitan water district which supplies water to some extremely large holdings on the coast * * * it would necessarily apply there also." (Imperial Irrigation District News, February 1965, p. 1); and

Whereas it is difficult to justify calling on the National Treasury for huge public subsidies to western private landowners for reclamation of agricultural and even urbanizing lands, except that owners be required to observe the monopoly and speculation controls prescribed by law: Be it therefore

Resolved, That the California Power Users Association oppose congressional authorization of the Lower Colorado River Basin project unless the Secretary of Interior first publicly takes effective legal measures to end the prevalent disregard of law by administrators of the Bureau of Reclamation and by excess landholders in Arizona and in southern California.

WALTER PACKARD, *Chairman.*

NATIONAL WILDLIFE FEDERATION,
Washington, D.C., August 23, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, House Committee on Interior and Insular Affairs,
Washington, D.C.

DEAR MR. CHAIRMAN: We appreciate the invitation and opportunity to express these views on H.R. 4671 and other bills "to authorize the construction, operation, and maintenance of the Lower Colorado River Basin project, and for other purposes."

If the committee sees fit to approve of the Lower Colorado River Basin Project Act, we hope the following principles will be given sincere and thoughtful consideration:

First, title II authorizes and directs the Secretary of the Interior to undertake various investigations, including the possibilities of importing water into the Colorado River Basin from sources outside its natural drainage. If these investigations are to be undertaken, we urge the committee also to authorize and direct that studies be made of the effects of such water transfers on fish and wildlife generally as described in appendix I of the Pacific Southwest water plan as drafted by the Fish and Wildlife Service. We are particularly concerned that such a program could have an adverse effect on anadromous fish resources, particularly salmon and steelheads.

Second, we hope and trust that section 308(a) will provide amply for the mushrooming public interest in outdoor recreational and fish and wildlife resources. Specific projects planned in several States include a number of accesses and facilities, fisheries management investigations, rough fish eradication, game bird watering devices, a national warm water fish hatchery, a national trout fish hatchery, the newly established Cibola National Wildlife River Valley historically

has been a prime wintering ground for waterfowl. The Cibola refuge will help mitigate losses of waterfowl habitat resulting from water development and water conservation projects and it is essential that adequate supplies of water be provided.

Third, we are exceptionally concerned about a recommendation of the Bureau of the Budget that the reservation of 84,000 acre-feet of water annually for consumptive use in the lower basin, exclusive of California, for non-Federal fish and wildlife installations. This reservation, long agreed upon as part of the Pacific Southwest water plan, should not be arbitrarily delayed or set aside for further study. The allocation of 40,000 acre-feet of water annually for Arizona's fishing lake program must be included, in our opinion, if the Lower Colorado River Basin Project Act is adopted. We believe this allocation rightfully should come from Arizona's allotment of Colorado River water and hope the committee will clear up any question which may exist about authority of the Secretary of the Interior to make such a reservation. The use of this water should be recognized as a part of the plan and these volumes should be delivered through the central Arizona project, directly or through exchange.

Basically, it is our conviction that the use of water for fishing and recreation is so valuable to wide segments of the public that they merit this modest allocation of water. These needs are as valid, in our opinion, as for many other purposes for which the consumptive use of water is authorized. Members of the House Committee on Interior and Insular Affairs are well aware of the widespread public interest in outdoor recreational pursuits.

The Arizona Game and Fish Commission plans to construct 50 or more fishing lakes, at its expense, of an estimated $17,500,000, over the next 25 years. Water for the lakes would be provided directly from the central Arizona project or through water exchanges. The lakes, probably averaging 100 acres in size, are planned to be constructed at the rate of one or two per year throughout the State.

Estimates made by the U.S. Fish and Wildlife Service indicate that, when completed, the lakes would supply 2 million man-days of sport fishing per year, mostly for trout. Economic benefits are estimated at $6 million annually.

The Arizona Game Protective Association, our affiliate in that fine State, also warmly endorses the fishing lake program.

Thank you for the opportunity of making these remarks.

Sincerely,

LOUIS S. CLAPPER,
Chief, Division of Conservation Education.

SPORT FISHING INSTITUTE,
Washington, D.C., August 27, 1965.

Hon. WAYNE N. ASPINALL,
House Committee on Interior and Insular Affairs,
Washington, D.C.

DEAR MR. CHAIRMAN: The Sport Fishing Institute would like to take this opportunity to comment on the 36 identical bills, H.R. 4671–4706 "To authorize the construction, operation, and maintenance of the Lower Colorado River Basin project, and for other purposes." We appreciate the major intent of these bills in resolving the old conflicts of lower Colorado River water development projects between the contiguous States.

Title II provides for investigations to import water into the Colorado River basin from outside sources. In the past, various proposals manipulating the headwater supply have jeopardized the water quality of the lower Colorado River. In the instance of diversion in the headwaters into the Frying Pan Arkansas project of the fairly clear and higher quality snow waters, which when once taken from the drainage, could no longer serve as dilutants to the highly alkaline and poorer quality waters of the lower river section. Too, there is always the danger of upsetting the natural ecology at the source when waters are diverted for purposes of augmenting an outside supply. We sincerely believe that extra caution and effort should be taken in the investigative phase by the U.S. Department of Interior through its Bureau of Sport Fisheries and Wildlife.

Section 305 considers a water salvage program through phreatophyte control "along and adjacent to the mainstream of the Colorado River * * *." May I call your attention, Mr. Chairman, to the fact that the never-ending meandering nature of the Colorado River in its lower reaches provides for little if any.

"nursery ground" in its mainstream section for fishery development, but considerable aquatic life habitat in its oxbow lakes and sidewater sloughs. This first became very obvious to me while working as a district fishery biologist for the southern California area of the department of fish and game in 1951, when a netting survey was made from Parker Dam south into Mexico in the neighborhood of the Cerro Prieta Mountain. We recovered no juvenile fish in the mainstream proper and all evidence from our survey indicated that the backwater slough areas, where there was aquatic vegetation, were the only really productive grounds for aquatic life. We urge that such phreatophyte control be carried out only under close supervision of the U.S. Bureau of Sport Fisheries and Wildlife.

Section 308(a) provides for "recreation and fish and wildlife development * * *" to promote outdoor recreational facilities in conjunction with reservoir, canal, and other features of construction in the Lower Colorado River Basin project. In view of current published findings by the Outdoor Recreation Resources Review Commission we know what the impact of outdoor recreation by the American public is, and will be in the very near future. Adequate and ample provisions should be made to permit maximum, multiple use of these recreational potentials. May I invite your attention principally to that section of the lower Colorado River between Hoover Dam at Lake Mead and Morrelos Dam (a Mexican irrigation diversion works) at the Mexican border, Arizona, California, and Nevada fish and game agencies have expended considerable time and effort in researching out the best possible form of fish and wildlife to serve the outdoor recreation-seeking public in this sector. In addition, due to the primitive nature of the area between Parker and Imperial Dams, we urge that additional attention be given to development of access facilities so that these renewable natural resources may be utilized to the fullest.

Mr. Chairman, we are considerably disturbed by the fact that the Deputy Director of the U.S. Bureau of the Budget earlier this year recommended that 84,000 acre-foot water allocation for "consumptive use, exclusive of California, for non-Federal fish and wildlife installation" be reserved for further study by the National Water Commission. The reservation of this amount of water was an integral part of the Pacific Southwest water plan—giving some 5,000 acre-feet to New Mexico, 22,500 acre-feet to Nevada, and 57,000 acre-feet to Arizona from their decreed amounts of water from the main stream of the Colorado River by U.S. Supreme Court decision 376 U.S. 340. We urge that of the 57,000 acre-feet for Arizona that 40,000 acre-feet be allocated to permit construction of some 50 recreational lakes in central Arizona. These lakes would total approximately 5,000 acres to be built over a 25-year period by the State at an estimated cost of $17.5 million. (These waters are fully described in the fish and wildlife appendix dated January 1964 to the Pacific Southwest water plan.) The Arizona Game & Fish Department has estimated that 60,000 acre-feet will be required to fill these 50 lakes and 40,000 acre-feet will be required to annually meet evaporation, seepage, and other water losses. Sport Fishing Institute urges that the Secretary of Interior's authority be clarified so that such a reservation may be made in the central Arizona unit, commensurate with the dictates of section 308(b) of the Lower Colorado River Basin project bills.

It is possible that the Arizona Game & Fish Department will utilize Dingell-Johnson funds for the 50-lake construction program provided by the Federal Aid in Fish Restoration Act of 1950. Small lakes such as these, averaging some 100 acres each, near large metropolitan areas—such as Phoenix in the State of Arizona—can provide tremendous outdoor recreation use. As an example close to Washington, D.C., I would like to quote some figures from the public use enjoyed at 218-acre Burke Lake in northern Virginia, Fairfax County. During the first full season of operation (December 1, 1963—November 30, 1964) the Fairfax County Park Authority reported person-visits to Burke Lake Park totaling 190,767 persons—with over 95,000 fishermen registered. This averages out at approximately 440 fishing trips per acre of water. Seventy-five percent of the cost of construction of Burke Lake was from Dingell-Johnson funds, derived from excise taxes paid on the manufacture of fishing tackle.

The U.S. Bureau of Sport Fisheries and Wildlife has estimated that the 50 lakes in Arizona would supply some 2 million man-days of sport fishing per year on a warm water fish and trout basis with benefits estimated at $6 million annually. Therefore, we see only the many benefits resulting from the construction of these 50 lakes, and the annual allocation of 40,000 acre-feet of water to the outdoor recreation-seeking Americans. We strongly urge that this committee

direct the National Water Commission to make a thorough study of this portion of the central Arizona project, to validate this great need before the Bureau of the Budget.

Mr. Chairman, Sport Fishing Institute would appreciate these remarks being made a part of the written record of testimony on H.R. 4671–4706.

Sincerely,

PHILIP A. DOUGLAS, *Executive Secretary.*

FEATHER RIVER PROJECT ASSOCIATION,
Glendale, Calif., August 17, 1965.

Hon. WAYNE ASPINALL,
Chairman, House of Representatives,
Committee on Interior and Insular Affairs,
Washington, D.C.

DEAR MR. ASPINALL: You will find enclosed copy of Feather River Project Association statement in support of the principles of H.R. 4671–4706 and H.R. 9248 (corresponding to S. 1019).

We respectfully request that FRPA statement be included in the record of hearings of August 23, 24, 26, 27, 1965, on the above bills.

The association has been actively studying and encouraging regional water development which will be in the best interests of the States involved. You may find the enclosed association's newsletter of interest in this regard.

Thank you for your consideration.

Yours sincerely,

E. F. DIBBLE, *President.*

STATEMENT ON H.R. 4671–4706 AND H.R. 9248

The Feather River Project Association strongly supports the principles of the above bills and S. 1019—the Lower Colorado River Basin Act—because this act is well designed to remedy underlying causes of water problems in a number of Western States in the best regional and national interests.

The act provides construction of the urgently needed central Arizona project. It includes the construction of Bridge and Marble Canyon Dams, which are necessary to help defray costs by maximum generation and sale of electric power.

The act provides for a 3-year study of additional water sources outside the Colorado River Basin and a report on feasibility of water importations from such sources. The act provides protection for States of origin.

The safeguarding of California's right, confirmed by the U.S. Supreme Court, to 4.4 million acre-feet per year from the Colorado River is protected against demands of new projects until at least 2.5 million acre-feet of additional imported water is provided by new importation works.

We suggest that such a study must consider possibilities of developing a much larger supply—5 to 10 million acre-feet or more per year for future use in the entire area.

We believe these developments are of such urgency that 3 years is a maximum time to be allotted to study of the western region. We oppose the study being made a part of a lengthy national study as proposed by the Bureau of the Budget.

The latter study might easily exceed even the 5-year period recommended by the Bureau—thereby causing serious losses to Arizona and other Western States.

We likewise oppose omission from the program of Bridge Canyon Dam as recommended by the Bureau of the Budget. The power generation from this dam is essential to make the program financially sound. Its construction causes no significant detriment to Grand Canyon National Park.

We support the proposed Colorado Pacific Regional Water Commission provided such a commission is given powers to review proposals and make recommendations to the President and the Congress thereon. To insure that the Commission shall be responsive to needs of each State, we recommend that its composition include water users.

We thank the committee for this opportunity to present the views of the Feather River Project Association to the end that this act may, through properly servicing the entire western region, accomplish maximum alleviation of water problems which are a serious threat to this important section of the national economy.

STATEMENT OF CALIFORNIA FARM RESEARCH AND LEGISLATIVE COMMITTEE, SANTA CLARA, CALIF.

When Secretary of the Interior Stewart Udall in September 1963 first announced the Pacific Southwest water plan for development of the Lower Colorado River Basin, the California Farm Research and Legislative Committee issued a statement which said:

"We have always favored basinwide river development, with fullscale generation of hydroelectric power as part of all Federal plans, and including the varied associated benefits which have historically characterized reclamation projects * * *

"It is becoming increasingly clear that the economic future of the 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."

The statement specifically called for enforcement of acreage limitation on project water, for public ownership of all power facilities, with priority of sales to public agencies, and for all-Federal transmission lines.

The position of the California Farm Research and Legislative Committee is the same as when the original Pacific Southwest water plan was announced: qualified support of all bills authorizing the Lower Colorado River Basin project. We want assurance from Congress and Secretary Udall that the excess lands provisions of Federal reclamation law controlling water and land monopoly and speculation in the benefits from public subsidies will be enforced.

Although such provisions are included in the present bills, as in all authorizations for western reclamation projects, evasion or nonenforcement is commonplace. The following examples come to mind:

Acreage limitation has never been enforced in Arizona. This was one of the reasons for rejection of the central Arizona project when it was presented to Congress in 1949.

Acreage limitation has never been applied to water from the Colorado River conserved by the federally constructed Hoover Dam. The Interior Department ruled last December 20 that owners of excess land in the Imperial Valley (Calif.) will have to conform to the law.

This reversed an informal ruling made in 1933 that exempted land in the Imperial Irrigation District, served by the Bureau of Reclamation's All American Canal, from acreage limitation. To date we have seen no action on the part of the Interior Department to enforce its December 20 ruling. If the acreage limitation law applies to excess land in the Imperial Valley, does it not also apply to other areas receiving water from the Colorado River, such as the Metropolitan Water District which supplies water to many large holdings?

The Bureau of Reclamation is encountering difficulties in enforcing acreage limitation on the Di Diorgio holdings near Delano, Calif., which have been receiving Central Valley project water for 13 years. Land which by law should be going into family-operated farms, is being sold to corporations and speculators under arbitrary rules devised by the Bureau. When first placed on sale last December, the land was priced at $1,600 to $1,900 an acre—a figure agreed upon after the Di Giorgio corporation successfully protested lower and more realistic appraisals. Obviously few "family type" farmers can afford land so highly priced. Consequently only one bid was received—from a wealthy farmer with land adjacent to the Di Giorgio holdings.

On July 16 sale of the land was opened to partnerships, corporations, and other legal entities with any number of acres providing the land is not in the Delano-Earlimart Irrigation District (where the Di Giorgio land is located). We question the legality of this. Bidders to date include a large fruit corporation which applied for a parcel priced at $236,000 and a San Francisco shipping executive and his wife who seek adjoining parcels of 160 and 140 acres priced at $548,000 as an "investment." Obviously this is a speculative "investment."

The Interior Department is presently pledged to spend nearly $500 million for dams, reservoirs, canals and distribution system for the Federal San Luis project which will provide water for the 500,000-acre Westlands Water District (the sole customer). Land in the district is assessed by Fresno County at around $25 million. Thus, the Federal Government is spending over $1,000 an acre to improve land presently assessed at less than $50 an acre. More than 75 percent of the land in the district is "excess acres" owned by absentee landlords, the largest being the Southern Pacific Railroad with 120,000 acres.

This half-billion-dollar expenditure is being made without first requiring that landowners sign recordable contracts to dispose of their excess holdings (after receiving subsidized water for 10 years). Secretary Udall says he will require the signing of such contracts when the water is ready for delivery. This will be too late. There is no assurance that the owners will sign. If they refuse the Government will be left with 1 million acre-feet of water per year and few customers eligible to take it.

Expenditure of taxpayers' money for subsidies to private landowners for reclamation of agricultural and urban lands cannot be justified unless the owners are required to obey the monopoly and speculation controls prescribed by law. As shown by the foregoing examples, the law is not being adequately enforced. Therefore, before giving our unqualified support to bills authorizing the Lower Colorado River Basin project we request that Congress and Secretary Udall spell out in detail exactly how acreage limitation will be enforced on the project.

STATEMENT BY PAUL S. TAYLOR

My name is Paul S. Taylor, and I reside in Berkeley, Calif. Between 1943 and 1952 I served as consultant in the Department of the Interior, advising on the acreage limitation provisions of reclamation law. Since 1952 I have continued my interest in reclamation law and have published a series of professional articles in law journals and elsewhere. One of these, entitled "Excess land law: execution of a public policy" (64 Yale Law Journal 477), was cited by the U.S. Supreme Court. The present statement represents my individual views. I regret that personal factors beyond my control prevent my personal appearance before this committee. However, I request that this statement be printed in the record of the hearings.

Reclamation law has two major aspects, one of these very popular with large private beneficiaries, the other very unpopular with them: (1) Reclamation law authorizes public subsidization of western water development on a huge scale, from $1,000 to $2,000 an acre or perhaps even more; (2) reclamation law, through its excess land provisions, seeks to prevent monopolization of water and speculative gains by the few, in order to distribute widely the benefits from public expenditures. For obvious reasons of special interest the second of these aspects of the law is often swept under the rug, unfortunately even, at times, by the executive and legislative branches of the Federal Government.

With the first of these aspects of reclamation law in mind, viz., the federally subsidized water, apparently some persons are of an opinion that the Lower Colorado Basin project is now cleared for authorization because one of the objections to its earlier approval by Congress is now removed. Under the headline "Two-State Water Feud Drying Up" the San Francisco Chronicle reported recently that Senator Carl Hayden, of Arizona, who "had been blocking" the "$425 million Auburn-Folsom project" in California "decided not to insist on (his) objections to (its) authorization" because of "Governor Brown's 'cooperation with me in meeting Arizona's problems.'" "The California-Arizona compromise over the central Arizona project and water development in the Southwest," said the Chronicle, "included plans to develop new water sources outside the arid area and to split the lower Colorado river water now available" (Aug. 6, 1965, p. 22, col. 1).

It is well to remember, however, that reclamation law requires more than agreement between beneficiaries on division of water and subsidies from the Nation's treasury. Observance of the law's controls over water monopoly and speculation for the benefit of the many rather than of the few, is expected. Indeed, especially in respect to plans for water for Arizona, it is to be recalled that in 1949 the central Arizona project was killed in the House not only because of disagreement over division of Colorado River waters between States, but also because of the record of nearly a half-century of failure to comply with the excess land provisions in Arizona. The language of Congressman Donald L. Jackson, of California, is worth repeating, because the failure of enforcement of the law he described in 1949 indures into 1965:

"True, the Bureau of Reclamation says that the 160-acre law will be enforced if the Arizona project is built. But we know that this law never has been enforced there. There is no reason to believe it will be enforced in the future. Rather, there is every reason to believe it will not be enforced (95 Cong. Rec. 10128).

Official and unofficial studies, before and since, support the Congressman's emphatic conclusion of fact. For example, Pendleton, history of labor in Arizona irrigated agriculture, unpublished doctoral dissertations, Berkeley, 1950; Klaus G. Loewald, hearings before Senate Irrigation and Reclamation Subcommittee, 85th Congress, 2d session, on S. 1425, S. 2541, S. 3448, pp. 230–238; U.S. Bureau of Reclamation, landownership survey on Federal reclamation projects, 1946, p. 16. Congressman Jackson's gloomy prophecy stands fulfilled even today; if the acreage held in excess has diminished, the subdivision occurred without benefit of the controls that Congress wrote into reclamation law to limit private speculation in the interest of settlers.

Nonenforcement of the excess land laws for a half century in Arizona is matched on the California side of the Lower Colorado Basin for a generation. Secretary of the Interior Stewart L. Udall showed a courageous awareness of longstanding nonenforcement in Imperial Valley when he announced on the last day of 1964 that he intends to bring nonenforcement there to an end by divestiture of excess holdings. But the Secretary has made no similar promise to end nonenforcement either in Arizona or on southern California lands watered under the Boulder Canyon Act other than in Imperial and Coachella Valleys. No sooner was the Secretary's decision to end nonenforcement in Imperial Valley announced, than the Imperial Irrigation District News, summarizing an opinion of its chief counsel, Reginald L. Knox, pointed out that:

"If the opinion of Solicitor Frank Barry is correct, it also applies to all areas reviewing water from the Colorado River, including land in the Metropolitan Water District which supplies water to some extremely large holdings on the coast. According to Knox, there has never been any reference to that area, but if the opinion is correct, it would necessarily apply there also" (February 1965, vol. XXVI, No. 9, p. 1).

Nonenforcement, its roots deep in the past, has received added impetus during recent years. Its temper probably never was described more clearly than by Congressman Clair Engle, of California, speaking to the House in 1955:

"I grant you, you start kicking the 160-acre limitation and it is like inspecting the rear end of a mule. You want to do it from a safe distance because you might get kicked through the side of the barn. But it can be done with circumspection, and I hope we can observe circumspection" (1955 hearings before House Subcommittee on Irrigation and Reclamation, on H.R. 104, H.R. 384, and H.R. 3817, 84th Cong., 1st sess., p. 70).

The devices reflecting "circumspection" are numerous; at least one of them, the "Engle formula" for repayment—substituting small money payments for policy—incorporated in the Small Reclamation Projects Act, received congressional approval under circumstances leaving a trail of expressed dissatisfaction across the years and on the Senate floor (102 Congressional Record 13659; 103 Congressional Record 6737, daily edition May 23, 1957). Without congressional approval, unsympathetic administrators frustrate the law by substituting "interpretations" of the law that thwart its purposes, in the place of interpretations that would achieve them. Two examples may be cited here that I have discussed more fully elsewhere:

(1) Substitution of a "quantity of water" measure for the statutory prohibition that no ineligible lands; i.e., exceeding 160 acres per individual, shall receive water; and

(2) Creating a distinction as to applicability of the excess land laws, between water reaching project lands via surface delivery, and water reaching them underground, a distinction not found in the statute nor logically consistent with its justification for public expenditures for private benefit. See Taylor, "Excess Land Law: Calculated Circumvention" (52 California Law Review 978, 989, 990, 1010).

Of course, officials charged with responsibility for administering reclamation law know and proclaim its purposes. For example, Commissioner of Reclamation Floyd E. Dominy recently said: "I am proud that our basic principles remain essentially unchanged in concept. This program is reimbursable * * * and will repay the Federal loan that finances it. We are today, as we always have been, fully committed to the conviction that the family farm is a national asset of fundamental importance." (Address before Mississippi Valley Association at New Orleans, Feb. 3, 1964; USDI release, Feb. 3, 1964.)

Solicitor of Interior Frank J. Barry, in his opinion M–36634 (Dec. 26, 1961) spoke of—

"* * * the resolve of the Congress, as a matter of deliberate policy, to prescribe by statute measures aimed specifically at the early breakup of preexisting

large holdings * * *. As the excess land provisions have evolved from 1902 to the present, the purpose of the Congress has been consistent. The changes that have been made have been in the means to accomplish the end, never to change its fundamental purpose. As the law has evolved the Congress has sought not to weaken but to strengthen; not to open loopholes but to close them; not to encourage speculation but to stop it * * *. Time and again the purpose of the [original] bill was declared to be to provide homes on the arid lands of the West and prevent land monopoly and speculation."

In the same opinion, Solicitor Barry quoted a supporter of the original reclamation bill, Senator Clark, of Wyoming, who assured Congress that "the effect of the bill honestly administered, would be to make individual homes in small areas and would most effectually prevent the accumulation of large holdings in the hands of speculators, cattle barons, or sheep kings." Solicitor Barry also quoted Congressman (now Senator) Carl Hayden, of Arizona, who said, in addressing the House, that "certain men, taking advantage of the provisions of the Reclamation Act, have speculated upon the land in the project. We have attempted in this bill to cure that evil * * *. The act was designed to make homes for the many, not riches for the few * * *. The new settler is entitled to a share in this profit, and we intend to see that he gets it" (52 Congressional Record 12241).

Assistant Secretary of the Interior Kenneth Holum, addressing the National Farmers Union convention on March 17, 1965, said:

"Except for the past 4 years, my life has been spent on a family sized farm in South Dakota * * *. I know the beauty of the freshly turned furrow, corn that is knee high on July 4, and golden fields of wheat under the summer sun * * *. Your interest in preserving the 160-acre limitation provisions of reclamation law * * * is deeply rooted in the belief that Federal investment shall benefit the many, not the few * * *. We believe strongly in this principle as well * * *. No administration has more firmly embraced this principle in its acts and deeds. We intend to offer new proposals to Congress that will, we believe, adapt the reclamation program even more to family farm needs." (Interior Department release Mar. 17, 1965.)

The administrative officer chiefly responsible for execution of the excess land laws shows, upon occasion, an awareness that successful administration depends on more than declarations of intention. In statements to the Congress, Secretary of the Interior Stewart L. Udall has shown an appreciation of the crucial importance of prompt and vigorous administrative action to achievement of the purposes of reclamation. Speaking of the means by which "the early establishment of a sound irrigated farm community [can be] immeasurably advanced," he advised the Senate last year that "any procedures that can accelerate the process of bringing excess lands under recordable contract should in turn accelerate the corresponding rate at which those lands can be expected to pass into eligible nonexcess ownerships." (Acreage limitation policy study prepared by the Department of the Interior pursuant to a resolution of the Senate Committee on Interior and Insular Affairs, 88th Cong., 2d sess., p. 94.)

Secretary Udall called to the attention of the Congress not only the crucial importance of bringing about early execution of recordable contracts by owners of excess lands, but also the necessity for avoiding restrictive definitions of benefits to private landholders from reclamation projects. Stressing that in the interpretation of the law "certain fundamental principles should be clearly defined," he insisted to the Senate upon the necessity for administrative interpretation of the law that is all-embracing in its recognition of values brought to lands by whatever route "on account of the existing or prospective possibility of securing *water from, through, or by means* of reclamation constructed irrigation works" (Ibid., p. 94). [Emphasis supplied.] On the financial side of reclamation, Secretary Udall has expressed his concern to avoid any "undue delay" that might cost the Government "unearned revenues—otherwise payable for water deliveries." (Hearings before House Subcommittee on Appropriations, 89th Cong., 1st sess., on public works appropriations for 1966, pt. 2, p. 5.)

These are fine words, spoken—all of them, by officials and Members of the Congress concerned for achievement of the purposes of Federal reclamation—in the spirit of the law. However, when one turns from words uttered to observed, documented administrative actions and inactions, the disparity between them is discouragingly impressive. Indeed, one is reminded of the account by Hans Christian Andersen known to every child, of the emperor's clothes that weren't there at all. A few examples from among the numerous specific in-

stances that could be cited, will serve to establish the connection between fable and fact.

1. The way to avoid "undue delay" and hazard of loss of "unearned revenues—otherwise payable for water deliveries" at San Luis unit of CVP is plain, and the administrative measures to be taken are simple and well known; require owners of excess lands to execute recordable contracts making their lands eligible under the law to receive (and pay for) project water deliveries.

If this were done, the Interior Department could enlarge the "market" for project water by around 130 percent. The Department moves, however, in precisely the opposite direction: it refuses to take the steps to enlarge the legal "market" but hastens the spending of public funds to construct the facilities capable of delivering the water.

2. The way to collect the millions of dollars owing to the Federal Government for 19 years' past use of CVP water by Sacramento River diverters is—as the House Committee on Government Operations recommended on March 22, 1965, in a similar instance of "past use" of water—that the Department of the Interior "should take steps to collect the amount" (H. Rept. 193, 89th Cong., 1st sess., p. 11, Death Valley National Monument (Furnace Creek area—Water rights and related matters)). The Department of the Interior proceeds in precisely the opposite direction: it omits any provision from the Sacramento diverters' repayment contracts for repayment of obligations incurred by past use of water. Secretary of the Interior Udall explains the omission to the Comptroller General of the United States in advance, using these words: "* * * there is little prospect of negotiating agreemnts regarding future use of Central Valley project water if we insist upon payment for water diverted for the period 1944 through 1963." The Secretary did not elaborate on the reason the "prospect" was small, except to note that the financial burden would be heavy; i.e., the diverters owe the United States a great deal. (Secretary Udall to Comptroller General Joseph Campbell, November 29, 1963.) After execution of repayment contracts, with no provision for collection included, Assistant Secretary Holum advised the National Farmers Union and National Catholic Rural Life Conference that "No 'claims' are being 'canceled.' * * * none of the Sacramento River diverters are 'being relieved of their indebtedness to the Federal Government.'" (July 9, 1964.) This explanation followed a report carried by the Sacramento Union on June 26, 1964, that:

The Bureau of Reclamation is offering to waive all charges for project water drawn previously by farmers if they sign a 1964 water contract.

"The Bureau has now told 30 potential signers that to get the waiver they must sign the 1964 contract." (P. B–16.)

3. The way to follow the example of Congress is for administrators "not to open loopholes but to close them." The Department of the Interior is doing precisely the opposite on project lands of the San Luis unit, CVP. The chief counsel of Westlands Water District, Mr. Ralph M. Brody, explained to Congress how construction of Central Valley project had benefited San Luis lands through ground-water improvement for more than a dozen years past, and would continue to benefit them in the future. In response to questioning by Senator Gaylord Nelson, Mr. Brody testified:

"Historically, over the years, there has been an inflow from the east side of the San Joaquin Valley, from natural precipitation, as well as whatever irrigation takes place there, as a result of project activities over the east side of the valley which will occur whether this distribution system is built or not." Westlands Water District contract hearing before Senate Interior and Insular Affairs Committee, 88th Cong., 2d sess., July 8, 1964, p. 104.)

Notwithstanding, the Department of the Interior makes no attempt to collect for this use of "water from, through, or by means of (CVP) reclamation constructed irrigation works." The Department also studiously refrains from applying the provisions of the excess land law to any of the waters referred to by Mr. Brody reaching San Luis unit lands "as a result of project activities." This departmental inaction is totally without statutory support; it opens not a "loophole" in the law, but a floodgate of circumvention. (For full discussion of this point, see Taylor, "Excess Land Law: Calculated Circumvention," 52 California Law Review 978.)

4. The way to achieve "early breakup of preexisting large holdings" is, as Secretary Udall's report to the Senate last year points out so clearly and simply, to "accelerate the process of bringing excess lands under recordable contract." The Department of the Interior follows a course on the San Luis unit of CVP

that is precisely opposite; it has not even asked the owners of excess lands on the project—and that covers 70 percent of the land of the project—to execute recordable contracts to qualify their lands to receive project benefits. The result may turn out to be no "breakup" at all. Defending the Department's inaction to the Senate, Solicitor Frank J. Barry explained, "Suppose * * * someone * * * wants to see whether his ground water will be sufficiently improved by the project so that he can derive water from the underground rather than sign a recordable contract. Now, he has an unlimited time * * *. Now, it turns out that unavoidably some of the seepage from nonexcess lands in the neighborhood improves an excess landowner's ground water situation." (Westlands hearing, p. 34.)

Solicitor Barry, in these words, described to the Senate on July 8, 1964, administrative interpretations and procedures currently adopted by the Department of the Interior that are clearly opposite to what he described in his legal opinion of December 26, 1961 (M–36634) as "the resolve of the Congress, as a matter of deliberate policy, to prescribe by statute measures aimed specifically at the early breakup of preexisting large holdings * * * never to change its fundamental purpose * * * not to weaken but to strengthen; not to open loopholes but to close them; not to encourage speculation but to stop it * * * to provide homes * * * and prevent land monopoly and speculation."

The Department of the Interior has so managed the negotiations for repayment contracts with Sacramento River diverters that apparently no recordable contracts at all have been executed in an area where large landholdings are conspicuous. According to the Sacramento Union:

"Robert Pafford, director for region 2 of the Bureau of Reclamation, said that he does not believe many of the landholdings will be broken up except for some through economic factors." (June 26, 1964, p. B–16.)

In other words, the Department of the Interior has been so administering the excess land law that no "early breakup" is achieved, if, indeed, any breakup at all. The Department of the Interior's procedures apparently have given excess landowners a financial alternative they can exercise through their districts at their option, that can frustrate completely Senator Carl Hayden's description of reclamation law long ago, as a design "to make homes for the many, not riches for the few."

5. In a notable instance, predecessors of Secretary Udall brought under recordable contract in 1952 several thousand acres in Delano-Earlimart district within CVP, owned by DiGiorgio corporate interests. Under Secretary Udall's handling, divestiture of these excess lands has produced results quite the opposite of creation of homes on the lands of the West and the control of speculation to assure that "the new settler" shall have "a share in this profit." The San Francisco Chronicle has reported two offers to purchase portions of the 4,400-acre DiGiorgio holdings—one by a "Morris Fruit Co." and the other by a "big buyer as investor," "president of a San Francisco shipping firm, and his wife." (July 16, 1965, p. 51; July 27, 1965, p. 48.) Apparently the Department of the Interior now interprets the statutory prohibition against receiving water for more than 160 acres per individual, as permitting ownership of lands receiving project water in any amount, so long as not more than 160 acres are owned in one district. (California Farmer, June 19, 1965, p. 11.) This appears to be an invitation to multiply the number of water districts, in order to raise the acreage per individual permitted to receive project water. No evidence of congressional intent to raise the legal limit is cited, or apparent. If the DiGiorgio divestiture procedures are to set a pattern for future divestitures, the excess land law will have been virtually stripped of meaning, and the decision by Secretary Udall to enforce the law in Imperial Valley or the Department's promise to enforce it anywhere else rendered hollow and superficial. Clearly, this performance by the Department of the Interior is not founded on what Solicitor Frank Barry calls "the resolve of the Congess." It is calculated, rather, to bring the era of "reclamation" ushered in at the turn of the century by the original "conservationists" to an unceremonious end.

This is not the first time in the history of the disposal of the public domain that administration has been associated with an atmosphere of scandal. Prof. Paul Wallace Gates, in his definitive account of the "Homestead Law in an Incongruous Land System," giving special attention to the pattern of landownership established in California, concludes that:

"The land reformers reckoned too lightly * * * with the astuteness of the speculators who in the past had either succeeded in emasculating laws inimical

to their interests or had actually flouted such laws in the very faces of the officials appointed to administer them * * *. The administration of the law, both in Washington and in the field, was frequently in the hands of persons unsympathetic to its principle, and Western interests, though lauding the act, were ever ready to pervert it" (41 Am. Hist. Rev. 655–56).

Even at the time, it was apparent what was going on. In 1885 the new Commissioner of the General Land Office, William A. J. Sparks, recorded these observations on the administration of the land laws immediately prior to his entry into office, a time when much public land in California passed into private hands:

"The land department has been very largely conducted to the advantage of speculation and monopoly, private and corporate, rather than in the public interest * * *. It seems that the prevailing idea running through this office and those subordinate to it was that the Government had no distinctive rights to be considered and no special interest to protect * * *." (Annual report, Commander General Land Office, 1885, pp. 3, 4.)

As recently as last year Secretary of the Interior Stewart L. Udall addressed the Congress with words less sharp, but still reminiscent of those employed by earlier administrators in characterizing the record before them:

"In the 35 years since the last iteration by Congress of the principle of land limitation, both Congress and the executive branch have on occasion exhibited a degree of concern for the excess landowner which may be difficult to reconcile with the policies embraced by the excess land laws." (Acreage limitation policy study, p. xiii.)

Congress, of course, is privileged to make and to change the laws; these are not prerogatives or responsibilities of administrators. Public confession may be good for the soul, but hardly a justification of further transgression.

The bending of the law from its course and purposes by administrators, of course, is not primarily their own idea. It results from outside pressures, now as in the eighties and in other decades, from large landholding interests with great gains in prospect from public subsidies and speculative incremental values.

In words uttered in another connection, no one has epitomized the current defects of reclamation administration by the Department of the Interior better than its Secretary, Stewart L. Udall:

"We have, I fear, confused power with greatness." (Quoted in San Francisco Chronicle, "This World," June 20, 1965, p. 2.)

I urge the House Committee on Interior and Insular Affairs, in its present deliberations over authorization of the Lower Colorado Basin project, to adopt the following procedures:

Recommendation No. 1.—Add language to the authorization bill that will assure the clear intent of Congress that the excess land provisions of reclamation law, as well as the public subsidy provisions, shall apply to water development under the lower Colorado Basin project; specifically, add the following sentences to section 501(a) of H.R. 4672 (or at the appropriate place in whatever bill may be given priority by the committee:

"Nothing herein shall be deemed to exempt large landowners from application of acreage limitation provisions of Federal reclamation laws and such provisions shall be enforced by the Secretary of the Interior without exception. Such provisions also shall be applied and enforced without exception in connection with all water service contracts entered into pursuant to the authority granted the Secretary under section 405(a) of this act."

Recommendation No. 2.—Defer action on the lower Colorado Basin project authorization proposals until the next session of Congress. The reason for deferral is to allow Congress and the public time and opportunity, to ascertain whether or not administrators of the Department of the Interior will

(*a*) Declare their intention, as they have in respect to Imperial Valley, Calif., to enforce the excess land provisions of reclamation law in Arizona, ending a half century of nonenforcement there, and in those portions of southern California where the law has remained unenforced for a generation since the Boulder Canyon Act.

(*b*) Revise administrative procedures and make other changes in divestiture operations that will bring enforcement of the excess land laws under recordable contracts or otherwise into conformity with the purposes of Federal reclamation, and achieve, instead of thwart, those purposes.

(*c*) Take immediate steps to obtain recordable contracts from excess landowners on the San Luis Federal service area to forestall law violation there.

(*d*) Reexamine and revise contracts with Sacramento River diverters, in

which the excess land laws have been thoroughly frustrated, in order to bring enforcement into line with reclamation law.

The lower Colorado Basin project proposes water developments of great importance to the West, and lays the foundations for vast national subsidies to the West. Deferral of action on project authorization is a reasonable measure of precaution, to permit clear determination whether large landholding interests in the West are to be allowed by administrators to harvest huge subsidies and speculative gains on the one hand, while scuttling the antimonopoly and speculation control provisions of the same reclamation laws under which they receive the public subsidies, on the other hand.

ILLINOIS AUDUBON SOCIETY,
Highland Park, Ill., August 14, 1965.

Hon. WALTER ROGERS,
U.S. House of Representatives,
Washington, D.C.

DEAR MR. ROGERS: The Illinois Audubon Society with this letter is registering its opposition to the bills in regard to the lower Colorado storage project and the construction of the Bridge Canyon and Marble Canyon Dams of the Colorado River.

We would be opposed because it would despoil and destroy the Grand Canyon and set in motion forces destructive to the plant, animal, and geological forms existing there.

It appears to be a form of a regional subsidy requiring millions in Federal expenditures. Also, in this area there exists water and power alternatives.

Much of the material for projects such as this relate what it will do for the area in terms of recreation and power. Yet, an area such as this should be left for scientific study. We need this area to be left unspoiled to be part of primitive America as a cushion against the ever-pressing, machine-gadget way of life we are experiencing in the United States.

Sincerely yours,

PRESTON S. DAVIES,
Vice Chairman of the IAS Conservation Committee.

THE COLORADO MOUNTAIN CLUB,
Denver, Colo., August 26, 1965.

Hon. WAYNE ASPINALL,
Chairman, House Committee on Interior and Insular Affairs,
Washington, D.C.

DEAR MR. ASPINALL: Please, include the attached statement in the record of the hearings on the Lower Colorado River Basin project.

Sincerely,

JOHN DEVITT, *Chairman, Denver Group.*

STATEMENT OF THE DENVER GROUP OF THE COLORADO MOUNTAIN CLUB

This statement is presented in behalf of the Denver Group of the Colorado Mountain Club. We wish to go on record as being opposed to the Lower Colorado River Basin project as expressed in S. 75, S. 1019, and H.R. 2671.

Three dams in this project will affect wild lands in Grand Canyon and the Gila wilderness area in New Mexico. Bridge Canyon Dam, although not being considered at this time, if it were constructed later would back water through the entire length of Grand Canyon National Monument and 13 miles into Grand Canyon National Park. Marble Canyon Dam will flood the upper geologic Grand Canyon beyond the park boundary. If this dam is used to provide peaking power there would be extreme daily fluctuations of the river level through the park. The result would be unpleasing in appearance and cause drastic changes in the ecology. Hooker Dam will back water into the Gila wilderness area, the first wilderness area in the United States.

Our group is composed of hikers, climbers, and nature lovers. We have been to these places. Our objection is based on the resultant loss of wilderness and on the violation of the national park. There are other good arguments against this project, both hydrologic and economic, but we will leave these to others more expert than ourselves.

STATEMENT BY WILLIAM E. WELSH, EXECUTIVE DIRECTOR, NATIONAL RECLAMATION ASSOCIATION, WASHINGTON, D.C.

My name is William E. Welsh. I am executive director of the National Reclamation Association. I am presenting this statement on behalf of the association.

The proposed lower Colorado River project is of tremendous importance to the entire West and to the Nation, and it is especially important to all States directly affected. It is therefore equally important to our Association.

In view of the fact that the Lower Colorado River project legislation provides that "the Secretary is authorized and directed to * * * investigate alternative sources and various methods including * * * works to import water into the Colorado River Basin from sources outside the natural drainage area of the Colorado River system," and also the fact that Resolution No. 2 entitled "Regional Planning," which was adopted at the last annual meeting of the National Reclamation Association held in Palm Springs, Calif., in November 1964 also relates to "consideration of interbasin and interstate movements of waters," it seems very appropriate that this resolution should be presented to the committee having under consideration this legislation. For the foregoing reasons, I am including Resolution No. 2 entitled "Regional Planning" in my statement and it reads as follows:

"RESOLUTION NO. 2—REGIONAL PLANNING

"Whereas there are now under way planning programs by various Federal agencies which include a consideration of interbasin and interstate movements of waters; and

"Whereas the objectives of such programs have not been well defined and limited by any clear-cut congressional directives; and

"Whereas it is vitally necessary that the objectives of such planning programs clearly embrace not only the preservation of existing water rights in the several basins and States but also the recognition of their existing and future needs to the end that their opportunities for economic growth and development are enhanced: Now, therefore, be it

"*Resolved*, That the National Reclamation Association urges that the Congress establish as a basic premise for the conduct of planning programs involving interbasin or interstate movement of waters of the several basins and States, not only the protection of existing water rights within the States, but also provision for the recognition and preservation of existing or future compact allocations of the waters of interstate streams, and the provision of all water supplies necessary to assure the ultimate development within the several basins and States; be it further

"*Resolved*, That the National Reclamation Association, through its president and board of directors, urge the Congress to require implementation of the above principles in connection with any proposed project authorizations growing out of presently existing or future planning programs involving the interbasin and interstate allocation of waters: be it further

"*Resolved*, That if it be found that by administrative action regional studies are being made which call for interstate transportation of water in opposition to the interest of the State from which the water is to be taken, then it is suggested that the affected States create an interstate commission to attempt to resolve any conflicting interests."

The above resolution was carried with nine States voting in favor of the resolution and five States voting against it; three States were absent and did not vote.

Mr. Chairman, we appreciate the opportunity of presenting this brief statement in order to set forth the position of the association with respect to the problem of interbasin and interstate movements of waters.

Thank you very much.

Respectfully submitted.

WILLIAM E. WELSH, *Executive Director.*

THE IZAAK WALTON LEAGUE OF AMERICA, INC.,
Glenview, Ill., August 27, 1965.

Hon. WALTER ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation, House Committee on Interior and Insular Affairs, Washington, D.C.

DEAR CONGRESSMAN ROGERS: It is time to call a halt. This is the feeling of the thousands of Izaak Walton League members all over the United States.

The proposed Bridge Canyon Dam and Marble Canyon Dam on the lower Colorado River are certain to destroy some of this country's most magnificent and beautiful scenery. The purposes of both of these proposed dams are to produce hydroelectric power and neither will do anything to conserve the already scarce supply of water. In fact, evaporation from the surface of the water in the proposed reservoirs and leekage therefrom will actually reduce the supply of usable water. Alternate sources of cheaper electric power could readily be developed through use of abundant fossil fuel supplies in the immediate area.

The Izaak Walton League of America is unalterably opposed to the construction of the proposed Bridge Canyon Dam and the Marble Canyon Dam or any other alteration of the Colorado River in the Grand Canyon area between Glen Canyon Dam and Hoover Dam. Attached you will find a copy of the resolution passed at the league's 1965 national convention in June which clearly outlines the league's opposition to the construction of these monstrosities.

Conservationally yours,

WILLIAM A. RIASKI, *Executive Director.*

RESOLUTION NO. 1—DAMS ON LOWER COLORADO RIVER

The Izaak Walton League of America, 43d Annual Convention, June 16–19, 1965, Cody, Wyo.

Whereas the Grand Canyon National Park and Grand Canyon National Monument comprise one of the world's most remarkable scenic climaxes, are keystones in the national park system, and are recognized throughout the world as symbols of America's far-visioned national park policy; and

Whereas proposals are now before Congress to construct two dams on the Colorado River—one at Marble Canyon above the park which would change the river regimen through the Grand Canyon, and one at Bridge Canyon which would create a reservoir flooding through the monument and into the park. inundating or damaging for all time vital elements and phenomena of this unique and inspiring region; and

Whereas such invasion would be clearly adverse to the purposes of the monument and park, would serve no direct reclamation purpose, and would flout President Theodore Roosevelt's admonition to the American people: "I want to ask you to do one thing in connection with the Grand Canyon in your own interests and in the interest 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"; and

Whereas the policies of the Izaak Walton League of America and the principles of the national park system hold that the purposes of national parks and monuments are for conserving areas of unique scenic, ecologic, geologic, historic, and related natural values unimpaired for the benefit of all the people and such invasion, if permitted, would carry an awesome threat to the very foundations of the national park system; and

Whereas the proposed Bridge and Marble Canyon Dams would in no way contribute to the water needs of the southwest, but are conceived solely for the purpose of producing hydroelectric power to finance a water supply project elsewhere in the region; and

Whereas coal, shale oil, and atomic energy offer alternative sources of electric power for the area: Now, therefore, be it

Resolved by the Izaak Walton League of America in convention assembled this 19th day of June 1965, at Cody, Wyo., That it opposes construction of dams at Bridge Canyon and Marble Canyon on the Lower Colorado River, or any other regimentation of the Colorado River between Glen Canyon Dam and Hoover Dam which would have similar impact upon the national park and the national monument.

THE IZAAK WALTON LEAGUE OF AMERICA, INC.,
COLORADO DIVISION,
August 23, 1965.

Re H.R. 4671, H.R. 4706, and H.R. 9248.

Hon. WALTER ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation, Committee on Interior and Insular Affairs, House Office Building, Washington, D.C.

DEAR CONGRESSMAN ROGERS: A heritage or an inheritance of devastation. This is the topmost thought of hundreds of members of the Izaak Walton League in Colorado. Do we want to leave our children an inheritance of beauty and splendor unsurpassed or do we want to leave them a pile of concrete with ugly powerlines stretching as far as the eyes can see?

The dams on the Colorado River have been of vital interest to Coloradoans for a number of years just as the Colorado River has been since most of our western slope waters run into this huge river. The Hoover Dam was built—and promptly filled with silt. A number of other dams have been built below it, and then, of course, there is the Glen Canyon Dam which inundated incomparable portions of the Nation's grandest scenery.

Where does the destruction of the Nation's most picturesque and majestic scenery stop? Or does it? Does this go on until all of the national parks have been devastated; all of the national monuments destroyed by one means or another if they satisfy, not justify, the desires of a person, or a department of the Government, or industrial interests?

It has been recognized that the proposed Bridge Canyon Dam and the Marble Gorge Dam are not for reclamation purposes but for Federal hydroelectric power. We in Colorado know that we have vast coal areas as well as have the other four corner States that could supply an unknown amount of electricity for years to come at a lower cost. This coal is in the general area or within 200 miles of the proposed dams. Our interest is not in how much coal there is in Colorado but rather in the preservation of our natural scenery which belongs to every person in the United States.

The Colorado Division of the Izaak Walton League of America would like to go on record as vigorously opposing any measures to authorize either the Bridge Canyon or Marble Gorge Dams on the Lower Colorado River, or to any other regimentation of the river in the Grand Canyon area between Glen Canyon Dam and Hoover Dam. The Colorado division opposes bills H.R. 4671, H.R. 4706, and H.R. 9248.

Sincerely,

JOSEPH F. STAMMEN, *President.*

COLORADO WHITE WATER ASSOCIATION,
Denver, Colo., August 20, 1965.

Congressman WAYNE N. ASPINALL,
Chairman, House Committee on Interior and Insular Affairs,
Washington, D.C.

DEAR CONGRESSMAN ASPINALL: The Colorado White Water Association wishes to have the following statement placed in the record of the hearings on the lower Colorado storage project.

We wish to go on record as opposing this project. Briefly our objections are as follows:

1. There is not enough water in the river to fulfill this projects plans and also satisfy the upper basins rights. The figures that the Bureau used for available water are in fact not truthful. The figures also do not take into account any long drought and its effect on present needs and upper basin needs.

2. The dams associated with this project violate both national parks and wilderness areas. One dam has been postponed—not canceled.

3. Power from the dams will not produce the profits stated by the Bureau, and therefore the public will not only have to pay for the water development, but the power development (loss) as well. Again the figures on water passing (power generated) are not truthful.

4. Any more dams on the river will decrease the flow and there is good reason to believe that the quality of water will also decrease.

Although this is a very brief outline of our objections, we believe that testimony before the committee will fully document these findings as many other

people in Colorado and elsewhere have reached the same conclusion that we have reached.

We, therefore, wish to go on record as opposing each and every part of the project, for both national and for our State's interests.

Yours truly,

CLYDE JONES,
Chairman, Conservation Committee.

SIERRA CLUB, ATLANTIC CHAPTER,
New York, N.Y., August 21, 1965.

Hon. WAYNE N. ASPINALL,
House Interior and Insular Affairs Committee,
Washington, D.C.

DEAR REPRESENTATIVE ASPINALL: The Atlantic Chapter of the Sierra Club wishes to put itself on record, in this letter, in opposition to the proposed building of Bridge Canyon and Marble Canyon Dams in Colorado. We understand that hearings on Lower Colorado River Basin project legislation will be held next week.

We oppose the building of these dams for two reasons. First, we feel that the backup of river water behind the dams would ruin the scenic beauties of the great canyons of the lower Colorado and disastrously disturb the ecological and geological balance of the river. Once flooded, the canyons could not be restored to their original state. Sight of the full grandeur of the canyon's national park and monument, which many of our Atlantic chapter members have enjoyed, would be denied to our descendants.

Second, these dams would not be water producing. In fact, evaporation from the lakes they would create would lessen the available water supply. Already-existing dams on the river are adequate to impound the river's peak flows. The dams would be used only to produce power, power which steam-electric plants utilizing the region's natural fuels could produce without destruction of some of the country's most magnificent scenery.

We in the eastern-seaboard chapter of the Sierra Club find that more and more of our new members are joining the club because the club's campaigns to save western wilderness lands from exploitation and ruin have caught their attention and enthusiastic support. Many of the newest members were drawn in by the Sierra Club's Grand Canyon book, "Time and the River Flowing." We believe this reflects a rapid growth in conservationist feeling in the United States. We urge the Interior and Insular Affairs Committee to take into account the growing wish of American citizens to protect their natural heritage. We urge that plans for these Grand Canyon dams be canceled.

Sincerely yours,

JESSIE KITCHING,
Director, Atlantic Chapter, Sierra Club.

WILDLIFE MANAGEMENT INSTITUTE,
Washington, D.C., August 27, 1965.

Hon. WAYNE N. ASPINALL,
Chairman, Committee on Interior and Insular Affairs, House Office Building,
Washington, D.C.

DEAR CONGRESSMAN ASPINALL: The institute will not be able to have a representative attend the committee's hearings on H.R. 4671 and similar bills, which seek to authorize the "construction, operation, and maintenance of the Lower Colorado River Basin project." In response to the committee's invitation, however, we wish to take this opportunity to comment on aspects of the proposed project.

Conservationists urge the committee to stipulate clearly that fish, wildlife, and recreational interests be fully represented and considered in any studies initiated under the terms of title II. Far more than supply, engineering, and economic considerations are involved in the exportation of water from one river basin to another. Modification of the water regimen of a drainage can exert both a direct and a long-term influence on the kind, abundance, and distribution of fish and wildlife resources. For this reason, it is suggested that

the committee acknowledge and define the fundamental role of the appropriate fish and wildlife agencies in any program that may be authorized to implement this title.

In title III, with respect to the authorization of Bridge and Marble Canyon Dams, we believe that neither should be authorized at this time. Aside from the many pertinent questions about the actual need for an impoundment at either site, as those facilities relate to the overall basin project plan, there is widespread concern about and opposition to this proposed invasion and impairment of the Grand Canyon National Park and Monument. The ecological changes that would follow the impoundment of water at either site, including also the effect of the operation of the projects on the natural character and dedicated purpose of Grand Canyon, have not been studied fully. The two proposed dams involve matters that are of national concern, and the decisions concerning them should not be made quickly or solely within the context of regional development considerations. Furthermore, with respect to the new authority that would be granted the Secretary in title II, authorization of Bridge Canyon and Marble Canyon Dams would prejudice the studies and investigations concerning comprehensive planning for Lower Colorado River Basin water resources.

Should the lower Colorado project be authorized, it is hoped that section 308(a) will be implemented fully so as to provide every opportunity for accommodating present and emerging demands for outdoor recreation and associated hunting and fishing. Leeway should be provided to mitigate fish and wildlife habitat losses where they occur and to enhance these resources whenever possible.

The Bureau of the Budget has reported to the committee that it is undecided whether the authorization for the reservation of not to exceed 84,000 acre-feet annually of mainstream water for non-Federal fish and wildlife installations, exclusive of California, is "in addition to reservations made and recognized in the Supreme Court's decree. * * *." All available information shows that the reservation is contemplated as part of Arizona's share of the Colorado River water. We urge the committee to clarify this point so there will be no delays in this regard, should the basin project be authorized.

It is believed that the committee already has received copies of the plan of the Arizona Department of Game and Fish to use reserved water for the operation and maintenance of 50 or more fishing lakes that it would construct at an expense of nearly $20 million during the next 25 years. A recent study by the University of Arizona shows that benefits to the State and local economy are far greater per acre-foot of water for this purpose than from any other use to which Colorado River water can be put, except for domestic or municipal needs. Estimates contemplate that the lakes planned by the Arizona department would supply about 2 million man-days of sport fishing per year. This program should be permitted to proceed apace with any other facet of the central Arizona project that may be authorized.

A final point involves the functions with which the proposed Colorado-Pacific Regional Water Commission would be charged. The burden of the commission's work, it would appear, would be directed toward the conservation, augmentation, and beneficial use of water and related land resources and to study of demand-supply situations to facilitate the preparation of future development plans. Studies of this kind are fundamental and necessary, to be sure, but it is believed that the commission should serve as the stimulus for an equally important series of studies and demonstrations. These would involve zoning on the part of the basin States so as to encourage settlement, development, and related human land use and occupancy in such places as to be compatible with the ability of the basin to supply water requirements. In other words, it seems that the States and Federal Government should have a responsibility to regulate development in a water-shy area so as to prevent, rather than to encourage, perennial overcommitment of available water supplies.

The present practice in arid areas is mostly one of permitting a water supply problem to develop and then taking belated action to service water demands by the authorization and construction of immense projects that hold the potential of destroying or greatly impairing resources and values treasured by millions of people. This prevents good resource planning.

I would appreciate having this letter made a part of the hearing record.

Sincerely,

IRA N. GABRIELSON, *President.*

STATEMENT FROM MRS. CARL B. NEWLON, LEGISLATIVE CHAIRMAN OF THE COLORADO FEDERATION OF WOMEN'S CLUBS

About the central Arizona project of the southwest water plan. Let me quote first the longstanding policy of the General Federation of Women's Clubs relative to the National Park Service.

"Whereas our national parks and monuments are administered by the National Park Service under policies which are intended to insure permanent preservation of the scenic, scientific, and historical features they contain, and which prohibit grazing, logging, mining, and engineering, or any other projects which will destroy their natural character; and

"Whereas many interests seek to despoil national parks and monuments by urging legislation by the Congress that would open them to exploitation: Therefore

"*Resolved*, That the General Federation of Women's Clubs asserts strong opposition to any efforts to commercialize any national park or monument except such developments as may be demonstrated clearly to be necessary to the national defense."

The proposed Marble and Bridge Canyon Dams cannot be considered the concern of Arizona citizens alone. The Grand Canyon is one of the world's scenic wonders. It offers geological and ecological information to all vititors including students of all ages. It provides the only majestic scenery of this kind in the world.

Women in the Colorado Federation of Women's Clubs are sympathetic with Arizona's constant and growing water problems. These are the problems of the Nation as a whole. There is no thought of permitting the proportion of the flow of the Colorado River allotted to the lower basin to be diminished. However, cannot the power the dams are intended to produce be supplied by some other method?

Surely even infrequent visitors to the Grand Canyon prefer it to any reservoir which would offer the usual boating, and possibly fishing, any reclamation dam supplies. The Grand Canyon is unique.

We owe the millions who follow us the opportunity to see the Grand Canyon. Let's keep it.

Mr. UDALL. Under previous unanimous-consent agreement, the Honorable John Murdock was allowed to file a statement. He was in the committee room at the time. I present his statement for the record.

(Mr. Murdock's statement follows:)

STATEMENT BY THE HON. JOHN R. MURDOCK

Mr. Chairman and members of the committee—first, I want to express my sincere thanks and appreciation for the friendly reception and the hearty welcome which you extended to me on the opening day of these hearings. It is heart warming, indeed, to find that after all these years I still have friends who remember—friends who recall my own devotion to the same work to which all of you are now dedicated on this great committee—and friends who continue to express their appreciation for my efforts toward the development of the vital water resources of our Western States.

As I look back over the years to the days when I was here with you as a member, and later as chairman, of this committee, I can't help but marvel at the changes which have taken place—not changes of material things, but changes in men, changes in thinking and changes in philosophy, attitude, and spirit. In those days we had bitter battles in the great Southwest—not only between States but personally between the many people who represented those States. There were emotional explosions which became almost irreparable—explosions which caused people on both sides to take strong and unchangeable positions—hard positions which made it almost ridiculous to even dream of negotiating the great compromises which you gentlemen and the leaders of our Western States have already worked out in current efforts to arrive at a workable solution of our western water problems. I could scarcely believe my ears when I sat in this hearing room on the opening day and heard the distinguished senior Senator from the State of California—whose State, in my day, was our mortal enemy—tell this committee that he was glad to join his

California colleagues, "as Americans living across the river from Arizona, in saying Arizona has a critical and crucial problem, and I want to see the central Arizona project built even though there were not to be included conditional authorizations."

For a Californian, in his position, to so unequivocally endorse and advocate construction of our long dreamed of central Arizona project, demands great courage and great dedication to the preservation of our western economy. I'm sure that our own leaders in the State of Arizona will be no less courageous and no less cooperative in working with all other Colorado River Basin States toward a solution of our mutual water problems.

In my day, our central Arizona project by itself seemed to be a tremendous undertaking. It included new and difficult engineering concepts relating to both power and water. It was ridiculed by our critics as "a grandiose scheme," "an unworkable dream," and "a billion dollar boondoggle." Yesterday's engineering problems, in the interim, have been solved time and again in the construction of badly needed reclamation projects in other areas and in other States. The size of our project is no longer so impressive when compared to the great Central Valley project in California, to the whole California water plan, to the construction of great dams on the Columbia and Missouri Rivers—and last but not least, to the great Colorado River storage project, credit for authorization and construction of which goes principally to the chairman of this committee. Our own early concept of the central Arizona project, standing alone, has been radically and boldly changed, principally through the vision and courage of present day water leaders who now talk—not about separate water projects in the various States—but about great regional projects encompassing several States, and, in one intriguing concept, even about joining with Canada and Mexico in a trination long-term plan which would provide abundant water for the next hundred years or more.

I congratulate the chairman and members of this committee for encouraging the dreams, the visions, and the "big thinking" of today's water leaders. I congratulate you for inquiring into regional water problems and in seeking regional and basinwide solutions to our Nation's water needs. This committee, under the guidance of its present chairman, has come a long way, since the heartbreaking bitter days of the 1940's.

Over the years, I have maintained a deep faith and an abiding confidence that this committee would ultimately resolve the many problems which have delayed fulfillment of our Arizona dream. As I have listened this week to the many witnesses who have come here to give you their help and advice—as I have listened to former critics and former opponents of our dream offer their cooperation and assistance—as I have listened to the searching questions of the chairman and his committee—I have come to the firm belief that a happy ending is finally in sight. I cannot conclude these comments without finally telling you how proud I am—and how grateful I am—that you, as my successors on this committee, are well on the way toward finally resolving these all-important problems. Nothing will give me greater lasting satisfaction than to see the results of your current efforts as an accomplished fact.

Mr. UDALL. During the testimony of the representatives of the Hualapai Indians and Mr. Marks, I inquired about the exact legal status of the reservation lands especially as it pertains to the damsite. There was some suggestion made that the Hualapai Indian Reservation covers both sides of the river at this point. Actually one abutment and part of the reservoir is in the Lake Mead Recreation Area and not on the Hualapai Reserveation.

I have letters from the Solicitor of the Interior Department dated August 31, September 1, and September 8, 1965, outlining the legal status of the Hualapai Reservation and giving the specific reservations and withdrawals made from time to time for powersite development. I think these particular documents are important to have in drawing and writing the bill. I would ask unanimous consent that this material be received for the record.

Without objection, it is so ordered.

(The material referred to appears on p. 657.)

Mr. UDALL. In that connection, the Interior Department has furnished me with a number of maps showing the exact location of these powersite reservations in the Bridge Canyon area and below the Grand Canyon, and a map showing the official boundaries of the Hualapai Reservation. I think these should be made a part of the file. Without objection, this will be so ordered.

(The maps referred to will be found in the subcommittee files.)

Mr. UDALL. I am preparing a memorandum on Arizona's legal position as to the inclusion of the Gila River system and its tributaries in determining upper basin obligations under the Colorado River compact. This was raised by several of the upper basin witnesses. We have their legal point of view, and I thought there should be a summary of the Arizona point of view.

Mr. HOSMER. Reserving the right to object, Mr. Chairman. That is a matter that is encompassed in the litigation between Arizona and California, is it not, which was made a subject of the Supreme Court case?

Mr. UDALL. No; I am talking about the rights as between lower basin and upper basin, a question Mr. Ely mentioned in his testimony, whether the compact interpretation as between the upper basin and the lower basin must include tributaries. This is a separate question from the Arizona-California litigation.

Mr. HOSMER. Would the gentleman extend his request to a memorandum of Mr. Ely on the subject?

Mr. UDALL. I would, to permit me to file one for Arizona and you to file one for California if you so desire, and you can obtain that from Mr. Ely.

Mr. HOSMER. Thank you.

(Memorandum referred to by Mr. Udall follows:)

PHOENIX, ARIZ., *September 2, 1965.*

MEMORANDUM FOR HON. MORRIS K. UDALL

From: John Geoffrey Will, special counsel, Arizona Interstate Stream Commission.

Subject: The extent to which the waters of the Gila River system, Arizona, before they reach the main stream of the Colorado River, may be called upon to share the burden of the Mexican Treaty, and the meaning of article III(e) of the Colorado River compact.

PART I

There have been intimations during the course of the hearings on H.R. 4671 and 36 other identical bills,[1] that, in the event there is in the main stream of the Colorado River insufficient surplus with which to service the Mexican Treaty,[2] the lower basin is required within the terms of the Colorado River compact,[3] before the amount of the deficiency is finally calculated, to deduct therefrom an appropriate part of the uses made of the waters of the Gila River system in Arizona.

For the reasons hereinafter stated, I am of the opinion that the waters of the Gila River system in Arizona, before they reach the main stream of the Colorado River, may not be called upon to share the burden of the Mexican Treaty.[4]

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[1] See, for example, the statement of Governor Love of Colorado.
[2] Treaty series 994.
[3] Federal Reclamation Laws, Annotated, U.S. Department of the Interior, Bureau of Reclamation (1953), pp. 363 et seq., particularly art. III(c).
[4] Northcutt Ely, Esq., is likewise of the view that lower basin tributaries are not so liable. In this connection, see his statement to the committee on Aug. 27, 1965.

The pertinent provision of the compact is article III(c) thereof, which reads as follows:

"If, as a matter of international comity, the United States of America shall hereafter recognize in the United States of Mexico any right to the use of any waters of the Colorado River system, such waters shall be supplied first from the waters which are surplus over and above the aggregate of the quantities specified in paragraphs (a) and (b); and if such surplus shall prove insufficient for this purpose, then the burden of such deficiency shall be equally borne by the upper basin and the lower basin, and whenever necessary the States of the upper division shall deliver at Lee Ferry water to supply one-half of the deficiency as recognized in addition to that provided in paragraph (d)."

Neither the foregoing, nor any other, provision of the Colorado River compact has ever been authoritatively construed as contemplating any obligation on the Gila River system in Arizona to contribute, except through occasional floodflows, to the servicing of the Mexican Treaty. On the contrary, it appears that neither the negotiators of the compact, the U.S. representative on the Colorado River Compact Commission, nor the Congress have ever considered that uses of the Gila River system in Arizona would have to yield to the servicing of the treaty.

At the time of the negotiation of the Colorado River compact, the basic document, to which the negotiators looked for reliable information regarding virtually all aspects of their task was the so-called Fall-Davis report (subsequently published as S. Doc. No. 142, 67th Cong., 2d sess.). It is interesting to note, at page 4 of the foregoing document, the statement that: "Most of the time the Gila River is nearly dry * * *" and at page 32, the statement that information concerning the acreage irrigated and irrigable in the Gila River Basin "has been given no study since it does not affect the general problem." It is apparent from the foregoing that the negotiators of the Colorado River compact did not look (except as its infrequent floodwaters might in the future be regulated to that end) to the Gila River to make any contribution to the servicing of the Mexican Treaty.

This question was again considered before the Congress consented to the Colorado River compact. At that time, Senator Hayden posed to the late Herbert Hoover, then Secretary of Commerce, the following question, among others:

"Is there any possibility that water stored by dams in the tributaries of the Colorado River in Arizona, such as Roosevelt Reservoir on the Salt River, or the San Carlos Reservoir on the Gila, might under the terms of such a treaty be released for use in Mexico to the injury of the water users of the projects for whose benefit such dams were constructed?"

Mr. Hoover's reply was, in pertinent part, as follows:

"I cannot conceive of the making or the ratification of a treaty which would have such an effect. If it were possible to believe that the Federal Government would treat its own citizens with such absolute disregard of their property and rights, I presume that they would receive ample protection, even as against the Government under the provisions of the Federal Constitution." [5]

During the course of the hearings on the Mexican Treaty, while interrogating counsel for the U.S. Boundary Commission, Senator Hayden said:

"Here is the idea expressed in another way by the Salt River Valley Water Users' Association. They say that: Whereas the proposed treaty if approved will take precedence over all existing Federal and State statutes and all written instruments relating to the waters of the Colorado River and its tributaries and will place the administration of said treaty in the hands of a commission which will have power to take water from the prior users on the American lands to fulfill the treaty guarantee to Mexico and * * *.

"Mr. CLAYTON. Senator, that simply is not true. Take, for instance, the case of your constituents in the Salt River Valley of Arizona. This treaty provides that 1,500,000 acre-feet shall be delivered to Mexico wherever it arrives in the boundary portion of the river. Does that mean that the Boundary Commission will have to go up Salt River Valley and say 'Do not divert this water, but let it run downstream to meet this demand?' It does not mean that at all. As a matter of fact, aside from the return and other excess flows that are going to be in the river anyway, part of which might come from the Salt River project

[5] Hearings before the Committee on Foreign Relations, U.S. Senate, 79th Cong., 1st sess., on Treaty with Mexico Relating to the Utilization of the Water of Certain Rivers, pt. 1, p. 60.

and along the Gila River, the regulation of the Mexican supply is to be done under the treaty at Davis Dam, and there above, both for the All-American Canal and down the river.

"Senator HAYDEN. Let me get that clear in my mind. The treaty provides that the regulating point is the Davis Dam on the main stream in the Colorado River?

"Mr. CLAYTON. Yes, sir.

"Senator HAYDEN. The Gila, being a tributary, comes in very much below. There is no regulating point on that stream?

"Mr. CLAYTON. There is none.

"Senator HAYDEN. Do you think in that sense they are protected?

"Mr. CLAYTON. Yes. But here again neither country is obligated to construct any flood control devices on the Colorado River anywhere. The treaty says that investigations shall be made of flood control below the Imperial Dam. We report that back to the two Governments; and only to the extent that they approve them and Congress appropriates the money for them are they to be built.

"As suggested by the Committee of Fourteen and Sixteen in Santa Fe in April 1943, a feature of that would be a dam at the lower end of the Gila River, below all developments on the Gila, at the Sentinal site or some other site, which would serve not only for flood control but to regulate water. We might be able to regulate water there to a certain extent, so as to insure credit for these flash floods that come down. We would impound them and let the water out according to schedule, but that would not affect the people up above on the Gila River or any of its tributaries.

"Senator HAYDEN. As I have said to my people, if it could be possible under this or any other treaty, to deprive users of water in the Salt River Valley in Arizona of a certain quantity of water in order to have it delivered to Mexico, there is no practical way on earth of getting it there.

"Mr. CLAYTON. There is none; it would not even come down the river, Senator.

"Senator HAYDEN. The water would not be wanted except in time of drought. There is more than a hundred miles of sand and gravel between the lowest dam in the Gila River and Mexico. It could not possibly be flooded. So as a practical matter I do not think there is anything to worry about. But theoretically, is there any? Just 22 years ago I asked the same question of Mr. Hoover in connection with the ratification of the Colorado River compact.

* * * * * * *

"In this case I do not want to vote to ratify a treaty that would have the effect as outlined in the question I propounded. You say it is impossible under the treaty that that effect could take place?

"Mr. CLAYTON. Theoretically and practically, there is nothing in the treaty that even hints at that; and, practically, as you say, it would be impossible."[6]

Again during the course of the hearings on the Mexican Treaty, the late Charles A. Carson, having previously testified as to his understanding regarding the obligations of the upper and lower divisions to contribute to any shortages in water for servicing of the treaty, said:

"Mr. CARSON. It will not occur for many years. But the reason I am bringing this up is that I understand that some of the people in Arizona have raised the question with our Senators that it might be possible under this treaty for some water to have to be furnished from the Salt River and the Gila River to furnish this Mexican supply. Then, further, this treaty does not in any degree set aside or supersede State laws as to priority. If Arizona had to furnish it, it would be from the junior priorities, which will be the mainstream uses, not Gila uses and the Salt River uses * * *.

"Senator MURDOCK. You would apply substantially the same rule, would you not, as to the other business?

"Mr. CARSON. Yes, sir.

"Senator MURDOCK. That under their State laws, on the basis of priority, the rights would be protected?

"Mr. CARSON. Yes, sir."[7]

Again during the course of the hearings on the Mexican Treaty, when Mr. Greig Scott, then counsel for the Salt River Valley Water Users' Association was testifying, the following interchange occurred:

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[6] Hearings, supra, pp. 127–129.
[7] Hearings, supra, pp. 266–275.

"Mr. SCOTT. * * *

"Much has been said about the amount of return flow going into Mexico. As I have previously told you, there is approximately 1,700,000 acre-feet of gravity water used in central Arizona above Gillespie Dam. I have lived in Arizona for 30 years. In that time no return flow water has ever reached the Mexican border; in fact, no return flow water has ever got beyond a few miles below Gillespie Dam.

* * * * * * *

"The Geological Survey measures the water that passes both in and over Gillespie Dam, and measures the water that passes the measuring station at Dome, about two-thirds of the distance between Gillespie Dam as well as the water passing Dome. In only 20 of the 120 months was there any measurable flow at Dome. We are now entering the 42d consecutive month when there has been no flow at Dome whatsoever."[8]

* * * * * * *

It appears further from the testimony at the hearings in question, that, not only would uses on the Gila River system not have to yield to the servicing of the Mexican Treaty, but that, for the supplying of any deficiency shared among the two divisions, transmountain diversions in Colorado would have to yield. Note, for instance, the following statement by R. J. Tipton:[9]

"We in Colorado have adopted as a State policy—and that policy is written into each enabling act, into each act which permits the formation of a district to finance these transmountain diversions—a provision which essentially makes the transmountain diversions junior to any development in the physical Colorado River Basin in Colorado. In other words, in the future if any project in Colorado must give way to satisfy the terms of the compact or must give way to take care of our part of one-half of any deficiency to supply water to Mexico, it is these major transmountain diversions. * * *"

It appears also that a very distinguished statesman from Colorado thoroughly agreed with the foregoing view. The late Eugene D. Millikin felt strongly that the upper division was willing to bear its share of the Mexican Treaty burden. Consider, for instance, the following colloquy:

"Senator MILLIKIN. We get the peace and the stability by knowing what is the claim of Mexico on the waters of this river. Until we knew what that claim is we do not have the peace and the stability with which we can go ahead with our own development.

"Senator WILEY. Of what pertinency was the testimony this morning, then, as to the water up in that area?

"Senator MILLIKIN. I am glad you asked that question. The pertinency—and I think Mr. Tipton agrees with me; he has already said so—followed your own question, which I respectfully suggest indicated that the only pinch from this proposed treaty, if there is a pinch, falls on California. Therefore, Mr. Tipton was demonstrating, and I think has completely demonstrated, that the pinch, if there is a pinch, is assumed by everyone throughout the river basin; and we are willing to assume that pinch in order to have the peace and the stability with which we can develop our water resources.

"Senator WILEY. Let me get that clear. By the word 'pinch' you mean scarcity of water?

"Senator MILLIKIN. If there is a surplus we have no problem at all. We have got to keep our mind on the possibility of a pinch.

"If there is a pinch, then, looking at it prudently, we in the upper and lower basins have got to see what it will cost us, and if it costs us anything, is it worth the cost? In Colorado we say—or I say, tentatively at least—we are willing to pay for the pinch, if there is a pinch in it, in order to have stability * * *."[10]

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[8] Hearings, supra, pt. 3, pp. 989 et seq.

[9] Hearings, supra, pt. 4, p. 1291.

[10] Hearings, supra, pt. 4, p. 1302. This view was subsequently echoed by Hon. Edwin C. Johnson in his testimony in support of the authorization of the Colorado River storage project. (See: Hearings before the Subcommittee on Irrigation and Reclamation of the Committee on Interior and Insular Affairs, U.S. Senate, 83d Cong., 2d sess., on S. 1555, p. 25, where he said, referring to the servicing of the Mexican Treaty: "* * * but if there be no surplus in the Colorado River system, then the burden of providing the necessary water will fall equally on the Lower and Upper Colorado River Basins." He subsequently estimated Colorado's share of the Mexican Treaty burden at 375,000 acre-feet per annum. (See hearings, supra, p. 26.)

Utah also took the view that, except for occasional flood flows, the Gila River system in Arizona was not intended to contribute, any more than the Virgin River in Utah, to the servicing of the Mexican Treaty.[11]

For the reasons above stated, it is my conclusion that Gila River waters are not and never have been subject to diminution for the purposes of satisfying any part of the Mexican Treaty burden.[12]

PART II

During the course of these hearings there has been considerable talk about the "consensus" that was reached between the upper basin and lower basin in the recent Washington meetings. There was also testimony concerning the "understanding" of the two basins that the upper basin should not be prejudiced by any temporary lower basin use of so-called upper basin waters. Almost entirely overlooked in all of these discussions was article III (e) of the compact which reads:

"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." [13]

(Mr. McFarland's memo of Aug. 18, 1965, the "History of Development on the Colorado River," does not even list this paragraph as one of the "main provisions" of the compact.)

Article III (e) obviously means what it says—and prevents the upper basin from withholding waters (even within their ultimate legal entitlements) which is not presently being used or needed for domestic and agricultural uses. The compact thus provides, as a matter of absolute right that the upper basin not withhold any water which it is not using nor needing for domestic or agricultural uses, and which can be used for such purposes in the lower basin. The upper basin may feel justified in seeking and securing legal protection against any lower basin attempt to claim in the future permanent rights as attaching to the lower basin's use of waters available under article III (e) of the compact and which may be within the upper basin's ultimate legal entitlement (sometimes conveniently and erroneously referred to in the hearings as "upper basin" water). However, there is no legal question as to the lower basin's absolute right to use such waters until such time as the upper basin is in a position to use them for domestic or agricultural uses.

Respectfully,

JOHN GEOFFREY WILL.

Mr. UDALL. I have letters from a number of Arizona associations, the Arizona Cattle Growers Association, the League of Arizona Cities & Towns, the Arizona Association of Soil Conservation Districts and others, in support of the legislation. I would ask that they go in the file or in the record at the discretion of the chairman.

Mr. HOSMER. Reserving the right to object, I would suggest that the same position be adopted for them as the California statements; namely, placed in the file with appropriate notations in the record.

Mr. UDALL. I would amend my request accordingly and without objection, it is so ordered.

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[11] See, for instance, the testimony of the late W. R. Wallace. (Hearings, supra, pt. 5, pp. 1522–1537.)

[12] It is and always has been Arizona's position that lower basin tributary uses are not required to be accounted for in any basis versus basin accounting under the compact. See: Arizona's briefs before the special master, and before the Supreme Court. The treaty itself provides only for the delivery of mainstream water (see III, Colorado River, art. 10) according to schedules dependent upon regulation at Davis Dam (see art. 15).

[13] See also art. IV(b): "Subject to the provisions of this compact, water of the Colorado River system may be impounded and used for the generation of electrical power, but such impounding and use shall be subservient to the use and consumption of such water for agricultural and domestic purposes and shall not interfere with or prevent use for such dominant purposes."

(The documents referred to will be found in the subcommittee files. A list of the organizations follows:)

The League of Arizona Cities & Towns.
Arizona Cattle Growers Association.
Arizona Cattle Feeders Association.
Arizona Farm Bureau Federation.
Arizona Association of Soil Conservation Districts.
Central Arizona Project Association.
Arizona Interstate Stream Commission.
Nogales Santa Cruz County Chamber of Commerce.
City of Sierra Vista.
Board of Supervisors of Yuma County.

Mr. UDALL. I have been asked by Mr. Aspinall and Mr. Rogers to announce that this will conclude the public hearings on this legislation; that the record will be kept open until 5 o'clock Wednesday, September 15, to receive additional statements or material which will go in the record or in the file, depending on whether they meet the requirements of the committee and in the discretion of the chairman and the ranking minority member. Is there any objection to this?

Mr. BURTON of Utah. I shall not object but when you say "close the public hearings," can you give us any light as to what the next step is? Are you going to hold public hearings when it comes before the full committee, or is the gentleman in a position to say?

Mr. UDALL. Under the traditions of this committee, all public hearings are normally held before the subcommittee. It is my understanding, though I am not authorized to speak, that this will terminate public hearings unless the chairman of the subcommittee and the chairman of the full committee determine that additional testimony should be received.

Mr. HOSMER. Mr. Chairman, I recall in connection with the upper Colorado project that the committee did see fit to reopen its hearings because it took a year or two or three or four to passage from deliberation.

Mr. UDALL. This can be done. The chairman of the full committee or the subcommittee could call further public hearings. This would be entirely within their discretion.

The subcommittee will now conclude the public hearings on this legislation, subject to that understanding, and the subcommittee will stand in recess subject to the call of the Chair.

(Whereupon, at 11:45 a.m., the subcommittee recessed, subject to the call of the Chair.)

(Subsequent to completion of the hearings the following material was received and accepted for the record:)

PHOENIX, ARIZ., *September 10, 1965.*

Hon. WALTER P. ROGERS,
Subcommittee on Irrigation and Reclamation,
House of Representatives, Washington, D.C.:

During the course of my testimony before your subcommittee on August 30 in connection with H.R. 4671 and other identical bills, I made the statement, in effect, that the central Arizona project water supply would be devoted almost entirely to domestic use. My statement was, of course, intended as a prediction of what is bound to happen in the long-range future if the area continues to grow in population as it has in the past. In context, I think it clear enough from my testimony that I was looking at the long-range future. However, it appears that some witnesses who followed me have used my statement as if I intended to say that the water supply to be provided by the central Arizona

project would not be utilized for agricultural purposes. We all know this may be true in time, but it can be readily seen that during the majority of the repayment period, the agricultural water uses could not possibly bear the cost of water without the aid of revenues from the hydroelectric facilities on the river.

I shall appreciate it if you will place this record at some appropriate point in the record of hearings in order that all basis for misunderstanding in connection with my testimony may be removed.

BARRY GOLDWATER.

STATEMENT BY JAMES F. DOHERTY, LEGISLATIVE REPRESENTATIVE, AMERICAN FEDERATION OF LABOR & CONGRESS OF INDUSTRIAL ORGANIZATIONS

Mr. Chairman, my name is James F. Doherty. I am a legislative representative of the American Federation of Labor & Congress of Industrial Organizations. On behalf of organized labor, I wish to express my appreciation for this opportunity to set forth our position on H.R. 4671 and 35 other identical bills to authorize construction, operation, and maintenance of the Lower Colorado River Basin project by the Bureau of Reclamation, Department of the Interior.

The broad goal of this legislation is to provide the means by which the immediate and pressing water needs of the Pacific Southwest region can be met. The outlines of the plan would also be a basis for a comprehensive program to solve the long-range water supply requirements of the Western States in the Colorado River Basin for both the upper and lower areas.

The AFL–CIO endorses the general goals of H.R. 4671 and the other bills. The region needs assurance of a present and future water supply to sustain its economic growth, and to support the large population growth in the area of the past two decades.

We in the AFL–CIO strongly urge that this project be so ordered as to maintain both the letter and spirit of congressional policies relative to the greatest good for the greatest number. Specifically, we urge that, before this subcommittee completes its deliberations on the bill, the subcommittee gets from the Secretary of the Interior his formal assurance that landholdings in excess of 160 acres in the Salt River project be subject to lawful recordable contracts.

The Secretary should be directed to report to the Congress and to the President that all necessary water observation and salvage and pollution control measures will be undertaken immediately to assure that all available supplies are being fully and efficiently put to use.

With these conditions imposed by the Congress and carried into effect by the Secretary, we would unhesitatingly support this legislation.

In the broader sense we hope that the Congress will investigate the new situation in which western reclamation finds itself: First, facing competing municipal and industrial water demands; and second, the inordinate costs of homesteading either a new project or one that is receiving supplemental water supply.

We must find ways to continue to make it possible to homestead a family sized farm in the West, and in so doing to use a revitalized reclamation program to help fight rural poverty.

Failure to come to grips with this problem will have injurious effects upon the entire western reclamation program which, in the past, has contributed so much to development of this region and to the economic strength of the Nation.

On behalf of the AFL–CIO I thank the committee for this opportunity to express our views.

TEXAS CONSERVATION COUNCIL, INC.,
Houston, Tex., August 27, 1965.

Representative WALTER ROGERS,
Chairman, Irrigation and Reclamation Subcommittee,
House of Representatives, Washington, D.C.

DEAR MR. ROGERS: The Texas Conservation Council wishes to go on record as definitely opposed to Bridge Canyon and Marble Canyon Dams, which are included in the Lower Colorado River Basin project. We are not opposed to the entire project but we do oppose the construction of these two dams for the reason that they would do irreparable damage to Grand Canyon National Park

and Monument and that they are, admittedly, only power dams and as such are not necessary to the success of the project.

These dams (and we include Bridge Canyon Dam because we are fully aware that its deletion from present consideration is only temporary) are not needed and would actually decrease the amount of available water in the lower basin. Streamflow records show that there is not enough water to operate both Glen Canyon and Hoover Dams for maximum output and that the proposed additional dams would only waste water through evaporation in this hot, arid country and through seepage. In Marble Gorge there would be considerable loss of water through seepage, possibly far more than the Bureau's estimate since no one can possibly predict how much water will become lost storage in the caves and solution channels of the redwall limestone. Marble Gorge Reservoir might even disappear like Anchor Dam Reservoir on the Bighorn River in Wyoming.

Hydroelectric power is no longer as important as it once was and everyone except the Bureau seems to realize this. The Southwest has huge deposits of coal, gas, and oil shale so that fuel is readily available. Fossil fuel plants can produce electricity cheaper than the proposed hydroelectric plants and can be built for a fraction of their cost; they can also be built where needed and so save the cost of long transmission lines. Atomic power is also on the way and will probably make hydroelectric plants obsolete long before these plants can pay for themselves. The hydroelectric plants are not even needed for peaking power, as claimed, since other powerplants can now supply peaking power in seconds. In our opinion the proposed dams are the worst kind of boondoggle.

The Bureau of Reclamation seems to be stressing recreation far more than reclamation. These dams will not reclaim a single additional square foot of land and it appears that even the Bureau does not claim that they would, but the Bureau goes all out to stress the recreational value of reservoirs. We object to the use of Federal funds to publish the elaborate color brochure entitled: "Lake Powell, Jewel of the Colorado" and we find particularly obnoxious the caption under a picture that reads: "To have a deep blue lake where no lake was before seems to bring man a little closer to God." It's too much like revising Robert Browning's well-known lines to read: "God's in His heaven and all's right with the world" thanks to the Bureau of Reclamation which corrected nature's stupid mistake.

There is, of course, no mention in this brochure of what was lost when Glen Canyon was flooded, nothing whatever to the beauty of the canyon and the significance of the living river, of the effect of the turbulent river on the rocks at the water's edge and the fascinating ecological communities that were destroyed when the water rose behind the dam. The pictures do not show the mud deposited on the canyon walls for they were obviously taken when the reservoir was filling.

We agree that there is a need for reservoir recreation in areas where there are no natural lakes but river recreation has values too. Reservoir recreation is much the same anywhere with the skiers and motorboat enthusiasts paying little attention to anything but the water. It can be found almost anywhere. There definitely is a place for reservoir recreation; but not in the Grand Canyon. The inspirational value of the canyon certainly would not be enhanced by the roar of motorboats echoing from the canyon walls.

The argument of conservationists that the Grand Canyon should be preserved for its inspirational and scientific values is often countered with the statement that "Man's needs come first," but what needs are we talking about? The needs of those who would exploit it for short-term profits or the needs of future generations to a share in its beauty and an understanding of the geological and ecological processes that are at work in this magnificent canyon? The Grand Canyon is famous throughout the world. It is awe inspiring and altogether wonderful, but it is not a finished creation and the living river is a constant reminder that this is true. Perhaps in some distant future the river may carve out an even more spectacular canyon—if man leaves it alone. The ages have created the canyon and we maintain that no one generation should assume the right to destroy it. The public believes in the integrity of the National Park System and it looks to you, its chosen representatives, to keep the faith.

Sincerely,

LAURENCE N. DEXTER, *Board Chairman.*

STATEMENT BY FRED T. DARVILL, M.D.

Perhaps the greatest conservation battle of the decade, or even of this century, is gathering force at this time. The controversy centers around the Grand Canyon of the Colorado, and the proposed Southwest water plan. If adopted, dams would be constructed at Bridge Canyon immediately above Lake Mead, and at Marble Canyon midway between Lee's Ferry and Phantom Ranch. Both of these dams would flood great segments of the Grand Canyon of the Colorado, producing unaesthetic silt-lined fluctuating reservoirs. The Bridge Canyon Dam would flood 40 miles of Grand Canyon National Monument, and if the proposed high dam is constructed, 13 miles of Grand Canyon National Park, thus setting an extremely dangerous precedent of further reclamation invasions of national park land. It is to be recalled that the Glen Canyon Dam, when authorized, specifically precluded invasion of Rainbow Bridge National Monument by the waters of Lake Powell. Congress however, failed to take any effective action thereafter; as a result, Rainbow Bridge National Monument will be partially flooded by this reservoir with resultant damage to the scenic values of this small unit of the National Park System. A similar precedent established in Grand Canyon National Park could lead to sweeping invasion of park lands for commercial purposes in the future.

It is of interest that in the spring of 1964, water had to be released from the Glen Canyon Dam in order to fill Lake Mead, since Lake Mead was so low that power generation in that area was threatened. It is quite obvious that at the present time, there is not sufficient water in the Colorado River system to fill the two reservoirs currently created; namely, Lake Mead in back of Boulder (Hoover) Dam, and Lake Powell in back of Glen Canyon Dam. It should be further obvious that two more dams placed between these two structures could not be filled in the forseeable future; in addition, a great deal of water would be lost by evaporation from the reservoirs so created. In short, in the arid Southwest where water is precious, the proposed Southwest water plan would under no circumstances create new water, and would actually result in significant water loss. In addition, irreparable damage would be done to the canyons and to a main unit of the National Park System, thus setting an extremely dangerous precedent. Furthermore, the power these dams would generate can be produced as efficiently by other means.

An alternate scheme to provide the Southwest with water without scenic destruction of the main canyon of the Colorado has been proposed. This would involve diverting water from the Snake River near Twin Falls, Idaho, and carrying it to Lake Mead. The difference in altitude is of such a degree that the water would generate sufficient power en route to pump it over obstructing mountains. The Southwest would be provided with additional water, and the resultant power loss to the Northwest from water not going through the Columbia River system of dams could be replaced by the Southwest through the new Pacific Coast intertie. This proposal involves no more expense than the building of the two dams on the Colorado River, and is immeasurably more practical, and would result in no aesthetic destruction of the canyons or invasion of a unit of the National Park System.

It is highly desirable that the entire Grand Canyon of the Colorado between the Grand Wash Cliffs and Lee's Ferry be included within the National Park System. Protection of this sort is needed to prevent further proposed developments of this type in the future.

It is noted that at the time of this writing the Bureau of the Budget and the Department of the Interior have agreed to not promote the Bridge Canyon Dam at this time. If, an inviolate agreement to completely abandon the Bridge Canyon Dam were to be made, and if the so-called Kanab diversion (diverting water from behind the Marble Canyon Dam into Kanab Creek, thus bypassing the Grand Canyon) were to be forever completely abandoned, and if access to the river below (i.e. downstream) the Marble Canyon Dam were to be constructed in association with the building of the dam and if the canyon below the Marble Canyon Dam site were to be included in perpetuity in the National Park System, I would not strongly object to the construction of the Marble Canyon Dam. However, in view of the broken agreement to protect Rainbow Bridge, I would want an ironbound, clear-cut, inviolate agreement that would not be broken if expedient sometime in the future by the Department of Reclamation.

However, it is still felt after considerable study of the matter that the best solution to the problem involves water diversion from the Northwest rather than any further dams on the Colorado River system.

RESOLUTION

The League of Arizona Cities & Towns

Whereas the State of Arizona, through the Arizona Interstate Stream Commission, has for many years sought congressional authorization of the central Arizona project, badly needed in order to provide supplemental water for the preservation of the economy of the central area and other areas in the State of Arizona through the importation of water from the main stream of the Colorado River; and

Whereas it appears that the State of Arizona will soon, once again, seek congressional authorization of the central Arizona project; and

Whereas the need for the central Arizona project, great as it was at the time authorization thereof was first sought in 1947, has become urgent for both municipal and agricultural purposes in the light of ever-receding ground water supplies: Now, therefore, be it

Resolved by the delegates of the League of Arizona Cities & Towns in conference assembled:

1. That the League of Arizona Cities & Towns hereby pledges its wholehearted support to renewed efforts by the State of Arizona, through the Arizona Interstate Stream Commission, to secure the authorization of the central Arizona project;

2. That the Arizona congressional delegation is urged to exert its best efforts to achieve the authorization of the central Arizona project;

3. That the President of the United States, the Director of the Bureau of the Budget, the Secretary of the Interior, the Commissioner of Reclamation, and all other appropriate officials of the executive branch of the Federal Government are requested strongly to recommend to the Congress the authorization of the central Arizona project;

4. That appropriate committees of the Congress are earnestly requested to hold hearings on proposed legislation to authorize the central Arizona project at the earliest practicable date and to recommend the prompt enactment of such legislation; and

5. That the Congress is requested to give its sympathetic consideration to proposed legislation to authorize the central Arizona project and to enact the same at the earliest opportunity.

This is to certify that this is a true and accurate copy of the resolution which was adopted at the annual conference of the League of Arizona Cities & Towns, held in Nogales, Ariz., on the 10th day of May 1963.

THE LEAGUE OF ARIZONA CITIES & TOWNS,
By JOHN J. DEBOLSKE, *Executive Director.*

Attest:

RICHARD D. MACRAVEY, *Notary Public.*

My commission expires June 30, 1967.

RESOLUTION BY THE ARIZONA ASSOCIATION OF SOIL CONSERVATION DISTRICTS

Resolved, That the Executive Committee of the Arizona Association of Soil Conservation District Supervisors, representing 39 soil conservation districts throughout Arizona, does hereby reconfirm its position as strongly endorsing the updated central Arizona project.

The executive committee, in behalf of all Arizona soil conservation district boards of supervisors, further resolves to do everything possible toward statewide unity, cooperative endeavor in securing early authorization for the central Arizona project, and appropriation of Federal funds for construction.

Resolution adopted June 21, 1963.

RESOLUTION No. 14—CENTRAL ARIZONA PROJECT

Whereas water is of prime importance to the State of Arizona, and Arizona's undeveloped share of the Colorado River is at present the greatest source of new available undeveloped wealth to the State of Arizona: Now, therefore, be it

Resolved, That the Arizona Cattle Growers' Association in convention as-

sembled does hereby wholeheartedly support the Central Arizona project, and the exchange principle, for the benefit of the whole State of Arizona.

I hereby certify that the above is a true copy of Resolution No. 14, passed by the 61st Annual Convention of the Arizona Cattle Growers' Association, in Flagstaff, December 12, 1964.

WILLIAM C. DAVIS, *Executive Secretary.*

A RESOLUTION BY CALIFORNIA GARDEN CLUBS, INC.

Whereas the Grand Canyon National Park and Monument constitute the crown jewels of the national park system and possess invincible characteristics of scenic splendor, while in the form as endowed by nature; and

Whereas the proposed building of power generating dams at Marble and Bridge Canyons would alter completely the natural ecological entity now prevailing along a free-flowing river and would cause loss of large volumes of water from the Colorado system, that is sorely needed for irrigation and human use; and

Whereas this mutilation of a natural wonder, which is the avowed priceless possession of the citizens of the United States and the world, constitutes a regional encroachment upon the rights and the heritage of the citizens of all nations; and

Whereas alternate methods of furnishing electric power are available and would probably be more economical over the years: Therefore, be it

Resolved, That the California Garden Clubs, Inc., at the annual convention held in San Jose, Calif., on May 12, 1965, do endorse an organized effort to preserve the Grand Canyon National Park and Monument in its present natural state; and be it further

Resolved, That this resolution be printed in Golden Gardens magazine and a copy be transmitted to the President of the United States in support of his program for the preservation of beauty in this Nation and that a copy also be transmitted to the Members of Congress and other interested parties.

Submitted by Henry M. Weber, M.D., F.A.C.S., conservation chairman.

Signed after adoption:

MRS. LAWRENCE A. WINSHIP,
President.

SAN JOSE, CALIF., April 12, 1965.

HOUSTON COUNCIL OF TEXAS GARDEN CLUBS, INC.,
May 24, 1965.

Re Bridge Canyon and Marble Gorge Dams.

Hon. WAYNE ASPINALL,
Chairman, House Interior and Insular Affairs Committee,
Washington, D.C.

DEAR MR. ASPINALL: The Houston Council of Garden Clubs, representing some 1,700 members, wishes to go on record as vehemently opposing construction of Marble Gorge and Bridge Canyon Dams on the Colorado River.

The damage these dams would do to Grand Canyon National Park and Monument is appalling. As we see it the reservoir created by Bridge Canyon Dam would be anything but a recreational asset, as proponents of the dam claim. It would back water up through the national monument and into the national park for 53 miles, submerging the canyon walls to a depth of several hundred feet and lining the walls with mud and silt when the lake is low. We are told that this would be in a part of the canyon that is inaccessible at present but it certainly could be made accessible in the future and, when it becomes more accessible, it should be in its natural state, a magnificent gorge with the living river to show its origin. Marble Gorge Dam would flood a very beautiful and scientifically important canyon that should be made a part of the national park and it would seriously curtail the flow of water in the rest of the canyon—a flow already limited by Glen Canyon Dam above it. It is inconceivable that plans to devitalize the Grand Canyon in this way would even be considered by Congress.

From all we have been able to learn about these dams, they are not essential to the Southwest water plan. They are solely for power, which experts tell us can be secured at less cost from coal and other sources. They will not supply

water to the arid Southwest but merely the money to help finance other parts of the water program. The public doesn't want to sell the Grand Canyon.

We are thinking, too, in terms of the future of all of our national parks if these dams are built, since they will establish a precedent that may lead to the desecration of other national parks. You Senators and Representatives are bound by a sacred trust to protect and preserve our national parks and monuments and keep them inviolate for future generations. We urge that you recognize and are guided by this responsibility.

Sincerely,

MRS. B. CARROLL THARP, *President.*

IOWA DIVISION OF IZAAK WALTON LEAGUE OF AMERICA, INC.,
Ames, Iowa, August 31, 1965.

Hon. WALTER ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation, House Committee on Interior and Insular Affairs, Washington, D.C.

DEAR CONGRESSMAN ROGERS: The Iowa Division of the Izaak Walton League of America, representing over 9,000 members, wishes to be placed on record as being vigorously opposed to the proposed Bridge Canyon Dam and Marble Canyon Dam on the lower Colorado River.

It is time to call a halt in the name of benefit-to-cost ratio on the encroachment of this area which is one of this country's most magnificent and beautiful natural wonders.

We urge that the Grand Canyon National Park and area remain as is and that any compromise is unthinkable and unacceptable.

Sincerely,

DALE BRENTNALL, *President.*

THE IZAAK WALTON LEAGUE OF AMERICA, INC.,
Kenova, W. Va., August 25, 1965.

Hon. WALTER ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation, Committee on Interior and Insular Affairs, House Office Building, Washington, D.C.

DEAR CONGRESSMAN ROGERS: In reference to the lower Colorado storage project and/or the proposed Marble Gorge Dam, Bridge Canyon Dam, we would sincerely appreciate having the following statement placed in the record of hearings:

"The West Virginia Division of the Izaak Walton League of America is vigorously opposed to the proposed construction of any such dams or any other proposed construction that would alter the natural river flow on the lower Colorado River between the Glen Canyon Dam and Hoover Dam."

Cordially yours,

GROVER C. LITTLE, Jr., *State President.*

MINNESOTA DIVISION, IZAAK WALTON LEAGUE OF AMERICA, INC.,
Minneapolis, Minn., August 23, 1965.

Hon. WALTER ROGERS,
Chairman, Subcommittee on Irrigation and Reclamation, Committee on Interior and Insular Affairs, U.S. House of Representatives, Washington, D.C.

DEAR REPRESENTATIVE ROGERS: The Izaak Walton League of America is unalterably opposed to the construction of dams on the lower Colorado River, as proposed in H.R. 4671.

Since the purpose of these dams is not to provide additional water but instead to produce hydroelectric power to be sold to help offset the cost of the Southwest water project, and since other sources of electric power are available in this area, there can be no excuse for the proposed destruction of one of our country's most priceless natural resources.

We of the Minnesota Division of the Izaak Walton League strongly urge your committee to recommend against this bill and the others similar to it, so that our national parks and monuments may be preserved for future generations of Americans.

Sincerely yours,

RAYMOND A. HAIK, *President.*

RESOLUTION OF THE PENNSYLVANIA DIVISION OF THE IZAAK WALTON LEAGUE OF AMERICA, INC., IN CONVENTION ASSEMBLED AT UNIONTOWN, PA., AUGUST 29, 1965

Be it resolved, That the Pennsylvania Division of the Izaak Walton League of America does support the recommendations of the national body of the league, and of U.S. Secretary of Agriculture Orville Freeman in their policy of administration of the "Boundary Waters Canoe Area" as outlined in proposed regulation; and be it further

Resolved, That the Pennsylvania division does support the national body of the Izaak Walton League of America in their opposition to the building of proposed dams in the Bridge Canyon and the Marble Canyon areas of the Grand Canyon of the Colorado River (Lower Colorado storage project).

Presented by Roy T. Frank, Oil City, Pa. (director-at-large).

Unanimously approved by the Pennsylvania Division held at Uniontown, Pa., August 29, 1965.

COLORADO RIVER WILDLIFE COUNCIL,
Las Vegas, Nev., April 21, 1965.

Hon. WAYNE N. ASPINALL,
House of Representatives,
Washington, D.C.

DEAR REPRESENTATIVE ASPINALL: Enclosed is a copy of a resolution passed by the Colorado River Wildlife Council at their meeting on April 6, 1965, at Las Vegas, Nev.

The States involved are deeply concerned with the channelization program, and sincerely hope you will take whatever action, which is appropriate and necessary, in support of this resolution.

Yours very truly,

HAROLD S. CRANE, *Secretary.*

RESOLUTION No. 1

Whereas the Bureau of Reclamation is carrying out a plan involving complete channelization and bank stabilization of the lower Colorado River from Davis Dam to the international boundary with Mexico; and

Whereas the primary purpose of the program is to salvage or develop water by reducing the acreage and volume of water in the channel and in side ponds, marshes, and lakes; and

Whereas these side ponds, marshes, and lakes associated with the lower Colorado River form the habitat of important fish and wildlife resources and form an integral part of the recreation and esthetic values of the area; and

Whereas the California and Arizona fish and game agencies have made analyses of the anticipated heavy losses to the fish and wildlife habitat resulting from the channelization and water salvage projects as currently planned; and

Whereas it appears that unless an adjustment of objectives and broadening of scope of the channelization and water salvage and development programs on the lower Colorado River is made, there will be an irreplaceable and unnecessary loss of fish, wildlife, and recreation values on the lower Colorado River; and

Whereas both the Arizona and California fish and game agencies have requested a reconstitution and replanning of the water salvage programs so as to include fish and wildlife and recreation as project purposes and the resources agency of California has conveyed specific recommendations in this regard to the Secretary of Interior: Now, therefore, be it

Resolved, That the Colorado River Wildlife Council does hereby adopt the following recommendations relative to the programs of channelization, water salvage, and water development on the lower Colorado River:

1. That the Secretary of the Interior be asked to direct an immediate reconsideration and reevaluation of all channelization and water salvage projects not already under construction on the lower Colorado River, so as to achieve a comprehensive and balanced development of the total water and land resources of the lower Colorado River.

2. Subject to the findings of these studies, that the Department of the Interior reconstitute the channelization and an anticipated phreatophyte control program on the lower Colorado River to provide for optimum multiple-purpose

development, including fish, wildlife, and recreation as primary purposes, and to make these programs as consistent as possible with the lower Colorado River land-use plan already approved by the Secretary of the Interior.

3. Through invitation of the Secretary of the Interior and cooperation of the States involved, that there be established a task force composed of two representatives of each State government, and one representative each from the Fish and Wildlife Service, Bureau of Reclamation, Lower Colorado River Land Use Office, the Lower Colorado River Land Use Committee, and a chairman to be appointed by the Secretary of the Interior. The Governor of each State shall appoint representatives covering the entire range of resource interests involved in the area. This task force would advise and consult with the Department of Interior with respect to the replanning of the channelization and water salvage programs. The task force's recommendations would be made to the Secretary of Interior.

4. That all steps possible be taken to stimulate a regional plan of water supply and augmentation for all beneficial uses of water including fish and wildlife and recreation, on the lower Colorado River; and be it further

Resolved, That the proposed appropriations for commencing work on the Topock Gorge, Parker Yuma divisions now before Congress in the President's budget be disapproved pending initiation and completion of the replanning of all water salvage programs on the lower Colorado River, as outlined previously in this resolution; and be it further

Resolved, That the provisions and concepts of this resolution be made applicable in principle to the Upper Colorado River Basin; and be it further

Resolved, That copies of this resolution be transmitted to the Secretary of Interior, Governors of the Colorado River Basin States, and the congressional delegations of the Lower Colorado River Basin States.

LOS ANGELES, CALIF.,
August 20, 1965.

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
House of Representatives, Washington, D.C.

GENTLEMEN: Enclosed is an economic analysis of the proposed Marble Canyon project that examines in detail the benefit-cost ratios presented for the project in U.S. Department of the Interior, Bureau of Reclamation, Pacific Southwest water plan, supplemental information report on Marble project, Arizona, January 1964.

I hope that it can be included in the record of your hearings on the Lower Colorado River Basin project next week.

Very truly yours,

ALAN CARLIN.

AN ECONOMIC REEVALUATION OF THE PROPOSED MARBLE CANYON PROJECT

(By Alan P. Carlin)

In its January 1964 report on the proposed Marble Canyon project in Arizona,[1] the Bureau of Reclamation has greatly overestimated the cost of producing the power at alternative sources located at the load centers. If corrections are made in these costs, the benefit-cost ratio for the project is slightly less than 1 to 1, using Federal Power Commission data and the interest rates assumed in the report. At higher (and more realistic) interest rates, the project looks even worse.

The basic error in the report is that it ignores the possibilities of nuclear power as an alternative source of energy to the proposed project. Nuclear power has made great strides toward a competitive position with other energy sources and is expected to become much more so in the next few years. The average annual costs of such power are computed in table 1 for a 600-megawatt plant started in 1970 and completed in 1973 using conservative data from the recent national power survey undertaken by the Federal Power Commission.[2] The computations assume that the plant, located at a load center, generates

[1] U.S. Department of the Interior, Bureau of Reclamation, "Pacific Southwest Water Plan, Supplemental Information Report on Marble Canyon Project, Arizona," January 1964.
[2] Federal Power Commission, "National Power Survey, Part II: Advisory Reports," Washington, U.S. Government Printing Office, 1964.

2.123 billion kilowatt-hours.[3] The dates were chosen to correspond with the expected construction time required for nuclear plants at the beginning of the 1970's and the earliest possible completion date for the proposed Marble Canyon project.[4]

TABLE 1.—*Average annual costs of alternative nuclear power plant located at load center*

[Millions of dollars]

1. Capital costs:	
(*a*) Construction costs [1]	84.00
(*b*) Interest during construction [2]	2.50
(*c*) Total initial capital cost [3]	86.50
(*d*) Average annual capital costs	4.96
2. Average annual operating costs:	
(*a*) Nuclear fuel [4]	3.18
(*b*) Other [5]	1.38
3. Total average annual costs	9.52

[1] Assumes a 600-megawatt plant at $140 per kilowatt. The $140 is that given for plants placed in service in 1972–73 in Federal Power Commission, "National Power Survey, Part II: Advisory Committee Report No. 15, "Nuclear Development," Washington, U.S. Government Printing Office, October 1964, p. 184, fig. 6. The source of the FPC data is given as the Office of Civilian Power, Reactor Development Division, Atomic Energy Commission. Advisory Committee Report No. 18, "Fuels for Electric Generation in Western United States," p. 220, suggests that the cost may actually be only $125–$135 per kilowatt by 1970.

[2] Assumes 3-percent interest (as 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. 25) and uniform construction costs over a 3-year period.

[3] Assumes a gross return of 5.74 percent corresponding to a net return of 3 percent and a plant life of 25 years.

[4] Assumes annual average generation of 2.123 billion kilowatt-hours with average fuel costs of 1.5 mills per kilowatt-hour over the life of the plant. Advisory Committee Rept. No. 15, p. 177, states that nuclear fuel costs are expected to be "in the order of 2 mills per kilowatt-hour for reactors operating about 1967. During the following decade, 1970–80, it is reasonable to expect improved core performance and further cost reduction for the fuel cycle, particularly for fuel fabrication, which may permit the realization of net fuel cycle costs in the range of 1 to 1.5 mills per kilowatt-hour by 1980." Others are more optimistic. Advisory Committee Rept. No. 18, p. 22, states that according to the General Electric Co., "The present nuclear fuel cost of 2.1 mills per kilowatt-hour should decline to about 1.5 mills by the late 1960's. 1.25 by the early 1980's, and to 1 mill by about 1990." In any case, 1.5 mills can be taken as a conservative average cost for fuel over the 25-year assumed life of a plant placed in service in 1973.

[5] Assumes operating costs of 0.65 mill per kilowatt-hour. This is based on an examination of the operating costs of thermal plants with similar load factors in the Pacific Southwest as shown in Federal Power Commission, "Steam-Electric Plant Construction Cost and Annual Production Expenses, 1960," Washington, Government Printing Office, and the expected differential (about 0.1 mill per kilowatt-hour) between such plants and nuclear plants shown in Advisory Committee Report No. 15, p. 179, for plants placed in service in 1972.

It will be noted that table 1 includes nothing for transmission or marketing costs. The rationale for this is that Marble Canyon power would face equal marketing costs once it is transported to the load centers, and the rather crude transmission system capital costs shown in the Bureau report would appear to be equal to or less than the actual costs of transporting firm power to the load centers.

The report is vague as to exactly which load centers it has in mind and even more silent on the subject of route, voltage, and character of the transmission lines. The only hint, in fact, is the assumption that the alternative steamplants cited by the Bureau would be "in the Phoenix and Los Angeles areas."[5] It would seem rather pointless, however, to transport the power to both, and this paper has assumed that only one alternative nuclear plant would be built. At the same time, the Phoenix area might not be able to absorb the peak power available from Marble Canyon, so it would seem better to assume that the power would be sold in the Los Angeles area.

[3] The energy that would be received at the load centers from the proposed project after transmission losses.

[4] Assuming major construction started in 1966 and required 7 years for completion.

[5] U.S. Department of the Interior, op. cit., p. 22.

Los Angeles is over 400 miles as the crow flies from the Marble Canyon Dam site. Federal Power Commission studies suggest that the capital cost of a transmission system capable of transporting 2.123 billion kilowatt-hours 400 miles would be about $46 million,[6] but stresses that this would not be firm power. This would require the addition of at least a second circuit, which would put the cost above the $76.5 million assumed by the Bureau.

The benefits and costs of the proposed project are compared in table 2 at the Bureau's 3-percent interest rate. No quantitative estimate is given for two costs neglected in the Bureau's report. The first (2b) is the additional evaporation and seepage that would result from the dam. The report indicates that the area of the reservoir surface would be about 4,000 acres at the normal water elevation.[7] Evaporation data collected over a 32-year period at Lees Ferry, Ariz., suggests that the mean annual evaporation from the reservoir would be about 7.5 feet.[8] Total evaporation would then be about 30,000 acre-feet per year. In addition there would be some additional seepage.[9] At the same time, there is some evaporation from the river at present in the section to be inundated by the proposed reservoir. It is probably safe to assume, however, that the additional seepage will exceed the present evaporation. The principal question is how to value the evaporation losses. At present their value is limited to that arising from their value in diluting the dissolved salts carried by the river.[10] At some time in the future, however, if the central Arizona project is built and the upper basin States use their entire allotment, these 30,000 acre-feet will come directly out of the water that would otherwise be used by California, and in particular, by the Los Angeles Metropolitan Water District.

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[6] Advisory Committee Rept. No. 16, p. 196, gives the cost per kilowatt-hour received as slightly less than 2.5 mills per kilowatt-hour for a 500-kilovolt alternating current 500-megawatt load at 50 percent load factor over 400 miles. Annual costs are assumed in the report to be slightly more than 11.5 percent of capital investment. This corresponds to a capital cost of

$$\left(\frac{2.5 \text{ mills/kwh}}{0.115}\right)(2.123\times10^{9} \text{ kwh})=\$46.3\times10^{6}.$$

It is worth pointing out that the Bureau's report assumes the same 100-year life for the transmission system as for the rest of the project. Whatever its merits in the case of the dam, this period is excessive in this case. A more acceptable figure might be 40 years.

[7] See U.S. Department of the Interior, op. cit., drawing 788–D–21.

[8] U.S. Department of Commerce, Weather Bureau, Hydrologic Branch, "Mean Monthly and Annual Evaporation From Free Water Surface for the United States, Alaska, Hawaii, and West Indies," Technical Paper No. 13, Washington, July 1950, p. 2. Lee Ferry is located on the Colorado River about 40 miles north of the damsite and adjacent to the proposed reservoir.

[9] The likelihood that this will be significant is suggested by P. T. Reilly, "Some Recent Observations on Glen Canyon," Sierra Club Bulletin, vol. 50, No. 3, March 1965, pp. 3–4.

[10] This assumes that the present problem of filling Glen Canyon Reservoir is a short-term phenomenon. If, however, the use of the river's water by the Metropolitan Water District is restricted in order to fill Glen Canyon, the value of evaporated water is its value to the MWD from the time Marble Canyon is filled, as outlined below.

TABLE 2.—*Benefits and costs of proposed Marble Canyon project at 3 percent*

[Millions of dollars]

	Bureau of reclamation [1]	Revised [2]
1. Benefits:		
(a) Power	17.17	9.44
(b) Fish and wildlife	.36	.36
(c) Recreation	.32	.24
(d) Area redevelopment	.15	.15
(e) Total	18.00	10.19
2. Costs:		
(a) Direct annual project costs	10.49	10.49
(b) Evaporation and seepage losses	0	[3]
(c) Impairment of natural beauty of canyon	0	[3]
(d) Total	10.49	[3]
3. Benefit-cost ratio	1.7-1	[4] 0.97-1

[1] U.S. Department of the Interior, Bureau of Reclamation, "Pacific Southwest Water Plan, Supplemental Information Report on Marble Canyon Project, Arizona," January 1964, p. 24.

[2] Line 1(a): Line 3, table 1 minus $0.08 million, equal to −$0.19 million+$0.11 million. The $0.19 million represents 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 $0.11 million represents the additional cost of generating 50 million extra kilowatt-hours (at 2.15 mills per kilowatt-hour) from the nuclear power station in table 1. The 50 million extra kilowatt-hours corresponds roughly to the energy that could be purchased for the $391,000 included on the cost side "to firm the on-peak generation of the Marble Canyon power" at the average cost of 8 mills per kilowatt-hour assumed by the Bureau in its estimate of alternative power costs. Line 1(c): Col. (1) minus $0.08 million representing the benefits of boat trips down the Colorado through Grand Canyon National Park that would no longer be possible if the project is built. The National Park Service states that 400 people made the trip in 1962 (U.S. Department of the Interior, "Pacific Southwest Water Plan, Appendix," August 1963, "National Park Service Appendix," p. 3). The average price paid per trip was $350 or more. The customers' and producers' surplus is assumed to be $200 per person. This calculation ignores the fact that the popularity of these boat trips is rapidly increasing.

[3] See text.

[4] Maximum.

The value of the water to the MWD is equal to the additional costs of obtaining 30,000 additional acre-feet 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-percent rate of discount and more at higher rates.[11] 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.[12]

Table 2 (line 2c) also suggests that the Bureau has neglected the costs of the project in terms of impairment of the natural scenic beauty of what is commonly acknowledged to be an unusually scenic canyon.[13] Although it is very 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.

In summary, even under the conservative assumptions used in computing the revised power benefits, and accepting the other benefits and costs given by the Bureau, the benefit-cost ratio is slightly less than 1 to 1. Perhaps the most beneficial assumption for the project and the least justified is the Bureau's 3-percent interest rate used in computing both the benefits and costs. Since

[11] Jack Hirshleifer, James C. DeHaven, and Jerome W. Milliman, "Water Supply: Economics, Technology, and Policy," Chicago, 1960, p. 354.

[12] The product of 30,000 acre-feet and $52 per acre-foot.

[13] See Francois Leydet, "Time and the River Flowing: Grand Canyon," San Francisco, Sierra Club, 1964.

the percentage of capital charges in total annual costs is larger for the project than the alternative, line 2a of table 2 will increase much more rapidly than line 1a as the interest rate is increased. Since a higher interest rate would be much more appropriate,[14] the benefit-cost ratio shown in column (2) of table 2 is a gross overestimate.

While this paper does not pretend to represent an exhaustive study of the subject, it would seem to be somewhat more complete than the Bureau's unsupported assertion that the lowest cost alternative to the project would be publicly owned non-Federal, gas-fired steamplants in the Phoenix and Los Angeles areas that would generate equivalent energy for $17,359,000.

[14] For a discussion of the discount rate in the context of U.S. Water resource development, and further references, see Hirshleifer, op. cit. After an extensive analysis, the authors recommend that public projects should use a discount rate of not less than 10 percent (p. 161). At this rate, the Marble Canyon project would not even be worth studying.

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