

CENTRAL ARIZONA PROJECT

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HEARINGS
BEFORE THE
SUBCOMMITTEE ON
IRRIGATION AND RECLAMATION
OF THE
COMMITTEE ON
INTERIOR AND INSULAR AFFAIRS
UNITED STATES SENATE
EIGHTY-EIGHTH CONGRESS
FIRST SESSION
ON
S. 1658
A BILL TO AUTHORIZE, CONSTRUCT, AND MAINTAIN THE
CENTRAL ARIZONA PROJECT, ARIZONA-NEW MEXICO, AND
FOR OTHER PURPOSES

AUGUST 27, 28, OCTOBER 1 AND 2, 1963

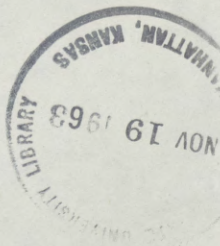
PART 1

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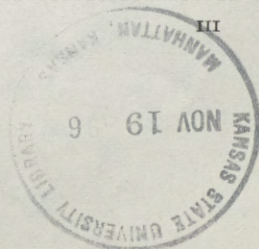
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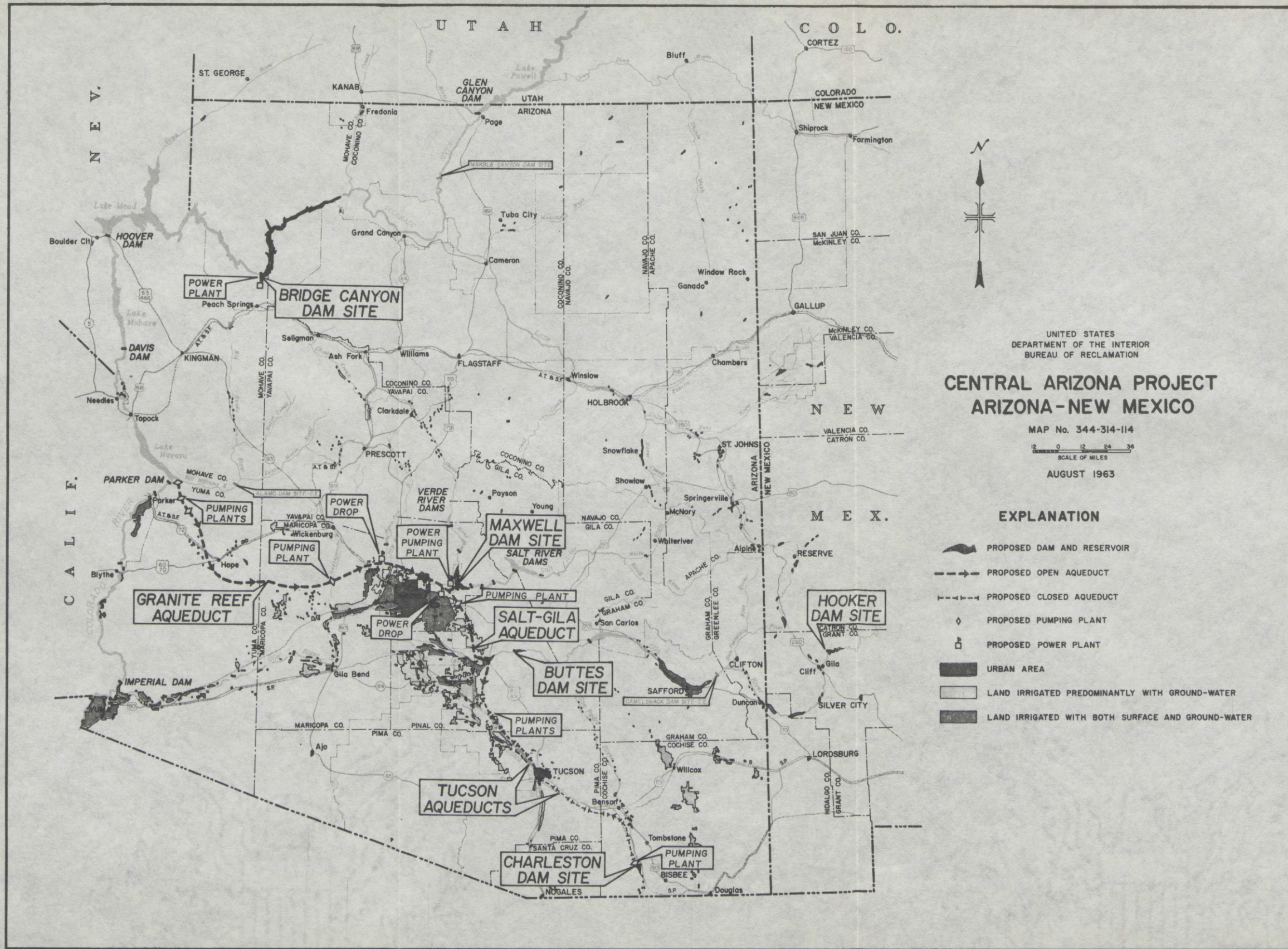
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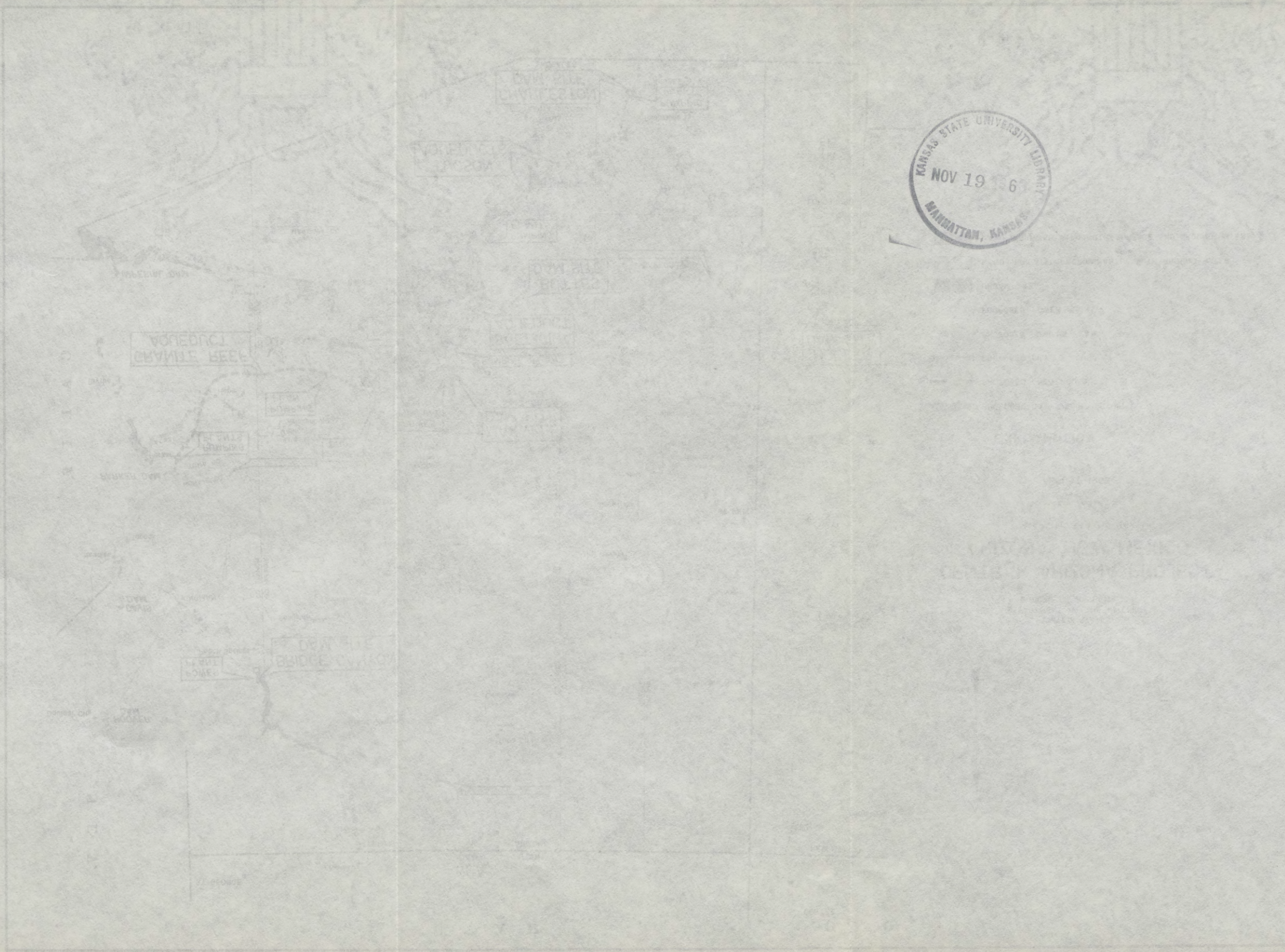
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CENTRAL ARIZONA PROJECT

TUESDAY, AUGUST 27, 1963

U.S. SENATE,
SUBCOMMITTEE ON IRRIGATION AND RECLAMATION
OF THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10 a.m., in room 3110, New Senate Office Building, Senator Frank E. Moss presiding.

Present: Senators Moss, Hayden, Anderson, Burdick, Kuchel, Allott, and Jordan.

Also present: Senators Goldwater and Bible.

Jerry Verkler, staff director; Roy M. Whitacre, professional staff member; and Stewart French, chief counsel.

Senator Moss. The subcommittee will come to order.

The meeting this morning is to consider S. 1658, introduced by Senators Hayden and Goldwater to authorize the Secretary of the Interior to construct, operate, and maintain the central Arizona project, Arizona-New Mexico, and for other purposes.

This project has had a long history before the committee and the Congress. The Bureau of Reclamation's original planning report was completed in December 1947, and was published as House Document No. 136, 81st Congress, 1st Session.

Hearings on bills to authorize the project were conducted in both the Senate and House in 1949. It was approved in the Senate in 1950 and again in 1951, but hearings were indefinitely postponed by the House Interior and Insular Affairs Committee in 1951.

An updated report was issued by the Bureau of Reclamation in January 1962. Based on the information contained in this report, a fact sheet outlining the salient points in the proposal has been prepared and is now before the committee members for their information.

This meeting has been called to hear testimony from officials of the Department of the Interior. No outside witnesses will be heard at this time. Ample time will be made available at a later date to make a complete record on the proposal.

Before calling on other members of the committee for statements, a copy of the bill and such comments as are available from the executive departments will be included in the record at this point.

(S. 1658 and departmental statements are as follows:)

[S. 1658, 88th Cong., 1st sess.]

A BILL To authorize, construct, operate, and maintain the Central Arizona project, Arizona-New Mexico, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the purposes of furnishing supplemental irrigation water and municipal water supplies to the water-deficient areas of Arizona and western New Mexico, through direct diversion or exchange of water, generation and sale of electric energy, control of floods, conservation and development of fish and wildlife resources, enhancement of recreation opportunities, and for other purposes, the Secretary of the Interior acting pursuant to the Federal reclamation laws (Act of June 17, 1902, 32 Stat. 388, and Acts amendatory thereof or supplementary thereto), is authorized to construct, operate, and maintain the Central Arizona project, Arizona-New Mexico. The principal works of the project shall consist of the Bridge Canyon Dam, Reservoir, and Powerplant; Maxwell Dam, Reservoir, and power-pumping plant; Buttes Dam and Reservoir; Hooker Dam and Reservoir; Charleston Dam and Reservoir; Granite Reef Aqueduct and pumping plants; Tucson Aqueducts and pumping plants; Salt-Gila Aqueduct; canals; electrical transmission facilities, and related water distribution and drainage works.

SEC. 2. (a) Contracts to repay the portion of the cost of the Central Arizona project allocated to irrigation and assigned to be repaid by irrigation water users which are entered into pursuant to subsection (d), section 9, of the Reclamation Project Act of 1939 (53 Stat. 1187) as amended, shall provide for a basic repayment period of not more than fifty years after initiation of water service to any block of land plus a development period, if any, not to exceed ten years as determined by the Secretary.

(b) Rates charged for commercial power and for water for municipal, domestic, or industrial use shall be designed to return to the United States, within not more than fifty years from the completion of each unit of the project which serves those purposes, those costs of constructing, operating, and maintaining that unit which are allocated to said purpose and interest on the unamortized balance of said construction allocation and, in addition, within the time specified in subsection (a) of this section, so much of the irrigation allocation for each block as is beyond the ability of the water users to repay.

(c) The interest rate to be used for purposes of computing interest during construction and interest on the unpaid balance of those portions of the reimbursable costs which are properly allocable 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 this bill is enacted, 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 date of issue. If the interest rate so computed is not a multiple of one-eighth of 1 per centum, the rate of interest to be used for these purposes shall be the multiple of one-eighth of 1 per centum next lower than the rate so computed: *Provided, however*, That as to Indian lands payment of construction costs within the capacity of the land to repay shall be subject to the Act of July 1, 1932 (47 Stat. 564).

SEC. 3. (a) The Secretary is authorized as a part of the Central Arizona project to investigate, plan, construct, operate, and maintain public recreation facilities including access roads, to acquire or to withdraw from entry or other disposition under the public land laws such adjacent lands or interests therein as are necessary for present and future public recreation use, and to provide for public use and enjoyment of the same and of the water areas of the project in a manner consistent with the other project purposes. The Secretary is authorized to enter into agreements with State or local public agencies or other public entities for the operation, maintenance, or additional development of project lands or facilities to State or local agencies or other public entities by lease, transfer, exchange or conveyance, upon such terms and conditions as will best promote their development and operation in the public interest for recreation purposes. The cost of the undertakings described in this section, including costs of investigation, planning, operation, and maintenance and an appropriate share of the joint costs of the Central Arizona project shall be nonreimbursable.

(b) The Secretary may make such reasonable provision in connection with the Central Arizona project as, upon further study in accordance with section 2 of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661, 662), he finds to be required for the conservation and development of fish and wildlife. An appropriate portion of the cost of the development shall be allocated as provided in said Act and it, together with the Federal operation and maintenance costs allocated to this function, shall be non-reimbursable.

(c) The Secretary is authorized to recognize area redevelopment as defined in Public Law 87-27 as a project function and to allocate such costs to this function as appropriate. The costs so allocated shall be nonreimbursable.

SEC. 4. Nothing contained in this Act shall be construed to alter, amend, repeal, construe, interpret, modify, or be in conflict with the provisions of the Boulder Canyon Project Act (45 Stat. 1057), the Boulder Canyon Project Adjustment Act (54 Stat. 774), the Colorado River compact, the Upper Colorado River Basin compact, the Rio Grande compact of 1938, or the Treaty with the United Mexican States (Treaty Series 994).

SEC. 5. There is hereby authorized to be appropriated, out of any moneys in the Treasury not otherwise appropriated, such sums as may be required to carry out the purposes of this Act.

EXECUTIVE OFFICE OF THE PRESIDENT,
BUREAU OF THE BUDGET,
Washington, D.C., August 21, 1963.

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 June 6, 1963, requesting the views of the Bureau of the Budget on S. 1658, a bill to authorize, construct, operate, and maintain the central Arizona project, Arizona-New Mexico, and for other purposes.

The purpose of this bill is clearly stated in its title.

The Department of the Interior has not submitted a report on the project proposed for authorization in this bill to the Bureau of the Budget under procedures set forth in Executive Order No. 9384. Until a report is received, together with the views and comments of the concerned States and Federal agencies, the Bureau of the Budget has no basis for appraising the merits of the proposed development.

Accordingly, it is recommended that action on S. 1658 be deferred until a report is submitted to the Congress in accordance with established procedures.

Sincerely yours,

PHILLIP S. HUGHES,
Assistant Director for Legislative Reference.

Senator Moss. The subcommittee has, as a member, Senator Hayden, one of the authors of the bill. And I will ask Senator Hayden if he has any statement he would care to make at this time.

Senator HAYDEN. I do, Mr. Chairman.

STATEMENT OF HON. CARL HAYDEN, A U.S. SENATOR FROM THE STATE OF ARIZONA

Senator HAYDEN. I appreciate this opportunity to make a statement in support of S. 1658, the bill which my colleague, Senator Goldwater, and I have introduced to authorize the central Arizona project. My statement at this time will be brief.

Arizona is at a crisis point. Arizona urgently needs more water, without which she faces a slowly withering economy as her ground-water bank account shrinks. She does not seek water to expand her irrigated agriculture. There is not sufficient water available to her to even permit maintenance of that agriculture which is now extant.

Arizona seeks only to meet her rapidly expanding domestic requirements and to maintain her irrigated agriculture as near as possible to present levels.

I anticipate, Mr. Chairman, that the testimony we shall hear today will be largely technical in nature and will be presented by the officials of the Bureau of Reclamation. Following the conclusion of that phase of the testimony, I expect that about the middle of September further hearings be set for the purpose of receiving testimony from Arizona witnesses; and that additional hearings be held soon after for others who may wish to testify in order that a complete record will be available to the committee to permit it to report this legislation favorably to the Senate at the earliest possible moment.

For 40 years I have witnessed the frustrating of Arizona's effort to put to use its full share of the Colorado River water. At every turn Arizona has encountered the deliberate delaying tactics of southern California and there is every reason to believe that this plan of obstruction will continue.

For example:

1. California refused to accept the division of water recommended by the Colorado River Basin Governors in 1924, and insisted on endless negotiations among the lower basin States.

2. California's unjustified interpretation of the tristate compact authorized by the Boulder Canyon Project Act defeated its adoption by the lower basin main-stream States.

3. Arizona's first three attempts to secure a Supreme Court decision regarding the Colorado River were successfully resisted by California.

4. California strenuously resisted and delayed ratification of the treaty which settled Mexico's rights to Colorado River water.

5. California consumed 11 months instead of the 90 days required by law in commenting on the Interior Department's central Arizona project report of December 1947.

6. From the time that the central Arizona project bill was first introduced in 1947, California succeeded in preventing a vote on the bill in the House and in 1951 terminated further consideration of the project by Congress by prevailing upon the House Committee on Interior and Insular Affairs to postpone further consideration of the project until the extent of Arizona's water rights had been adjudicated or agreed upon.

7. While the central Arizona project was before Congress, California represented to Congress that litigation determining Arizona's rights in Colorado River water could be adjudicated upon briefs and oral arguments, that it would not be necessary to take interminable testimony as to factual matters, that the issues could be disposed of in a reasonable time not to exceed 2 years, and that California saw no occasion for and did not intend to involve the upper basin States in the case.

After Arizona initiated proceedings in the Supreme Court in 1952, California, contrary to her previous representations to Congress, attempted to bring the upper basin States into the litigation, delayed the course of such litigation by numerous requests for additional time, and made an elaborate and time-consuming presentation of her case before Judge Rifkind, the special master, all of which prolonged completion of the case until 1963.

8. Following the Supreme Court's opinion on June 3, 1963, California requested and was given until September 16, 1963, to file a petition for a rehearing which required an extension of the time set by the Court for the filing of proposed forms of decree. California now insists that Congress take no action on the central Arizona project until the Supreme Court has entered a final decree.

9. California seeks further delay by insisting that no action be taken by Congress on the central Arizona project until a formula for allocation of water during periods of shortages be fixed by negotiation among the States, or failing such agreement by the States, by an act of Congress or by regulations promulgated by the Secretary of the Interior.

10. California insisted before the special master and the Supreme Court that no opinion could be rendered in the case unless the Court made a determination of the future water supply available to the lower basin. Now that the special master and the Supreme Court have rejected that contention, California insists that Congress must not consider the central Arizona project until the Interior Department prepares and submits to Congress a detailed inventory of all water supplies and uses in the lower basin and a determination of the rate and extent of development in the upper basin. To quote Mr. B. Abbott Goldberg, attorney, and chief deputy director, California State Department of Water Resources, in a speech made recently:

The Court has done nothing which the Congress cannot undo.

Other examples could be listed, but California's position is unmistakably clear. So long as water continues to run downhill, she will fight to prevent any additional uses of Colorado River water other than by California.

I think all of you know that I have always attempted to help in any way possible with every project for the development of our country's resources—even when I was being fought on my own project for my own State. I am entitled, and the State of Arizona is entitled, to prompt action on the central Arizona project; and there is no sound reason why this project cannot be considered now. It is entirely compatible with the Southwest water plan of the Department of the Interior as disclosed in the report thereon yesterday released by the Secretary of the Interior.

The central Arizona project was conceived in 1940 as a separate project. The Bureau of Reclamation found it feasible in 1947. The Department of the Interior reported favorably on it in 1948. A bill authorizing it passed the Senate in 1950 and again in 1951. A bill would have been reported from the House Interior Committee in 1951 except for the untimely death of one of its members, Congressman William Lemke of North Dakota, who was known to strongly favor the project. As suggested by the House Interior Committee, Arizona filed suit in 1952. This past June the Supreme Court finally established Arizona's share of the Colorado River water.

An updated central Arizona project feasibility report made by the Bureau of Reclamation shows beyond question that the project is a better project now than it was over 12 years ago. There can be no doubt that the need is more urgent than ever.

Since 1950 I have made certain that sufficient funds were made available to the Department of the Interior to keep alive the central Arizona

investigation program and closely related projects in Arizona. From fiscal year 1950 through fiscal year 1962 over \$2 million was spent for that purpose. Over \$1 million was appropriated in fiscal 1963 and about \$1.5 million is scheduled for expenditure in the current fiscal year. In addition, my own State has made available to the Federal Government over \$200,000 for studies relating to the central Arizona project with the understanding that once the Supreme Court had ruled, we would ask Congress for immediate consideration of that project.

Now having done what we were told to do in settling our right to the water, I believe that both the administration and the Congress are morally committed to give first priority to this urgently needed project.

The Senate has twice passed bills to authorize the central Arizona project. The Senate has available to it the record of my prior statements in behalf of the project, beginning some 16 years ago. I particularly call your attention to the statement made by me in 1949, when I testified on S. 75, during the 1st session of the 81st Congress. Such statement begins on page 733 of the printed hearings. That statement is as pertinent and valid today as it was when made 14 years ago. I then stated that Arizona was entitled to 2,800,000 acre-feet of water from the main stream of the Colorado River, in addition to its use of Gila River water. My opinion in all respects has been upheld by the Supreme Court of the United States.

The statement which I made in 1949 is pertinent and valid today because I was talking then about essentially the same central Arizona project about which I am talking today. The report on that project was distributed by the Interior Department for comments by all seven of the Colorado River Basin States. There was no objection to the authorization of the project from Colorado, New Mexico, Utah, or Wyoming. Nevada felt that authorization should await a Supreme Court adjudication settling rights to the use of Colorado River water.

The State of California's objections to the project were transmitted to the Secretary of the Interior by Hon. Earl Warren, then Governor of California, who stated, in his letter of transmittal of December 29, 1948, that:

It is only because a determination of the respective rights of the lower basin States to the waters of the Colorado River system has not been made that California submits any criticism of your proposed report.

However, the objections of the Colorado River Board of California were extensive. It objected primarily on the ground that adequate surveys, investigations, and plans had not been made; that important elements of the project would have useful lives shorter than the project's proposed repayment period; that there was insufficient upstream storage to permit a regulated flow adequate for firm power output at Bridge Canyon; and that Arizona was not legally entitled to sufficient water from the main stream of the Colorado River to make the project feasible.

None of these objections was valid. Each of them was made solely for the purpose of delaying the authorization of the project. This committee carefully considered each of them; and, having done so, specifically rejected all of them and recommended passage of the bill.

After the bill to authorize the central Arizona project had been passed by the Senate the second time, extensive hearings on legislation to authorize that project were held by the House Committee on Interior and Insular Affairs. Shortly before the conclusion of those hearings, Mr. John Saylor, of Pennsylvania, made the following motion about the bills to authorize the central Arizona project:

I move that H.R. 1500, 1501, be postponed until such time as use of the water in the Lower Colorado Basin is either adjudicated or binding or mutual agreement as to the use of the water is reached by the States of the Lower Colorado River Basin.

That motion was adopted by the House Committee on Interior and Insular Affairs. Thereafter 15 members of that committee signed a statement containing the following language:

* * * the adjudication of the water rights should come before the authorization of the project * * *.

The litigation suggested by the House committee to determine Arizona's title to water of the main stream of the Colorado River was begun in 1952. California then set about the business of assuring delays in the Supreme Court. First, she tried to bring into the suit the States of Colorado, New Mexico, Utah, and Wyoming. This action was taken by California despite her assurances given to this committee at hearings before it in 1949 on S. 75 and S.J. Res. 4, in the 1st session of the 81st Congress. Mr. Arvin B. Shaw, assistant attorney general of California, then stated:

* * * there is no intent on the part of California or Nevada to involve the States of the upper basin in the proposed litigation * * *.

That statement appears at page 84 of the hearings. Although her motion to bring in the upper basin States was denied, California had nevertheless succeeded in achieving months of needless delay.

Have we seen the end of California's attempts to delay authorization of the central Arizona project? Unfortunately, it does not appear that we have. She now demands that no action be taken on the central Arizona project until an overall plan for the development of the water resources of the Pacific Southwest can be considered. I hope you will not yield to any such demands.

I was gratified when Governor Brown, shortly after the Supreme Court decision, announced in a press release that California having lost the Supreme Court case, would not try to accomplish by obstruction what she had failed to accomplish by litigation. To our dismay, we now find that a small, but influential group of Californians continues in an effort to nullify, by delay, the Supreme Court's decision, notwithstanding the further commitment made to this committee in 1949 by Mr. Shaw that California—

was willing and ready to submit to the decision of the Supreme Court as to what our rights are, to accept the answer and abide by it.

This is the group which advocates that no congressional action be taken on our central Arizona project until the Secretary of the Interior has had an opportunity finally to formulate his plan for the development of the water resources of the Pacific Southwest—a plan which would cost billions of dollars and would include projects re-

quiring many years of investigation and planning before their feasibility could be determined. These Californians are utilizing the Pacific Southwest water plan as an instrument of delay. We must wait, they say, until the affected States have had an opportunity to comment upon it. Our experience with California is that it takes California close to a year to make comments that are required by law in 90 days. This is the California practice when the central Arizona project is involved.

Do not misunderstand me. I shall be among the first to give earnest consideration to the Interior Department's Pacific Southwest water plan. I shall vote to authorize all of those elements of that plan which are meritorious and sound. Such plan, however, must not be used as an instrument for delaying authorization of the central Arizona project, which was conceived 23 years ago as a separate project; which was found feasible by the Bureau of Reclamation in 1947 as a separate project; which was reported on favorably by the Interior Department in 1948 as a separate project; which today is a better project than it was then; which is more urgently needed at the present time than at any time in the past; and which has been given the highest priority by Arizona. When, in due course, the Pacific Southwest water plan comes before the Congress, the prior authorization of the central Arizona project will pose no problem. It fits into the Pacific Southwest water plan. Its prior authorization will be helpful to that plan.

Since I first came to Congress in 1912, I have labored unceasingly to help Arizona secure the full benefit of its rightful share of Colorado River water. A civilization has grown up in Arizona that has added wealth and strength to our Nation. That civilization, as is true in the rest of the Southwest, is based on water. Today that civilization is threatened. Arizona has only one source of water if that productive civilization is to survive—that source is the Colorado River.

It cannot be denied that there is sufficient water available to Arizona from the Colorado River to justify a central Arizona project. California, on the other hand, has other ample sources of supply within its own borders sufficient to meet its needs. If Federal assistance is needed to develop those sources, I will be glad to obtain that help for California. This is no new attitude on my part. I cheerfully supported the appropriation of Federal funds required to bring the water from the Sacramento River into central California.

The Congress has never failed to act in a case such as this. Arizona can wait no longer. I am confident that this committee, this Congress and this administration will give first priority to the central Arizona project—a desperately needed project.

When the Supreme Court handed down its historic opinion on June 3, 1963, it appeared that my lifetime of labor was about to bear fruit and that the people of my State would realize that benefits of their full rights in the Colorado River. I trust that I—and the citizens of Arizona—will not be disappointed.

Finally, I would like to say that I believe that in the final analysis the State of California and those people who today purport to speak

on her behalf will redeem the pledge of Hon. Earl Warren given in 1948 that:

Whenever it is finally determined what waters belong to Arizona, it should be permitted to use that water in any manner or by any method considered best by Arizona * * * .

I thank you, Mr. Chairman.

Senator Moss. Thank you, Senator Hayden, for your statement. We appreciate the many long years which you have worked on water projects, and have served your State of Arizona. We value having you on this committee.

A former member of this committee, who has also devoted himself thoroughly to the development of water resources in Arizona, and elsewhere, is Senator Goldwater, who is the coauthor of the bill we are now considering today.

We are glad that Senator Goldwater is with us this morning.

If you have a statement, or want to make any comment, we would like to hear from you now, Senator.

STATEMENT OF HON. BARRY GOLDWATER, A U.S. SENATOR FROM THE STATE OF ARIZONA

Senator GOLDWATER. Thank you, Mr. Chairman.

I appreciate very much your calling this hearing at Senator Hayden's and my request so that we can get this bill underway.

I can't add anything to the eloquent statement made by my senior colleague. He has devoted a lifetime to this. His dedication is known by all of the people in Arizona, and by the Senate.

I think I ought to call attention to the fact that all through the years that Arizona has been seeking this project, all through the years of delay caused by the action of California, that we have supported wholeheartedly projects in the other States, whether they be lower basin or upper basin.

I think I can tell you without any cause for doubt that the Arizona delegation is united behind this bill.

A similar bill was introduced in the House. And the people of Arizona are united as they have never been before. They are united because Arizona realizes more today than at any time in her history the absolute need for water if Arizona is not only going to continue to grow but not become the seventh civilization who has lived in our deserts and have died and passed away because of the lack of water.

Our water needs are with us today. They are not here tomorrow. I think that prompt enactment of this measure, the central Arizona project, would help the overall plan of the Secretary of Interior rather than hinder it.

And I am very fearful that if we wait the length of time noted in the newspaper reports of the Secretary's statement yesterday, that Arizona will be in very serious trouble waterwise.

I, therefore, urge the committee to continue its hearings, to develop them fully, to give all sides a chance to be heard, and in the end pass S. 1658 to the full committee and then out to the floor of the Senate where once again the Congress can act on this project.

I thank you.

Senator Moss. Thank you very much, Senator Goldwater, for your comments. We are pleased to have you come and sit with us this morning.

The senior Senator from California, Senator Kuchel, is the ranking minority member on the full Interior Committee, and also on this subcommittee.

Senator Kuchel is here with us this morning. He is a valued member of the committee.

We have worked together over long years on many water projects.

He represents the State of California, which is, of course, involved here as the statements have indicated, and we will ask Senator Kuchel if he would care to make any comments at this point.

**STATEMENT OF HON. THOMAS H. KUCHEL, A U.S. SENATOR FROM
THE STATE OF CALIFORNIA**

Senator KUCHEL. I do.

First, Mr. Chairman, I want this record to show that I very vigorously object to these hearings this morning.

I have been a member of the U.S. Senate for 11 years. I have been a member of the Interior Committee for 11 years.

Congress in 1944 passed legislation designed to establish orderly procedures under which reclamation and flood control projects would be considered by these two committees, the Interior Committee in the Senate and the Interior Committee in the House.

As I recall, during the last 11 years, this committee, on which I have sat, has followed that law. It certainly has followed that law with respect to any project of the prodigious size of the one now before this subcommittee.

The law is clear. When a Member of the Senate or House of Representatives introduces a bill to provide for the authorization for construction of a project, it quite wisely directs the affected agency of the executive branch of this Government to make a report, either recommending the legislation or objecting to the legislation, or recommending the legislation subject to amendments.

The law quite wisely further provides that after the affected executive agency has made its report, the States affected, through the State governments involved, then have an opportunity to make their comments on the proposed legislation.

There is nothing wrong with that law. And even if one objected to it, it is still the law of this land.

Let this record clearly show that the Department of Interior has made no comment on this pending legislation introduced by my two beloved colleagues from Arizona, Senator Hayden and Senator Goldwater.

Let the record further show that the people of California, acting through the government of their State, have obviously had no opportunity to comment on this legislation, because their comments must, under the law, await the comment of the Secretary of Interior.

Surely it is a matter of regret that friends and neighbors in the U.S. Senate now sit here in what at best would be an exceedingly difficult problem for them and for their colleagues in the Congress to determine, without the recommendations of the Secretary of Interior

and of the States of the Lower Colorado River Basin to help guide them.

As a matter of fact, I present for the record a letter from the Bureau of the Budget, which I shall read.

The Budget Bureau, writing to Senator Jackson, the chairman of this committee, under date of August 21, 1963, states:

DEAR MR. CHAIRMAN: This is in reply to your letter of June 6, 1963, requesting the views of the Bureau of the Budget on S. 1658, a bill to authorize, construct, operate, and maintain the central Arizona project, Arizona-New Mexico, and for other purposes.

The purpose of this bill is clearly stated in its title.

The Department of the Interior has not submitted a report on the project proposed for authorization in this bill to the Bureau of the Budget under procedures set forth in Executive Order No. 9384. Until a report is received, together with the views and comments of the concerned States and Federal agencies, the Bureau of the Budget has no basis for appraising the merits of the proposed development.

Accordingly, it is recommended that action on S. 1658 be deferred until a report is submitted to the Congress in accordance with established procedures.

Sincerely yours,

PHILLIP S. HUGHES,

Assistant Director for Legislative Reference.

Now, that statement does not come from a Californian. It comes from the Bureau of the Budget, objecting to these procedures—and I think I can use the phrase “these procedures constitute an attempt to end run the law of the land.”

We had a meeting, Mr. Chairman, about 3 weeks ago in which most of us around this table participated. That meeting was called at the request of the dean of the Senate, for whom I have the most profound admiration, respect, and love. I mean it. The Senator from Arizona, Carl Hayden, is President pro tempore of the Senate and is held in higher respect, I think, than any other Member of the U.S. Senate.

He asked that this hearing be had.

I objected. I pointed out, for example, that the Arizona versus California lawsuit is not final. I pointed out that the people of California, acting through their attorney general, as the attorney general has a duty to perform, will on or before September 16 request the Supreme Court to permit the people of California a rehearing.

There is nothing novel about that.

The fact of the matter is the U.S. Supreme Court has not even entered a decree in the Arizona versus California lawsuit. Presumably, the Supreme Court will dispose of the petition of the State of California at its fall term.

And, of course, I objected, further, that in America, a proponent must subject himself to the cross-examination of an opponent. That is part of our system. And then, the jury, which is in this case the Congress of the United States, will decide.

And yet today we are told by the chairman of this subcommittee that only Bureau of Reclamation witnesses will testify, and not one single sentence of opposition from any other witnesses will be heard.

I learned today for the first time that we will have hearings in September. This is something new.

Again, those hearings, presumably, will take place in the absence of any position on this bill by Secretary of Interior Udall, or the States affected.

I observe my friend from New Mexico, Senator Anderson, here. I have a great respect for him. New Mexico may well be actively interested in further developments or proposed developments on the Colorado River. I doubt very much that my friend from New Mexico would want to have hearings proceed in the absence of his State being given a full opportunity to determine whether there is anything in this legislation that would affect the good people of his State. And I say that for the other States in the Colorado River Basin, also.

Now, the regrettable fact is that water is scarce in that part of the Nation from which my able friends from Arizona and I come.

When I was a boy, I remember reading the vigorous dispute in the U.S. Senate between one of my illustrious predecessors, Hiram Johnson, a great personal friend of Senator Hayden, as they were contending with respect to the construction of what is now known as Hoover Dam. Congress finally determined that Hoover Dam was to be built in the interests of the American people. Arizona was fighting it. And finally Senator Johnson triumphed.

I think it fair to say, Mr. Chairman, that Hoover Dam today represents the difference between economic life and economic death in southern California.

I want this record to show that the people of California are grateful to Carl Hayden for helping my predecessors when the Central Valley project was created by the Congress of the United States; and, for helping me and my colleagues in implementing it in the years I have been in the Senate—as we are continuing to do. For in northern California, I want this record to show in my judgment the Central Valley project, built by the Government of the United States, represents the difference between economic life and economic death in northern California.

Arizona has a problem and a serious one. So do the people of California. I think ours is just as urgent—that is my point.

Just a few years ago, the people of California bonded themselves in an amount of \$1,750 million to help themselves by ponying up their own money, to try to bring water from the north of my State to the south of my State to help give a reasonable amount of water to the millions of people who were coming into my State at the rate of 600,000 new people every year, in order to sustain the economy there and provide some measurement for growth.

Fifteen minutes ago I first received a copy of Secretary Udall's basin-wide proposal—a plan by which the Congress might hope that the people of Arizona and the people of California, working together, might jointly solve their problems.

Is not that document something that ought to be given the most prayerful consideration of this committee and the people of the States involved?

Of course it is.

My able friends from Arizona said this central Arizona project must go forward as it is and not as a part of the basin plan. This is not what the Secretary of Interior has recommended in his Pacific Southwest water plan, as I hurriedly reviewed it. I shan't go into specifics at this point, except to say that money is a problem with respect to providing additional supplies of water to thirsty people in parched lands. The money to construct the central Arizona project which is now before this committee would in part result in the language of the

bill from a full and complete commitment of one new, gigantic dam, entirely to pay for this project—whereas, Secretary of Interior Udall suggests that a similar large reservoir be built, but that the revenues from the hydroelectric energy produced by the waters behind that dam be utilized for the benefit of the entire Pacific Southwest.

Perhaps it is inevitable that some of the difficulties between our States in the past be spread onto the record. I wipe a little bit of the blood off my face from the recollections my distinguished friend from Arizona, Carl Hayden, has set forth. And I shall not try at this point to reconstruct what my understanding is of the history of a controversy involving two sovereign States—except to say that when the Colorado River compact was being ratified, it was ratified by every State, every State, that is, except the State so ably represented by my two friends from Arizona. Their ratification came on later.

And except to recall, too, that when my fellow Californian, a very great American, Earl Warren, made these statements he was reflecting then what the good people of California want now. The people of California want to see their neighbor be able to sustain a growth, but they want that same opportunity for their own fellow citizens who live in my State.

So when my able friend from Arizona says "Californians are utilizing the Pacific Southwest water plan as an instrument of delay," I deny it.

When my able friend says, "We must wait," they say, "until the affected States have had an opportunity to comment on it," I agree with it, because that is the law. And when my able friend says, "Our experience with California is that it takes California close to a year to make comments that are required by law in 90 days," I say the 90 days have not run, and won't start to run until the Secretary of the Interior makes a correct report of the project covered by this bill, and then gives it to the States involved.

I ask consent that a copy of my letter to Senator Jackson, objecting to this hearing, go into the record.

I ask consent that a letter from the Governor of California, Edmund G. Brown, addressed to Secretary Udall, be placed in the record.

And I want to tell my Democrat colleagues on this committee what he says:

In the wake of the recent Supreme Court decision in *Arizona v. California*, I have heard that you have been requested to submit to Congress a report on a proposed central Arizona project without following the usual procedures for new projects. I am confident these reports are inaccurate. However, because of the importance of this matter to all of us, I want to take this opportunity to request now that any report on the central Arizona project be submitted to the affected States, including California, for review as required by the Flood Control Act of 1944.

I ask parenthetically, Mr. Chairman, what is wrong with following the law?

Governor Brown concludes:

The affected States are entitled to review not only the engineering aspects, including water supply, but also the legal aspects, including the ramifications of the Supreme Court opinion, which we have not yet had an opportunity to study carefully and fully. I would appreciate hearing from you as soon as possible.

The Board of Supervisors of Los Angeles has passed a resolution along these same lines. I ask consent that go into the record.

I ask consent, also, that a resolution of the Colorado River Board of California along the same lines go into the record at this point, as well as a telegram which I received from the Honorable Stanley Mosk, attorney general of California, along the same lines.

Senator Moss. All of those documents will be printed in the record. (The documents referred to follow:)

U.S. SENATE,
August 13, 1963.

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

DEAR SENATOR JACKSON: I deeply and vigorously protest your apparent decision to direct the Senate Subcommittee on Irrigation and Reclamation to hold hearings on the bill to authorize the \$1 billion central Arizona water project at this premature time. This project, hastily revived by Senators Hayden and Goldwater within 24 hours of the decision by the Supreme Court of the United States in *Arizona v. California*, would remove 1.2 million acre-feet of Colorado River water from an already overtaxed system. Its authorization poses a very real hazard that someday the water faucets throughout southern California might well run dry and that the burgeoning population, expanding factories, and well-tilled fields and orchards of that great area might be without nature's most essential resource.

As you know, I have previously voiced and interposed my vigorous objections to the request for hearings on this bill at this time. I believe such "quickie" hearings are not only a wanton affront to the people of California, but that they also constitute a disregard of the usual and historic procedures of our committee.

Both law and custom provide, quite wisely, that before a bill to establish a water resource project—particularly a highly controversial one—is to be heard, the Secretary of the Interior shall study it and make his findings and recommendations known to interested Federal agencies as well as to the governments of the States which would be affected by such a project. Only then is such a project recommended to the Committees on Interior and Insular Affairs of both Houses of Congress and hearings subsequently scheduled.

The central Arizona project proposal is no ordinary, run-of-the-mill reclamation bill. It involves the question of California's being able to continue its use of Colorado River waters as it has done since, and before, the construction of Hoover Dam.

Elementary justice demands that every word and every sentence, every claim and every proposition, of those who would testify in favor of this project be subjected to the most careful, penetrating cross-examination by those who question the project's fairness and doubt its feasibility. Proponents should not be permitted to build an unanswered—but definitely not unanswerable—record, so far in advance of the actual recommendations by the Department of the Interior and the State governments who are deeply concerned.

Not only have the recommendations and detailed project proposal of the present administration not been received or reviewed by the States, but even more important, the pending litigation between Arizona and California has really not been concluded. While the opinion has been announced, no decree has been entered into nor will it be until after the parties submit their suggestions for such a decree this fall. California, moreover, is petitioning for a rehearing of this case. In light of the facts upon which the Court based its decision, this is not an idle gesture.

Even if one wishes to assume that the Court has spoken with finality, which it has not, the crucially important question of the allocation of water in times of shortage is unresolved by either the Secretary of the Interior or the Congress. Secretary Udall has announced that he agrees with the position which has been taken by both the Governor of California and myself that any such decision by him should await a final decree by the Court. Thus, with final judicial determination not yet made and the administrative decision which must flow from that still unresolved, it is simply impossible for Congress to pass an intelligent judgment on the feasibility of a project so far reaching, so vast, and so expensive as that of the central Arizona. Congressional action under these conditions and at this time would simply be a deadly serious game of blindman's buff from not only the standpoint of California's water rights, but also the standpoint of the public interest.

Apart from the pending issues as to water rights, equally unresolved are the questions of actual water supply. I have repeatedly asked the Department of the Interior for a current inventory of the water supply on the lower Colorado River. Despite recently agreeing when before our Irrigation Subcommittee to furnish such material, the Department has subsequently refused such information. The only figures of which I am aware cast grave doubt on the sufficiency of water for the central Arizona project. To hold hearings where only one side can state its case because the responsible department of the Government has refused to furnish the other side with the requested material would be a sham hearing at worst and a completely inadequate hearing at best.

The Secretary of the Interior has announced that his Department will soon have ready for submission to the affected States and Federal agencies a new, far-reaching plan designed to meet the water resource needs of the entire Pacific Southwest region. That plan will include provision for the same purposes as would be served by the central Arizona project. To proceed now with piecemeal consideration of but one part of what will soon be presented to us as a coordinated whole would be poor practice. Haste now might impair the hope of all of us for the wisest conservation and utilization of the resources of the Colorado River.

In view of these substantial objections, I do hope that you will agree to reconsider this matter and postpone any hearings on S. 1658 until the proper preliminary procedures which our committee has long followed with other and similar projects might also be followed in the case of the central Arizona project. I do not believe this is the time to abandon a decade-old congressional policy of awaiting final determination of the yet unresolved issues of both water rights and water quantities before giving further consideration to this project.

Sincerely yours,

THOMAS H. KUCHEL.

RESOLUTION OF BOARD OF SUPERVISORS, COUNTY OF LOS ANGELES,
LOS ANGELES, CALIF.

On motion of Supervisor Hahn, unanimously carried, it is ordered that the following resolution be and it is hereby adopted:

"Whereas U.S. Senators Thomas H. Kuchel and Clair Engle have just protested the decision of Senator Henry Jackson, of Washington, chairman of the Senate Interior and Insular Affairs Committee, in scheduling hearings for August 27 and 28, 1963, on the grandiose central Arizona project, which announcement has come as a surprise to the water lawyers and water leaders of California; and

"Whereas the further consideration by the Congress of additional appropriations of Federal money to provide for the diversion of 1.2 million acre-feet of Colorado River water to serve Phoenix, Tucson, and other areas in central Arizona should not be held until after the Supreme Court of the United States has rendered its final decree in the longstanding Colorado River litigation; and

"Whereas Secretary of the Interior Stewart L. Udall has publicly recognized that such further hearings should not be held, in fairness to California, until after the final decision of the U.S. Supreme Court in *Arizona v. California*; and

"Whereas historically, congressional committees have recognized that it was improper for committees in the Senate and the House of Representatives to hold hearings on legislative matters still involved in litigation; and

"Whereas such premature hearings have been scheduled in advance of the receipt by the Colorado River Board of California of either the Bureau of Reclamation's engineering report on the \$1 billion project, or the Interior Department's regional development plan for the lower Colorado River, both of which reports had been assured for consideration and study by California before additional Federal moneys were considered for appropriation to the vast central Arizona project: Now, therefore, be it

"Resolved, That in full support of the position taken by the Colorado River Board of California, Senators Kuchel and Engle, and also taken by State Attorney General Stanley Mosk, the Board of Supervisors of the County of Los Angeles hereby protests further hearings on the central Arizona project as now scheduled for August 27 and 28, 1963, and hereby requests the Insular Affairs Committee to postpone such hearings until the Supreme Court of the United States has given its final decision in the allocation of water rights on the Colorado River; and be it further

"Resolved, That copies of this resolution be sent to U.S. Senator Henry Jackson and all members of the Insular Affairs Committee, and copies to all members of the congressional delegation representing California."

I, Gordon T. Nesvig, clerk of the Board of Supervisors of the County of Los Angeles, State of California, do hereby certify that the foregoing is a full, true, and correct copy of an order which was adopted by the board of supervisors of said county on August 20, 1963, and entered in the minutes of said board.

In witness whereof, I have hereunto set my hand and affixed the seal of the board of supervisors this 22d day of August 1963.

GORDON T. NESVIG,

Clerk of the Board of Supervisors of the County of Los Angeles, State of California.

RESOLUTION OF THE COLORADO RIVER BOARD OF CALIFORNIA, JULY 13, 1963

Be it resolved, the Colorado River Board of California recommends that the State of California pursue the following policies with respect to the Colorado River, in view of the Supreme Court's decision of June 3, 1963:

I. PROTECTION OF 4.4 MILLION ACRE-FEET ANNUALLY FOR CALIFORNIA FROM THE COLORADO RIVER

The Supreme Court has unanimously rejected the special master's recommendation that if the water supply of the mainstream is insufficient to furnish annually 4.4 million acre-feet of consumptive use to California, 2.8 million to Arizona, and 300,000 to Nevada,¹ the water available shall be prorated among them, thus curtailing existing uses in California to supply projects in Arizona not yet authorized. By a vote of 5 to 3, the Court has referred to the Secretary of the Interior and to Congress the question of whether, in the event of a water supply of less than 7.5 million acre-feet, existing projects shall be protected against proposed new projects, in accordance with the law of equitable apportionment and priorities of appropriation, or whether the insufficient supply shall be prorated among the States. (Three Justices voted in favor of interstate priorities, and against reference of this issue to the Secretary.) We commend Attorney General Mosk and his staff and counsel for the defendant agencies upon their success in obtaining that rejection of the special master's recommendation on this crucial issue.

At stake is the survival of one or more of the California projects now serving over 5 million acre-feet annually to more than 8 million people and to major components of California's agricultural economy.

The interstate priorities of the existing California projects must be protected against any future Arizona projects to the extent of 4.4 million acre-feet annually from the Colorado River, in all further proceedings before the Secretary of the Interior, the Congress, and the Supreme Court. No compromise is possible on the issue of protection of existing projects against future ones, except with respect to Nevada's relatively small allocation. There appears to be a reasonable prospect of supplying Nevada's 300,000 acre-feet, California's 4.4 million acre-feet, and Arizona's presently existing projects without shortage. The priorities of Arizona's existing projects should be given the same protection as California's.

II. WATER FROM THE COLORADO RIVER IN EXCESS OF 4.4 MILLION ACRE-FEET

Permanent availability to California of water from the Colorado River in excess of 4.4 million acre-feet per annum is dependent, under the terms of the Boulder Canyon Project Act and the California Limitation Act, upon the availability of water for use in the lower basin in excess of 7.5 million acre-feet, of which excess California is permitted to use one-half. The physical existence of such an excess depends, for all practical purposes, upon the Court's reversal of its holding that the tributaries are to be excluded from the calculation of the lower basin's total supply. The Colorado River Board recognizes that if California prevails upon a petition for rehearing on this issue, our half of the "excess," according to present estimates of the water supply, will nevertheless

¹ Figures throughout are in consumptive use, diversion less returns to the river which must be distinguished from the flow of water at a particular point.

fail to furnish a dependable supply for the full requirements of California's Colorado River projects, and that a deficiency problem will remain. The deficiency will be accelerated and enlarged if a central Arizona project is constructed.

The Colorado River Board accordingly believes that if in discussions initiated by the Secretary of the Interior, a statement of California's position with reference to Federal assistance to alleviate water shortages in Arizona should become necessary, California may properly assert that on the same grounds, Federal assistance to alleviate shortages in California would be proper. It should be plainly understood that any such action relates to the furnishing of water in addition to, and not in substitution for, any part of the 4.4 million acre-feet of water per annum from the Colorado River to which the priorities of California's three Colorado River projects relate. All such discussion must necessarily be conducted upon the basis that the Supreme Court decision is not now final and will not be final until the Court rules on petition for rehearing and the decree is thereafter settled.

III. NECESSITY FOR AN INVENTORY OF THE WATER SUPPLY

The Supreme Court's decision makes imperative the necessity for an accurate inventory of the water resources of the Colorado River system and of the demands upon those resources, as the State of California has repeatedly urged.

STATE OF CALIFORNIA,
Sacramento, June 5, 1963.

HON. STEWART L. UDALL,
Secretary of the Interior,
Washington, D.C.

MY DEAR MR. SECRETARY: In the wake of the recent Supreme Court decision in *Arizona v. California*, I have heard that you have been requested to submit to Congress a report on a proposed central Arizona project without following the usual procedures for new projects. I am confident that these reports are inaccurate.

However, because of the importance of this matter to all of us, I want to take this opportunity to request now that any report on a central Arizona project be submitted to the affected States, including California, for review as required by the Flood Control Act of 1944. The affected States are entitled to review not only the engineering aspects, including water supply, but also the legal aspects, including the ramifications of the Supreme Court opinion which we have not yet had an opportunity to study carefully and fully.

I would appreciate hearing from you as soon as possible.

Very truly yours,

EDMUND G. BROWN, *Governor.*

LOS ANGELES, CALIF., *August 16, 1963.*

HON. THOMAS H. KUCHEL,
U.S. Senate, Washington, D.C.:

I heartily agree with both California Senators in their objection to hearings on a central Arizona project bill on August 27 and 28. Neither the State of California nor Members of the Congress have yet seen a report from the Secretary of the Interior on the central Arizona project or on the Secretary's proposed basinwide project. Obviously, hearings at the present time cannot accomplish a useful purpose.

My staff will be ready to assist you as requested, if the hearings are held.

STANLEY MOSK, *Attorney General.*

Senator KUCHEL. The California Legislature passed an act in 1929 limiting California to taking 4,400,000 acre-feet of water per year from the Colorado River, plus, if I recall correctly, a half of what would be declared surplus under the terms of the Colorado River compact.

Over the years, California has received and utilized and placed to beneficial constructive use far more than the 4,400,000 acre-feet.

No one today has come forward to testify how much water is in that river.

California has projects in being. Before this kind of a new 1,200,000 acre-feet project, at the cost of a billion dollars, out of the Federal Treasury, were to be created in the State of our neighbor, is it not fair for the people of the United States to ask where does the water come from? Will you have to take it away from what California has been using in order to give it to somebody else?

And, on that basis, how do you determine what people shall be deprived of water in what State, and who shall not be so deprived?

In order for this committee to make an honest judgment there ought to be at every hearing people representing an honest opposition, people entitled to cross-examination of the witnesses who appear here, people able to come forward themselves, and demonstrate as best they can to the members of this committee their point of view with respect to a project as tremendous and as prodigious as this.

I simply say, therefore, that my position today is one of objecting with all the vigor I can command against a hearing that is indecently premature, that affronts the people I have the honor to represent at the moment in the U.S. Senate, and that it ought not to be heard by this committee until the Secretary of Interior, under the law, has made his recommendations and until all the States involved have the opportunity which the law gives to them to come forward.

Those are some of the comments, Mr. Chairman, I make as we begin what I would describe as an illegal hearing, and a very regrettable one.

Senator Moss. Thank you, Senator Kuchel, for your vigorous statement, representing the point of view of California, and your own point of view.

The Senator referred to the meeting, informal meeting, held by Senators from the lower basin States and others with the Secretary of the Interior some 3 weeks ago, at which time this very problem was discussed, and at which time we talked about the hearing to be held, which was already tentatively scheduled for this date. It was generally agreed, although the Senator from California raised his objection then—I give him credit for that—he stated then his position of objecting to the hearing; but it was generally agreed, with the Secretary of the Interior, and with the other members of the committee who happened to be in that meeting, that we would go forward at this time.

The Senator from California need not worry that there will be no opportunity to cross-examine, because whatever is put into the record today will be printed and will be available to all members of the committee, and for others to read and see, and there will be later hearings when they may come forward and contest any statements that are made, or demand explanations; any witnesses who appear now from the Department will be subject to recall by this committee and will be examined further. As a matter of fact, from the standpoint of cross-examination, I would think that the opportunity would be enhanced, because of the chance that the opposition would have to carefully examine minutely all of the testimony, and to research it in order to ask the kind of cross-examination questions they would like to have.

Now, there are no further hearing dates set by this subcommittee at this time for September or any given future time. There may be hopes that we could continue on this matter. Certainly this subcommittee would never expect to act on a bill until we had had the fullest hearings, and we have had all the reports that would be made by the Federal departments.

But I see nothing improper about beginning to make the record, to put together the basic information that this committee will need, especially on a project that has been before us for about 20 years, and on which there has been extensive basic information gathered.

Senator KUCHEL. Will the Senator yield?

Senator Moss. Certainly.

Senator KUCHEL. Does the Senator recall any instance where this committee has gone forward with hearings in the absence of the report of the Secretary of Interior and the affected States?

Senator Moss. Well, I can recall one or two hearings we have had where the report came walking in and was put on the table as we sat down. But it was done by this committee in order to stimulate, I think, the preparation of the report.

This is rather an unusual case. I think we will all admit—because of the tremendous size of the project, the long period of time it has been under consideration.

But it is the judgment of the chairman of the full committee, and I am sure the majority of the committee, that it is proper to proceed at this time. And that is the reason we are proceeding.

The senior Senator from New Mexico, the ranking member of this committee, is here, former chairman of the full committee. And his State is involved to a small degree in the lower basin.

Do you have any comments to make, Senator Anderson?

**STATEMENT OF HON. CLINTON ANDERSON, A U.S. SENATOR FROM
THE STATE OF NEW MEXICO**

Senator ANDERSON. No. I simply received today—this is only a portion of the report of the Secretary of Interior on the Pacific Southwest water plan. I suppose we will spend some time on that when we get down to cases.

But, if so, we are here for quite awhile.

I want to say that I don't believe the committee has ever before gone into an irrigation project of any size without a report from the Department.

I have been on it for 14 years.

I think that is true. I don't think that necessarily stops us. I do think it causes us to be a little careful.

I have served on this committee while the central Arizona project has been twice favorably reported and twice passed by the Senate of the United States. I do think there may be some changes. I think the Senator from California—maybe I misunderstood him—but when he said California was entitled to 4.4 million acre-feet plus one-half the surplus in the river, he meant one-half of the surplus over 7½ million acre-feet.

Senator KUCHEL. In the lower basin; yes, sir.

Senator ANDERSON. Because we in the upper basin States fight everything that California says about water in the river. We watch very carefully what they say.

But there is a problem that arises out of this surplus, because it was my good fortune, as a newspaperman many long years ago, to attend some conferences in which the Santa Fe compact was resolved, and President Hoover, then the Secretary of Commerce, and everybody there thought there was surplus in the river above 15 million acre-feet; it was well known that it would flow somewhere between 16 and 20 million acre-feet. It now flows less than 15 million acre-feet and will, I think, in perpetuity flow less.

And, therefore, we do have some problems, very definitely.

I hope that when the big States, the important States, get through fighting over the water, they don't entirely overlook the little project in my State, known as Hooker Dam.

Senator HAYDEN. We won't.

Senator ANDERSON. Well, the last time there was discussion of Hooker Dam somebody reported the water should be used for the San Carlos Indians of Arizona, and that was not pleasant news to the people in New Mexico.

I only hope we may have some crumbs that fall from the master's table as we go along.

But I am going to be very much interested in what is reported. But I am very much interested in this report put out by the Secretary of Interior, covering the whole Pacific Southwest water plan, because I do think a great deal of additional planning is necessary if we are going to have enough water to go around for everybody.

I appreciate the opportunity of being here.

Senator Moss. Thank you, Senator Anderson.

Senator Bible, of Nevada, a lower basin State.

STATEMENT OF HON. ALAN BIBLE, A U.S. SENATOR FROM THE STATE OF NEVADA

Senator BIBLE. My only comment, Mr. Chairman, is very much along the lines of Senator Anderson's comments. Nevada has a very vital stake in this Southwest water shortage problem. We have a project ready to go, and a project of top priority, because it is a project that is designed to take care of the domestic and industrial water needs of southern Nevada.

They are in short water supply there at the present time. It is an increasing problem. It simply points up the overall problems of this entire Pacific Southwest.

I have some familiarity with the Arizona-California water suit. The State of Nevada in a good neighbor policy years ago attempted to set itself up as an arbitrator in the conflicting claims.

I don't know that we ever really contributed too much. But at least I hope that we are getting to the stage where this problem can be once and for all finally resolved, and these projects can move forward, without undue delay.

I am going to follow this testimony very, very closely and very carefully, because I think it is time that we come to grips with the projects that are so much needed to take care of the water shortages in the complete Pacific Southwest.

Thank you, Mr. Chairman.

Senator Moss. Thank you, Senator Bible.

Senator Allott of Colorado, an upper basin State. Do you have any comments, Senator?

**STATEMENT OF HON. GORDON ALLOTT, A U.S. SENATOR FROM THE
STATE OF COLORADO**

Senator ALLOTT. Some very brief ones, Mr. Chairman.

I am sure that we are all aware of the very deep interest that our senior Senator has had in the promotion of irrigation projects and reclamation projects in the West.

Like my friend from New Mexico, some of us in the upper basin States think and believe sometimes that it takes a long time for the crumbs to fall from the table.

We have faced, also, the bitter opposition, and also obtained help, from our friends in California, for projects that we felt could not possibly affect California adversely.

The resource over which we are concerned here unfortunately is like a gold mine. There comes a time when the resource is depleted. And I am afraid that we are in much the same position with the Colorado River.

We are facing a diminishing situation. I believe, as my friend from New Mexico does, that we will probably never see that 15 million acre-feet in the river. I don't know what the reason is—whether it was bad estimates and bad guess estimates at the time the original Colorado compact was written. But at least the upper basin States are the ones who are bearing the brunt of those bad estimates, and will bear the brunt of them for a long, long time.

Senator ANDERSON. Will my friend yield?

I don't think it was bad estimates. They had records of the river over a long period of years. This conference in Santa Fe was in 1922. That is 40 years ago or more. During these 40 years the temperatures across this country have been gradually rising, which has resulted in a reduced runoff of rainfall. And, therefore, we will never look forward, I don't believe, to a season when there will be 15 million acre-feet in the northern stream.

Whereas, when they had the meeting in Santa Fe, Delph Carpenter of your great State, and one of the greater water lawyers, I think, of all times, was of the opinion that it might run as much as 20 million acre-feet on a regular basis, and he has figures to sustain that and good figures.

The trouble was that the rain stopped a little bit, the temperatures rose, and it has changed the picture.

Senator HAYDEN. Will the Senator yield to me?

A study of the tree rings made by competent people in the University of Arizona, going back for hundreds of years, show that there are wet cycles and dry cycles, and apparently at this time we are in a dry cycle. I won't say forever and ever amen there would be no more water in the Colorado River than is running this year. But it is entirely possible that we were at the close of a wet cycle when the Colorado compact was written, and that we have gone into a dry cycle.

Senator ALLOTT. Well, I appreciate the words of my friends. I think other factors have contributed to this somewhat, too.

And that is the use of land and the failure to retain water where it falls.

But I would like to say just this one point: I do not remember—and I would like to make this point clear with this committee—I do not remember a meeting of this committee—and I have checked with my friend from Idaho—in which any decision was taken with respect to the holding of this particular hearing.

Now, personally, I have no objection to having this hearing. This is a project, this is a matter we have to face, no matter when we face it. And I have no particular objection to it.

But I want to make it clear that certainly for myself, I had no notice of any meeting that I can recall. And I have checked with the staff, checked with my colleague from Idaho, who verifies this. At no meeting at which I was present was this matter and a determination made to have hearings this morning.

I simply want to keep the record straight on that, because we had nothing to do with it.

But I have no personal objection to going ahead with these hearings. And this is said merely for the record—merely for the purpose of keeping the record straight.

Senator GOLDWATER. Will the Senator yield?

I find myself in disagreement with my friends from California and Colorado in stating that this hearing is illegal. This is a hearing that has been anticipated for years.

Senator ALLOTT. Will my friend yield there first? I did not say this meeting was illegal. I simply said I wanted to set the record straight that I was not present, and I do not recall, nor does my staff member recall, nor does my colleague from Idaho recall ever being present at the meeting of the Interior Committee where it was decided to go ahead with this. I do not say that this is illegal.

Senator GOLDWATER. I misunderstood the Senator. I know that my friend from California used that language.

I point out that ever since 1950 Senator Hayden has been able to get money appropriated for the specific use by the Bureau of Reclamation to keep an investigation of the central Arizona project up to date.

I know from the report that from fiscal year 1950 to 1952 over \$2 million has been spent for that purpose, and over \$1 million was appropriated in fiscal 1963.

Now, this in my judgment is merely to hear that report.

As I understand it, the Director of the Bureau of Reclamation is leaving the country for a short while. I think it is highly proper that the people of this country, particularly of the States concerned, be allowed to hear what this report is that over \$3.5 million will have been spent on by the end of this year.

This does not constitute in my mind a formal hearing on this bill. It is merely a statement by the Commissioner of the Bureau as to the feasibility, the cost, et cetera, et cetera, that we have been helping to finance in this very Congress.

There is nothing unusual about that.

Senator KUCHEL. Will the Senator yield?

Senator MOSS. May I say, I think we are getting diverted as to whether this is legal or illegal. The record will show that the refer-

ence was made to an informal meeting where all of the Senators of the lower basin were present, and the Secretary of the Interior, and the Under Secretary of the Interior, and the chairman of the full Interior Committee—where all this conversation went on before. And at that time is when the chairman of the full committee indicated after our discussion that the hearing would go forward as scheduled.

Now, that is what we are doing. And I do not think we should get diverted onto a quarrel as to whether there was a formal meeting of the Interior Committee to do this.

This is a hearing set by the chairman. And I, as chairman of the subcommittee, am designated to conduct this part of the hearing.

The Senator from Arizona, Mr. Goldwater, is correct in saying that this is to get the testimony of the Commissioner of the Bureau of Reclamation, and the timing was governed somewhat by the fact and the time that he will have available to appear before the committee.

Senator KUCHEL. I would like to ask the junior Senator from Arizona a question, if I may.

In the statement of the senior Senator from Arizona, on page 5, I quote:

There is no sound reason why this project cannot be considered now.

I simply ask my friend from Arizona, Senator Goldwater, if he can recall of any instance where hearings went forward in the Senate Interior Committee in the absence of a report from the Department of Interior and the comments of the affected States.

Senator GOLDWATER. I cannot say that in the years that I have served on this committee that that would be true. However, as I said in my prior statement, I do not look upon this as a formal hearing or opening of hearings on this piece of legislation.

This involves the testimony from a Government official who has had charge of spending over \$3 million to keep the report alive.

I think we should have an interest to learn what that report sounds like.

Senator KUCHEL. Well, whether it is a formal hearing or not, this meeting is called to advance the cause of your bill, is it not?

Senator GOLDWATER. It is not my understanding at the informal meeting we had that that is the case.

Senator KUCHEL. Well, it certainly is not to kill it.

Senator GOLDWATER. It is a case of accommodating the Commissioner of the Bureau of Reclamation who I understand is going to Russia.

Senator Moss. May I intervene again. I think we are getting down to really quibbling about this.

As was stated when we first began, this is a hearing to begin to make the record, and to that extent it is an official hearing—there is no question about—because this will be part of the official record.

Senator KUCHEL. And there is no precedent for it, Mr. Chairman.

Senator Moss. But it is going to be limited to hearing, other than the comments of the committee members, one witness today, the Commissioner of the Bureau of Reclamation. That is all that will go into the record at this time.

Now, the record will be open, there will be further hearings. I expect there may be several further hearings on this matter. There may be field hearings, even out in the Southwest, besides here in Washington.

So this does not conclude anything today. The matter will simply be before the committee over a period of time.

This is a tremendous project. It is tied in with the Southwest plan, as has been indicated. And it is going to take lengthy consideration by this subcommittee and the full committee before we would ever be prepared to act on the bill.

Does the Senator from North Dakota, Mr. Burdick, have any comment?

Senator BURDICK. This appears to be a Southwest problem. I will say nothing.

Senator KUCHEL. You want to include yourself out, don't you?

Senator MOSS. Could you divert a little of that Missouri River over, so we would not worry so much about the amount in the Colorado?

Senator ALLOTT. Mr. Chairman, I want to reserve my rights here, and I want to preserve my position.

The chairman of this committee, the Interior Committee, has the right to set hearings any time he wishes. The chairman of the subcommittee has the right to set hearings. The only thought I wish to bring forth, and I want to make it specifically clear, is that the meeting was set by someone. It was not set by the committee. And that statement has been made here. It was set by the committee. And I want the record to be perfectly clear that the committee did not set it.

Outside of this, I do not care whether the chairman has called a meeting or not. This is the chairman's prerogative. And those of us who sit in the minority are quite aware that this is the chairman's prerogative. We face this all the time.

Senator MOSS. Well, I subscribe to that—that this was not set by the committee. The date was set by the subcommittee chairman and the full committee chairman in consultation prior to an informal hearing, where it was discussed and where it was decided in the informal meeting that despite the objection of the Senator from California, it was decided we would go forward nevertheless.

Senator ALLOTT. But, Mr. Chairman, at this informal meeting—I do not know who was present—but I want to make it perfectly clear the Senator from Colorado was not there, and it was not discussed with him, nor was it ever discussed with him.

Senator MOSS. Nor was any Senator other than the lower basin Senators and the chairman of the full committee.

Senator ANDERSON. Will the Senator yield to me for just a second? In point of service I think I am the senior member of this committee. I have been around as long as anybody now on it. At no time did I know anything about the chairman consulting the full committee in setting hearings.

Sometimes I just consult my own Secretary to find out if I am going to be in town. Sometimes I consult the staff to find out if they are going to be ready. And I completely agree with the Senator from Colorado, the question of whether there is any authorization is outside the question.

As he pointed out, the chairman has a right to set it, the subcommittee chairman has the right to set it. It has been set. Let's go on.

Senator KUCHEL. Mr. Chairman, this hearing has been called unofficial. But this will be part of the record in support of this bill.

Senator MOSS. This is official. It will be printed up and become part of the record.

The Senator from Idaho.

Senator JORDAN. I will reserve my questions at this time, Mr. Chairman.

Senator MOSS. Thank you very much.

We will now hear from the Commissioner of Reclamation, Floyd Dominy. I understand he will have some of his assistants.

Do you wish to have them come up and sit with you?

Mr. DOMINY. A little later, if we get into questions, I will ask them to come up, Mr. Chairman.

Senator MOSS. All right. You may proceed.

STATEMENT OF FLOYD E. DOMINY, COMMISSIONER OF RECLAMATION; ACCOMPANIED BY C. A. PUGH, AREA ENGINEER, PHOENIX DEVELOPMENT OFFICE; AND ARLEIGH B. WEST, REGIONAL DIRECTOR, BUREAU OF RECLAMATION, REGION 3

Mr. DOMINY. Mr. Chairman and distinguished members of this distinguished committee, I am always happy to come before this committee, as I have been doing now for many years, to report on legitimate reclamation activities.

Senator Hayden has given you a brief history of the legislative efforts of the State of Arizona to obtain authorization of the central Arizona project. I am sure that you, the members of this committee, fully appreciate the very large part that the most senior of your Senate colleagues has played in these efforts.

In my 25 years in the Nation's Capital I have been impressed with the fact that Senator Hayden has never limited his support of water projects to those in his home State of Arizona, or even to the arid West.

His influence in furthering water resource development has extended to every area of the Nation. His interests cover every aspect of water conservation, use, development, and research, including irrigation, municipal and industrial water supply, flood control, hydro-power, rivers and harbors, fish and wildlife, and all related functions.

I am pleased to have the opportunity to appear before this committee today to testify regarding the economic and engineering details of the project which Senator Hayden has proposed and which is an integral part of the Pacific Southwest water plan, released for review by the affected States and Federal agencies only yesterday by the Secretary of the Interior.

The Pacific Southwest water plan, as I am sure you have been informed through the Secretary's press releases and announcements during the past few months, is a comprehensive plan for coordinated development of the water resources of the Lower Colorado River Basin and southern California. These are the areas which depend upon the Colorado River and its tributaries for all or part of their water supplies and which comprise the region termed the "Pacific Southwest" in Secretary Udall's plan.

The Pacific Southwest is, at the same time, the fastest growing and most water deficient region of the United States. Its population of about 11 million is expected to triple in the next 40 years; yet the water available to this region is inadequate to sustain on a long-term basis the economy that now exists.

A program of coordinated regional water resource development, such as that set forth in the Secretary's plan, is essential to maintain the present development and provide for further growth of this dynamic and important segment of the Nation's economy.

The central Arizona project that would be authorized by enactment of S. 1658 is an integral unit of the more comprehensive Pacific Southwest water plan. The central Arizona project plan was originally set forth in the Bureau of Reclamation's report of December 1947, and subsequently published, together with the comments of the affected States and other Federal agencies, in House Document 136, 81st Congress, 1st session. In 1947, project proposal included construction of Bridge Canyon Dam on the Colorado River as a source of energy for project pumping and commercial power, a pumping and aqueduct system to convey water to central Arizona, and four additional dams and reservoirs to further conserve and regulate the waters of the Gila River system in central Arizona and western New Mexico.

Except for adjustments in the plan to fit changed conditions on the Colorado River and in the service area since 1947, the central Arizona project features, as proposed in S. 1658, are the same as set forth in the 1947 report and also, insofar as water service to the central Arizona project area is concerned, they are the same as proposed in the Pacific Southwest water plan. The differences between the central Arizona project plan, as advanced by S. 1658, and the Pacific Southwest water plan, are primarily differences of concept and financing. The physical works for water delivery would be identical in either case.

Under the concept of coordinated regional development, set forth by the Pacific Southwest water plan, revenues from all existing and proposed hydroplants on the lower Colorado River would be pooled in a development fund to provide financial assistance for water resource development throughout the Pacific Southwest. Bridge Canyon Dam would therefore be constructed as a unit of the Pacific Southwest water plan rather than be identified solely as an integral part of the central Arizona project. In other words, under the regional development concept, Bridge Canyon Dam and powerplant would be separated from the central Arizona water features but, together with other existing and proposed hydro developments, would provide the necessary power for pumping water to central Arizona and also financial assistance for the central Arizona project and other units of the Pacific Southwest water plan.

Senator KUCHEL. Commissioner, may I ask you a question there?

Are the provisions for the use of the revenues from Bridge Canyon under the Hayden-Goldwater bill identical with the provisions of the recommended basin development by the Department?

Mr. DOMINY. No, sir. As you pointed out, and as my statement points out, this bill identifies Bridge Canyon solely with Arizona, whereas the comprehensive plan would identify it with a basinwide financial concept.

Senator ANDERSON. Is the location the same?

Mr. DOMINY. Yes, sir.

Senator BIBLE. Will you develop that financial concept as you go along in your statement?

Mr. DOMINY. Yes, sir.

It should be noted that under the Pacific Southwest water plan, central Arizona project pumping energy would be derived from the proposed Marble Canyon powerplant rather than from Bridge Canyon Dam and powerplant.

This change would permit the entire capacity of the Bridge Canyon powerplant to be available for peaking generation and thus, provide for maximum utilization of existing and proposed thermal capacity in the area as well as to provide the maximum financial contribution to the development fund.

These hearings today are concerned with a bill to authorize the central Arizona project. The committee is aware that a formal report outlining the views of the administration as to the merits of this proposed bill has not yet been transmitted.

Senator HAYDEN. Is it available?

Mr. DOMINY. The report, sir?

Senator HAYDEN. Yes.

Mr. DOMINY. There is an updated planning report on the proposed central Arizona project; yes, sir. But it is only at this stage a regional director's report addressed to me, and it has not been through the final clearance that reports of this nature take.

Senator HAYDEN. Well, what I was trying to get at is, it contains your engineering information.

Mr. DOMINY. Yes, sir. And it is based on that updated report that I am reporting here, the economic and engineering facts.

Senator HAYDEN. Is there any reason why it could not be made available to this committee?

Mr. DOMINY. Of course, I am not at liberty, as you well know from all your years, sir, to submit reports that have not been proposed through all of the channels of clearance. And in this particular case, it is proposed that this report would be revised to fit the comprehensive plan that the Secretary outlined, and has submitted to the States.

Senator HAYDEN. Personally as a member of this committee I would like to know the difference between the report that exists now and how it would be in the revised state. It may be I will be delighted with the new way of doing it. But nevertheless, I would like to know the differences between the two. And how can we know that unless we see the other report?

Mr. DOMINY. Of course the burden of my statement here will be to outline the economic and engineering facts and features of that report.

Senator HAYDEN. My question should be addressed to the Secretary of the Interior.

Senator ANDERSON. Mr. Chairman, I asked a minute ago about if the location would be the same and you said, "yes." Now you say it should be noted that under the Pacific Southwest power plan, central Arizona project pumping energy would be derived from the proposed Marble Canyon powerplant rather than from Bridge Canyon Dam and powerplants.

I think I remember the central Arizona project pretty well. I thought power was going to be developed there and not at Marble Canyon.

Mr. DOMINY. Yes, sir; I pointed out the Bridge Canyon Dam site and the size of the dam are the same—only in the comprehensive basin proposal, Marble Canyon would be added.

Senator ANDERSON. You would build another dam?

Mr. DOMINY. Yes, sir; under the comprehensive basin plan.

Senator ANDERSON. What is that going to be charged to?

Mr. DOMINY. That will also contribute to the basin development fund, the revenues from it.

Senator ANDERSON. There was just barely enough revenue from Bridge Canyon Dam to pay for that in the project we had before the Congress before.

Mr. DOMINY. The Bridge Canyon Dam we have here, and my statement will bring that out in a moment, provides for a substantially larger production of power, because now we have Glen Canyon on the river, and we can make Bridge Canyon much more effective in the power production field with the regulation provided at Glen Canyon.

Senator ANDERSON. You know what has happened to Glen Canyon. You can hardly sell the current, because at 6 mills it is not competitive.

The Public Service of Arizona has built a plant that is going to cost 4 mills to deliver power. The Public Service of New Mexico is going to be under 4 mills to deliver power. And you have it for sale at 6.

Mr. DOMINY. Senator, it has been oversubscribed. As a matter of fact, hydropower—

Senator ANDERSON. Most of it is regarded as dumping power, is it not?

Mr. DOMINY. No, sir. Hydropower, when correlated with basic thermal facilities, has great advantages, and is worth more because you can turn hydro off and on.

Senator ANDERSON. Maybe I better ask my question this way. Do you propose that the Marble Canyon Dam, under this other program, will get enough money to pay for both of them?

Mr. DOMINY. Marble Canyon and Bridge Canyon will each be self-supporting. The power from them will be in demand, and will pay out the cost of power with interest in less than the 50-year period that is normally provided, and will provide surplus revenues.

Senator ANDERSON. I thought you said Bridge Canyon was not going to be the breadwinner.

Mr. DOMINY. No, sir. I said that under the comprehensive plan we would use power from Marble to pump the central Arizona project water rather than Bridge Canyon power, and that the Bridge Canyon could then be operated primarily for peaking purposes, to make it real advantageous to augment the thermal capacity now existing and proposed in the Pacific Southwest.

Senator ANDERSON. I understand.

Senator GOLDWATER. Mr. Chairman.

Mr. Dominy, am I wrong in my recollection that the last time you and the Secretary were in my office—I forget whether it was March or sometime back—the statement was made that within 2 weeks of the decision of the Supreme Court, if it were favorable, a report on the central Arizona project would be forthcoming?

Mr. DOMINY. My recollection of that conversation, sir, is substantially that—that because we had received money from the State of Arizona, and because we had been receiving Federal funds to continue our investigations, we did assure you that it would be physically possible to put together any data on the central Arizona project plan very soon after the decision was to be handed down, yes, sir.

Senator KUCHEL. Well, let me ask, just so there is no misunderstanding. The Department of Interior has not made any formal comment on this bill; is that correct?

Mr. DOMINY. That is quite correct, sir.

Senator KUCHEL. Now, is it not usual in your experience of 25 years—is it not usual that the Department furnishes this study with its comments and report on reclamation project bills before the committee proceeds with hearing them?

Mr. DOMINY. It is certainly the usual process. I also point out that my statement here says that since there is no official report from the administration, that my testimony will be directed to providing such factual information on the economic and engineering features of the project proposed in Senate 1658 as the committee may desire.

In other words, I am not here with any prepared position approved by the administration on the merits of this proposal. However I am here in the capacity of Commissioner of Reclamation to report on the economic and engineering facts which we have gathered to supplement the report of 1947.

Senator KUCHEL. Commissioner, during the time you have served as Commissioner of the Bureau of Reclamation, have you ever testified before a committee similar to the fashion that you propose to testify today when legislation is pending but the Department has not rendered a report?

Mr. DOMINY. Yes, sir; there have been occasions when I have been in this position when I could comment on engineering economic facts without expressing an opinion on the merits of the bill.

Senator KUCHEL. Has that been a rather usual procedure?

Mr. DOMINY. No, sir. But it is not unprecedented.

Senator KUCHEL. Have you done it on a number of occasions?

Mr. DOMINY. Yes, sir.

Senator KUCHEL. Have you done it on reclamation bills of the magnitude of this one?

Mr. DOMINY. No, sir.

Senator ANDERSON. Senator Goldwater asked a question a while ago about the preparation of the report. You said it could be done in 2 weeks. The Supreme Court reached a decision a long time ago. Why was it not done?

Mr. DOMINY. Because in the interim, the decision was made at policy levels that the emphasis would be placed on a broader, more comprehensive approach to the problem and that, therefore, we would not complete the final review of the Department and give the blessing of the Department to the specific central Arizona updated report, but our physical assets in personnel and trained engineers were put on this major job of reviewing the whole problem in the entire basin, to draft under forced draft conditions this specific proposed Southwest water plan.

Senator ANDERSON. Secretary Udall, in a letter dated June 28 of this year says:

The report of January 1962 has been further refined by study since its completion and its supplementary report has been prepared.

Not shall, be; will be; may be; but has been prepared.

This supplemental report firmly establishes the economic and financial feasibility of the central Arizona project.

I am trying to find out why that could not be presented to us.

Mr. DOMINY. It could be.

Senator ANDERSON. Then let me ask why was it not?

Mr. DOMINY. It could be by proper authorities. The report is in this status, Senator Anderson; it now carries the date of June 7 and is signed by Regional Director A. B. West, and was transmitted to me. In this form it is a regional director's report only.

Senator ANDERSON. You would not hold it up from June 7 when we were going to have these hearings, would you?

Mr. DOMINY. I would normally process the report and transmit it to the Department with recommendation. The Department would review it and transmit it to the Bureau of the Budget.

In this case, this was not done because the policy decision was that we would direct our efforts to the comprehensive plan embracing a broader proposal and not confine our report at this time to a limited central Arizona project.

Senator ANDERSON. Isn't it still true that the whole is the sum of its parts?

Mr. DOMINY. It is, sir.

Senator ANDERSON. What could be wrong with one of the parts, then?

Mr. DOMINY. I see no reason why it should be, sir.

Senator KUCHEL. May I call attention to a letter which the Department of the Interior yesterday sent to the Governors of California, Colorado, New Mexico, Arizona, Nevada, and Utah, in which he says:

I fully intend to meet the commitment made in my June 12 letter and intend to be ready to submit the plan to Congress early next year.

Is it not your understanding, Commissioner, that the position of the Secretary of the Interior was and is that he would make a report on this specific bill next year and not now?

Mr. DOMINY. The report that you are referring to in that communication, Senator Kuchel, is in my judgment a reference to the comprehensive southwest basin report.

Senator KUCHEL. And not to this—

Mr. DOMINY. Not to the specific central Arizona project report proposed in S. 1658.

Senator GOLDWATER. Would the Senator yield?

Was the date of that letter June 12?

Senator KUCHEL. Yes.

Senator GOLDWATER. I have a letter from the Secretary of the Interior dated June 28, in which he says, and I repeat again:

The supplemental report firmly establishes the economic and financial feasibility of the central Arizona project.

There must be some discrepancy here because 2 weeks after that letter was written, a letter was written over the signature of the Secretary that a report was ready and that it was highly favorable.

I am wondering, in view of the fact that the Secretary himself made a point of the feasibility of this report, why the report was not made.

Senator ANDERSON. I merely asked that question because I have seen a good many irrigation projects in the last 14 years and it is helpful to have a Bureau of Reclamation report. I am one of those who thinks the Bureau of Reclamation has done a great service to this country. If they have a report ready on the central Arizona project, I would like to see it, for two reasons:

One, I would like to know what economic feasibility means, as pertains to a bill twice passed by the Senate of the United States, and the other reason is that I have a small interest in what happens to New Mexico.

Mr. DOMINY. The balance of my statement may satisfy you on that, Senator.

Senator ANDERSON. You proceed at your own peril.

Senator GOLDWATER. May I ask that two letters, one written by myself to Secretary Udall and another in answer to that letter, be made a part of the record?

Senator MOSS. They shall be made a part of the record at this point.
(The documents referred to follow:)

JUNE 14, 1963.

HON. STEWART LEE UDALL,
Secretary of the Department of Interior,
Washington, D.C.

DEAR STEW: Paragraph 2(c) of supplement B of the recent proposal you submitted to the Governors, etc., has me concerned. For several years Senator Hayden has been furnishing the Bureau with money to keep up-to-date the studies, including feasibility, of the central Arizona project, and it is my distinct recollection that you told me in my office and later repeated it before assembled water interests from Arizona that within very few weeks after the Court decision, the Bureau would be ready with full reports to back up the congressional hearing on legislation.

Your supplemental now puts the contract date for this feasibility report at 1967. Would you please explain to me the change in time between the meetings of a few months ago and June 12.

With best wishes,

BARRY GOLDWATER.

THE SECRETARY OF THE INTERIOR,
Washington, June 12, 1963.

HON. BARRY GOLDWATER,
U.S. Senate, Washington, D.C.

DEAR BARRY: The enclosed letter to the Governor of your State is self-explanatory.

I hope that I will have an opportunity in the near future to sit down and discuss with you some of the opportunities which your State will have, water-wise, as a result of the new action phase resulting from the recent Supreme Court decision.

Sincerely,

STEWART L. UDALL,
Secretary of the Interior.

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., July 28, 1963.

HON. BARRY M. GOLDWATER,
U.S. Senate, Washington, D.C.

DEAR SENATOR GOLDWATER: I am happy for the opportunity to clarify the point raised in your letter of June 14, 1963, covering the status of a report necessary to establish the feasibility of the central Arizona project.

Attachment B of my letter of January 18, 1963, to Congressman Wayne N. Aspinall indicated that a report on the central Arizona project had been submitted to the Congress in September 1948, appraised and brought up to date in fiscal year 1961 with funds advanced by the State of Arizona and that detailed studies were underway leading to a further report in fiscal year 1967.

The appraisal report of January 1962 has been further refined by studies since its completion, and a supplemental report has been prepared. This supplemental report firmly establishes the economic and financial feasibility of the central Arizona project.

As a matter of policy, investigations leading to a report proposing the authorization of a reclamation project are carried only to the point of a positive and firm demonstration of engineering, economic, and financial feasibility. In practically all cases, a significant amount of additional detailed investigation remains to be done after authorization and prior to construction to define such items as the exact works to be constructed, the specific areas to be served, the precise plan of project operation, and the specific conditions for the marketing of water and power.

It is this part of the work which will be done by 1967. Upon authorization of the central Arizona project, such work can proceed concurrently with initiation of construction without causing delay.

Sincerely yours,

(Signed) STEWART L. UDALL,
Secretary of the Interior.

Mr. DOMINY. Let me repeat one sentence here. The committee is aware that a formal report outlining the views of the administration as to the merits of this proposed bill has not yet been transmitted.

My further remarks, therefore, will be directed to providing such factual information on the economic and engineering features of the project proposed in S. 1658 as the committee may desire.

Because we will be talking about project facilities which were originally proposed in the Bureau's report of 1947, I will first provide some background information on that report as a basis for my remarks.

It is appropriate to point out early that the State of Arizona has not only sought authorization of the project on past occasions but also has contributed almost a half million dollars toward preparation of the 1947 report, and toward gathering the data and making the studies that were necessary to update this report to reflect today's condition. The State of New Mexico also has contributed funds to update project data pertinent to that State.

By the time Arizona became a State in 1912, plans for diverting Colorado River water to the most highly developed areas in the central part of the State were under discussion, and by about 1920, various plans for such diversions had been drawn. At the start of World War II, discussions between the Bureau of Reclamation and State officials of Arizona were in progress regarding cooperative investigations to develop plans for importing Colorado River water to central Arizona.

Firm plans were not undertaken, however, because of the war effort. In 1944, Arizona's Governor Osborn called a special session of the State legislature during which time it ratified the Colorado River compact, approved the contract with the Secretary of the Interior for

delivery of 2.8 million acre-feet per year, plus one-half of any surplus of Colorado River water to Arizona under the Boulder Canyon Project Act, and also appropriated funds for cooperative investigations with the Bureau of Reclamation.

Senator KUCHEL. When was the Colorado River compact first approved by any of the States?

Mr. DOMINY. It was in the twenties.

Senator ANDERSON. It was presented in 1922. The first report, I think, was in 1923.

Mr. DOMINY. I think that is right, sir.

Arizona State Senate bill No. 4 provided \$200,000 of State funds to be administered by the State land commissioner for cooperative investigations with the Bureau of Reclamation. This bill was signed by the Governor on February 24, 1944. The Bureau of Reclamation in February 1945 initiated its investigations which culminated in the Bureau of Reclamation's central Arizona project report of 1947.

The plan proposed in the 1947 report provided for pumping water from Lake Havasu behind Parker Dam and conveying it through a canal system to the central part of the State. Bills to authorize the project passed the Senate in 1950 and 1951, as Senator Anderson referred to here, but in 1951 hearings before the House Committee on Interior and Insular Affairs were postponed until such time as Arizona's right to the use of lower Colorado River water was adjudicated or settled by other means.

Following postponement of the hearings by the House committee, the State of Arizona filed suit against the State of California in 1952 to confirm its water rights, and litigation has been in progress since that time.

Following the filing of the Supreme Court suit, *Arizona v. California, et al.*, in 1952, the Bureau of Reclamation suspended further work on investigations of the central Arizona project and on all other proposed diversions of main-stream Colorado River water in the lower basin pending settlement of the litigation.

During the 1950 decade, when activity on the central Arizona project was dormant, Arizona experienced the fastest population and economic growth in the Nation.

Senator ANDERSON. What does that prove, that if we kill this project, Arizona will grow faster?

Mr. DOMINY. It proves that without this project, the economy of that area is going to dry up almost as fast as it expanded.

The original central Arizona project report documented the fact that Arizona in 1946 had an estimated population of 660,000.

Four years later, the official census listed 749,587 people, and in 1960 the total was 1,302,161, a gain of nearly 100 percent since the original studies were made.

The majority of the new Arizona residents have settled in the metropolitan areas of Phoenix and Tucson, and in the adjacent areas of central Arizona.

Prior to the special master's report and recommended decree being submitted to the Supreme Court, in December 1960, Arizona officials were mindful of the fact that the State was the fastest growing State in the Nation and recognized that additional data were needed to document the changes that had taken place since the 1947 report was published.

Following the special master's report the State of Arizona, through its interstate stream commission, entered into a contract with the Bureau of Reclamation in April of 1961, under which the State contributed \$100,000 to the Bureau to update the 1947 report. The State of New Mexico also contributed funds to assist in this report preparation. The results of these investigations were presented to the Arizona Interstate Stream Commission in an appraisal report dated January 1962. No Federal funds were used for this purpose.

The Bureau of Reclamation's January 1962 appraisal report on the central Arizona project made no effort to estimate the quantity of water that would be available for importation to central Arizona from the Colorado River, because this question was still in litigation before the Supreme Court.

In the updating studies, it was assumed that 1.2 million acre-feet per year would be diverted. This was the same assumption used in the 1947 report.

The central Arizona project is, today, the same project that was outlined in detail in the Bureau of Reclamation's report of December 1947. Changes have been made in the project plan only as were necessary to take advantage of development during the last decade, and to modify the location and design of project features as required to meet present conditions.

Project costs were reestimated at present cost levels, and benefits and repayment capacity were reanalyzed. New estimates of local water supply availability were made upon the basis of the most recent water supply records. The economic and financial analysis also has been revised to the extent necessary to reflect congressional and administrative criteria made applicable during the past decade. Projections of future water needs were also a part of the investigation.

Senator KUCHEL. Commissioner, if I may interrupt you, just a moment ago you testified that the Bureau of Reclamation's January 1962 appraisal report on the central Arizona project made no effort to estimate the quantity of water that would be available for importation to central Arizona from the Colorado River because this question was in litigation before the Supreme Court. Have you made an effort since that time to estimate the quantity of water that would be available?

Mr. DOMINY. We have this problem under active review. As a matter of fact, our chief hydrologist is in the hospital at the moment largely because of his real strenuous efforts to resolve some of these serious problems on the Colorado River water supply.

Senator KUCHEL. That, of course, would be of crucial importance, would it not, for any decision as to the feasibility of any new reclamation project in the lower basin?

Mr. DOMINY. Certainly it has bearing.

Senator KUCHEL. You will not testify, then—you are unable to testify this morning as to the quantity of water that would be available?

Mr. DOMINY. 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.

Senator KUCHEL. Would not be in derogation?

Mr. DOMINY. No, sir. It would not be in derogation.

Senator ANDERSON. You would trim down the in excess of 4 million acre-feet they are now using?

Mr. DOMINY. It then would be in derogation assuming the present flow records of the Colorado River. We have used, of course, the latest information, hydrologic information. We picked the driest period of record, 1930 to 1962. This is drier than anything we had at the time that the compact was drawn. And on that projection, certainly, you would have shortage, very quickly after central Arizona came into full use, in delivery of above 4.4 million to California.

Senator ANDERSON. If you limited California or it limited itself to 4-million-4, there might be enough water available to the Arizona project, but it would mean cutting off a million acres, roughly, from California?

Mr. DOMINY. Yes, sir. California is now diverting acre-feet in excess the 4.4 million awarded by the court.

Senator HAYDEN. Let me ask you this: How long would it take to construct the central Arizona project?

Mr. DOMINY. Let me get that figure from Mr. Pugh.

From the time we started construction of the central Arizona project, when would we have water delivered?

Mr. PUGH. About 10 years from beginning of construction. It would depend upon the rate money would be advanced.

Mr. DOMINY. It would be a 10-year optimum schedule.

Senator HAYDEN. In that 10 years, the State of California could get a substitute from the water lost out of the Colorado River from northern California?

Mr. DOMINY. This is certainly the position the Commissioner of Reclamation feels we should all take at this time. I think we should quit acting like a bunch of bears around the honeypot and assuming this is the only feed we are ever going to get and divide up what is there rationally and all of us eat from it with the assumption that there is going to be more brought in when we are hungry, that we can do it. We have the know-how, the engineering competence, and the imagination necessary to keep this fastest growing area in the whole Southwest developing and keep the water supply available as it is needed. There is no question in my mind but what this can be done.

Senator ANDERSON. You do not mind my realizing this is the last honeypot as far as New Mexico is concerned, do you?

Mr. DOMINY. I realize it.

Senator HAYDEN. In other words, there is an ample supply of water in northern California that could be transported to southern California to make up for whatever loss there is from the Colorado River?

Mr. DOMINY. Of course, you and I are not at liberty to divide up California's water supply. They do this under their own State laws and counties-of-origin doctrine. I agree with you, there are vast quantities of water going unused into the ocean from northern California and other parts of the Pacific coast.

I agree with you also that there are other means available to us to augment the water supplies of the Colorado. Certainly phreatophyte control, which we are doing on the Rio Grande, which has been suc-

cessful, can be done. Certainly lining of canals. We are making real progress on evaporation suppressants, which will conserve water.

Senator ANDERSON. I am trying to get you to say the possibility of nuclear power still is a real factor——

Mr. DOMINY. I realize that. I think if we were to put the same effort into nuclear power for hydroelectric and desalination purposes that we put into the Hanford works, we could solve this problem in a matter of a few years. All we have to do is decide it is critical enough and put the imagination and engineering science of American industry to work and it will be solved.

Senator ANDERSON. I agree with you thoroughly. I just want to bring out the fact that unless you do some of these other things, it does involve a handicap to California and we have to bear that in mind.

Mr. DOMINY. It involves an implied handicap to California on the use of water, certainly. Everyone recognizes this. Everyone recognizes that as soon as the central Arizona project comes in, we are starting toward a day when the shortage will occur. But the water is there now. If the Supreme Court ruling stands as it is, I see no reason why Arizona should not have its project and put its water to work and we all work toward solving the shortage that will eventually occur.

Senator KUCHEL. Mr. Commissioner, you say your hydrologist has not yet completed his report. Will that be available later on?

Mr. DOMINY. Certainly we can give such information as we have gathered and no one has greater information on the hydrology of the river than the Bureau of Reclamation.

Senator KUCHEL. With respect to the question that Senator Anderson raised, that there is an immediate hazard to the people of California in the construction of the reclamation project envisaged in this bill, let me ask you this:

Is there any hazard to California of receiving less than 4,400,000 acre-feet, in your judgment?

Mr. DOMINY. If there were no other advancements in the science of water, if we didn't accomplish canal lining, if we didn't do phreatophytic control, if we did none of the other things it is perfectly possible to do and we had the central Arizona project in full being at a million-two acre-feet diversion, such as is proposed here, and if we had cyclical water history repeated on top of the one we have now, there could be, conceivably, a need to share some shortages by about 1985 or 1990, possibly.

Senator KUCHEL. So that to that extent——

Mr. DOMINY. But we have time to solve these problems, as I see it.

Senator KUCHEL. To that extent, if there were additional works on the river, and if, as you suggest, the cyclical cycle were to repeat itself, there would be a greater hazard that California would not receive even the 4,400,000. Is that correct?

Mr. DOMINY. I think this is possible if you didn't do any of these things, which I think ought to be done and could be done very quickly to guard against such eventuality.

Senator KUCHEL. Is it your feeling that whatever things are done to help the people of Arizona, simultaneously, other public works should be undertaken with the new scientific skills so that the hazard which might otherwise arise for California will be eliminated?

Mr. DOMINY. Yes; I am completely in sympathy with the farsighted program Secretary Udall has thrown the strength of his office behind, which is to approach this from a regional point of view and quit the bickering around the honeypot, but work to keep the honeypot full.

Senator GOLDWATER. Mr. Dominy, I am sure you will find most of the people of the Southwest of that opinion, but do you believe the central Arizona project authorization should be held up for favorable action on these early parts of the Southwest project?

Mr. DOMINY. I am in my statement making clear that the central Arizona project embraced by Senate 1658, except for Marble Canyon, Bridge Canyon joint financial structure, is identical with what is proposed in the larger proposal, as one stage of the Southwest water plan. The central Arizona project is one of the strong motivations behind any Southwest water plan. It is a basic ingredient of that plan and ought to go forward at the earliest practical moment.

It has been held up for 12 years. The matter was critical when we drafted our 1947 report. It has become seriously critical now with the overdrafting of ground water and the only thing that can prevent catastrophe in the Southwest is a real statesmanlike approach to the water problem and the support of the Federal Government in financing it, strictly on a reimbursable basis.

The revenues are there: with Marble and Bridge Canyon, with Hoover and Parker and Davis, we can crank out the revenues to finance whatever is necessary to bring the water to the Pacific Southwest.

Senator ANDERSON. Are you testifying how much water is there now to bring that water from the Colorado conversion over to the city of Los Angeles?

Mr. DOMINY. I don't have that figure.

Senator ANDERSON. It is a rather substantial sum.

Mr. DOMINY. Yes.

Senator ANDERSON. If you were able to work as you are working now at Oak Ridge for desalination of water and if you are able to do it at Key West, if you are able to find a desalination process that is less expensive than conversion, you would be able to free some of this water?

Mr. DOMINY. I believe that is a potential.

Senator ANDERSON. You will have to move along; otherwise you are jeopardizing the people of California?

Mr. DOMINY. My answer is that there is unused water in the Colorado River now and will be for many, many years that ought to be put to work for central Arizona and before the shortages that could be forecast will come, we solve the problem and make the revenues available under a basin plan to help solve it.

Senator KUCHEL. Are you suggesting that the arrangements to help solve the hazards to California be considered subsequently to the consideration of the Hayden-Goldwater bill?

Mr. DOMINY. I am sorry Senator, because I have already said I have no position on the merits of moving this bill. All I can testify on are the economic and physical facts, because there is no position on this bill from the administration.

Senator KUCHEL. Well then, in view of the questions which Senator Anderson asked and your answers, is it fair to state that, from

the standpoint of the people I represent, a hazard does exist and will continue to exist which requires as effective and as prompt action as the hazard that exists to our neighboring State of Arizona?

Mr. DOMINY. I have testified that even if we did nothing more than let the Colorado River run its course and built central Arizona and started diverting 1,200,000 acre-feet 10 years from now and we could not start diverting the full amount at first—it may take years of build-up—I have testified that if you did no water salvage of any kind, you would not have shortages in California below 4.4 million, at least until about 1985.

Senator KUCHEL. Suppose, Commissioner, you had some completely feasible reclamation projects in the upper basin that the Congress were to approve, will that add to the potential damage to California?

Mr. DOMINY. This projection, which I have just put in, is based on a very liberal estimate as to how fast the upper basin States will put their compacted water to work. I personally feel that California has no fear of shortages below 4.4 million for at least 40 years from now, 40 years from the time the central Arizona project is authorized.

Senator KUCHEL. Would you look with favor on legislation by the U.S. Congress to translate your feelings of “no fear” into a statute?

Senator GOLDWATER. Watch that.

Mr. DOMINY. I have already testified that to me the time for litigation in this matter is past. We ought to approach it from an affirmative point of view for the first time. We will solve the problem. This is an area that particularly the senior citizens of our Nation are going to continue to flock to, because of the climate. Now that the hot summers are solved because of air conditioning, everyone that I know that is going to retire goes to Arizona, or California, or western New Mexico, and Nevada, I hasten to add, and even to Utah. This is the area that we have to protect for water supply, because it is the single one ingredient that is lacking—you have everything else. The single one ingredient that is lacking for decent human habitation is water, and I do not think we are going to refuse or fail to solve it.

Senator KUCHEL. Commissioner, I have a respect for you, as you well know. But I have to say that I kind of think the people of California would prefer to have some additional guarantee against water shortages than merely your statement that they need not have any immediate fear.

Senator GOLDWATER. Might I point out that California has a guarantee in the form of completed works. Ours are merely dreams.

Senator KUCHEL. I asked him, if this bill of yours, Senator Goldwater, were to become law, if we had another dry cycle, a continuation, if we had further reclamation projects approved by Congress along the Colorado River and the upper basin, whether or not there could be a hazard that we would receive less than 4,400,000 acre-feet and the Commissioner said “Yes.”

Senator GOLDWATER. I suggest there is that hazard now without any law.

Senator Moss. As the Senator knows, the upper basin is bound by the compact to let 7½ million acre-feet go down the river.

If we get into a very dry cycle, we take the brunt of it first in the upper basin. We have to let our 7½ million go down and depend on whatever storage we have for our shortage above.

Senator KUCHEL. How much crosses Lee Ferry today, Commissioner?

Mr. DOMINY. This depends, of course, on the year. At the moment, we have a very dry year. The runoff in the Colorado Basin is equal to the second lowest year of record.

Senator KUCHEL. How much is that in acre-feet?

Mr. DOMINY. Mr. West, can you give me the figure?

Mr. WEST. The April-July runoff for this year at Lee Ferry was just at 3 million acre-feet, 3,007 million acre-feet, which, as you say, is the second lowest of record.

Mr. DOMINY. This is Regional Director A. B. West, Boulder City, Nev.

Senator KUCHEL. Translating that into the terms of the contract, what would that be, then, approximately, for the present year?

Mr. WEST. For a calendar year?

Senator KUCHEL. Well, however, you determine it.

Mr. WEST. It would be probably, Senator, a little over 4 million acre-feet for a water year.

Mr. DOMINY. This is the reason Glen Canyon was built, so we would average out these extremes.

Senator BIBLE. What is the last 10-year flow?

As I remember the requirement, there must be delivered 75 million acre-feet over a 10-year period. So I think it would be helpful if you would supply for the record—maybe Mr. West knows—the last 10-year flow.

Mr. DOMINY. I will be glad to supply that for the record.

(See chart, p. 74.)

Mr. DOMINY. Incidentally, last year we were quite fortunate. We did get a good year and we did fill Hoover. By that happy circumstance, we did close the gates of Glen Canyon Dam, because we had prospective water. If we hadn't filled Hoover, we would not have closed the gates this year at Glen Canyon because of the light snowpack.

I want everybody to know that I had the decision before me just this week, should we plug the diversion tunnel. Well, the filling criteria say I shall not plug it unless there are certain assurances that we can keep Hoover at a certain level. So we are not going to issue instructions to plug it, because it is a very bad runoff year. This will mean that it will cost us somewhat extra to plug it later, but we are not going to violate any agreements of any kind that we made in respect to filling Glen Canyon. We are just going to get more snow this next winter. We just have to have it; that is all.

Senator MOSS. Thank you, Commissioner.

We are approaching the noon hour, when we will have to recess.

Senator ANDERSON. Not necessarily.

Senator MOSS. I guess we could go on.

Senator KUCHEL. No; we cannot go on.

Senator ANDERSON. The only thing that would be objectionable is if we are going to take a vote and I don't believe there is any vote today.

Senator KUCHEL. I hope we take a vote in the Senate on the railroad issue today. We have a railroad strike just around the corner.

Senator ANDERSON. I mean in this committee.

Senator KUCHEL. You cannot be in two places at once, Senator, and I do want to be present here and I want to be present on the floor on the railroad discussion.

I say that in completely good faith. Kick it over until tomorrow morning.

Senator MOSS. I say that because the Senator did indicate he wanted to be on the floor and would not be able to attend tomorrow morning.

Senator GOLDWATER. Mr. Chairman, I am not a member of this committee, so I may be presumptuous, but I wonder if Mr. Dominy's statement may not be made a part of the record and allow those of us interested to study it overnight and ask questions tomorrow morning.

Senator ANDERSON. I so suggest.

Senator MOSS. That, then, without objection, will be done.

The entire statement of the Commissioner will be placed in the record and we will ask the Commissioner to be here at 10 o'clock in the morning, prepared to answer questions that may be directed to him as a result of the statement he has placed in the record.

(The balance of the prepared statement of Floyd E. Dominy, Commissioner of Reclamation, is as follows:)

I would like to point out that should the central Arizona project have been authorized in 1950 or 1951 when authorization bills passed the Senate, it would appear reasonable to assume that the project would now be in operation. Colorado River water would be flowing into Arizona and the benefits of such water would now be felt in all areas of the State and in the western part of New Mexico. The project works, had they been constructed during the last decade exactly as planned in the original report of 1947, would be adequate in all respects to provide the same service to the areas of need as is planned under present conditions.

The use of the water imported from the Colorado River would now be somewhat different than originally planned, in that a greater proportion of it would be used for municipal and industrial purposes rather than for irrigation, but, except for some location changes and extensions required by the population growth, the basic facilities would have required no change whatever.

The appraisal report of January 1962 clearly brought home to State and Federal officials the fact that the need for water in central Arizona was far greater today than in 1947, when the original report was issued, and that, if additional water were not made available to reduce the rate of depletion of the ground-water resources, economic retrenchment of the area would be inevitable. The appraisal report also showed that, although the costs of the central Arizona project had risen in accordance with the trend of the times, the benefits accruing to the project and the capacity for repayment of costs by the potential water users had risen at a far greater rate due to the growth and development that had occurred in the area.

Following issuance of the appraisal report, appropriations for additional studies of the central Arizona project were made by the Congress. Approximately \$592,000 of Federal funds were expended on project investigations during the past fiscal year.

Up to this point, I have attempted to present more generalized background information to provide you with a broad perspective of the water problem in Arizona and western New Mexico, and the long period of engineering, legislative, and legal struggle through which the people of the area have persevered in an attempt to obtain Federal assistance in solving the problems of the area. I am sure, however, that in these hearings you would need more detailed information on the project for your further consideration.

Because the bill now under consideration seeks authorization now of a project originally formulated and proposed more than 15 years ago, I will present factual data on our most recent studies to bring you up to date on the project plan. As I previously stated, the project is the same project outlined in the 1947 report, but the changes in how the water will be used are significant because of growth

and development that have occurred during the last 15 years. The fundamental elements with which I believe you will be concerned in this case are:

1. The problems and needs of the area.
2. The proposed plan of development.
3. The water supply.
4. The effect of the project upon other areas.
5. Economic and financial feasibility of the proposed project.

I will discuss these elements in that order.

PROBLEMS AND NEEDS OF THE AREA

The basic problem of Arizona and western New Mexico can be summed up in one word: "water." These areas comprise an arid region, with favorable climate and abundant natural resources—except for water—and the demand for this limited resource increases daily.

Prior to World War II, the area had about reached the limit of its replaceable water resources and overdrafting of the ground water basins had begun in order to sustain the economy that existed at that time.

Subsequent to the war, the central part of Arizona experienced the fastest rate of growth of any part of the Nation. In order to sustain the new populations, additional water was needed and it was obtained by exploitation of the ground water resources.

At the present time, almost one-half of all the water used in central Arizona is obtained by overdrafting, or mining, these precious ground water reserves. Mining is not a term which I have coined for this purpose. It is the common term used throughout Arizona to describe the process by which the needed water is obtained. It might be said that the agricultural and industrial economy that now exists in the area is a mining economy because its water supply, almost 50 percent of it, is obtained by the same extractive processes that are used in mining areas or in the oil and gas fields. Water is being extracted from the earth at a rate faster than the aquifer is being recharged.

Water levels are dropping at an alarming rate with an indicated present ground-water overdraft of about 2.2 million acre-feet annually. Since 1944, gross pumpage has increased more than threefold. During this period the runoff of local streams has in fact decreased, the net result being increased withdrawals of underground stored water—water that had been stored underground in ages prior to man's exploitation. Deleterious effects, both economic and physical, are inherent in these excessive withdrawals.

Declining water levels necessitate deeper wells, additional costly equipment, rehabilitation or replacement of pumps, and higher pump lifts, thereby increasing costs sharply. Where limited groundwater storage is available to draw upon, declining water levels have resulted in sharply reduced yields or in some localized areas exhausting the supply. Prohibitive water costs, insufficient yield of wells, and actual depletion of underground reservoirs have and will continue to force more and more acreage out of production.

Rapidly declining water levels have also resulted in land surface subsidence. Visual expression of the phenomenon is evident in sheared well casings, pump installations 3 to 4 feet above their original surface position, structure foundation problems, and earth fissures and cracks.

It is anticipated that under the present water supply and water use regimen, these problems will become more severe with the passage of time, and unless additional water is made available to the area, severe economic retrenchment will be inevitable.

Paradoxically, within Arizona and western New Mexico are depressed areas, so classified under the Area Revelopment Act, which have been bypassed by the unprecedented growth that has occurred in central Arizona. These include extensive Indian reservations and also non-Indian lands which have insufficient water to provide for future growth and development. Lack of water is the basic problem in these depressed areas, as it is in the growing areas in other parts of Arizona. On a quantitative basis, the greatest water shortage is in central Arizona, but shortages exist, or are imminent, throughout Arizona and the western part of New Mexico.

The paramount need of the area is for import of water to the central part of Arizona to augment the supplies that are locally available. 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.

Under such arrangements, areas of need in the higher elevations could be permitted to withhold water that is locally available but appropriated by downstream water users in exchange for replacement import water delivered to the downstream appropriators. Import of water from the Colorado River to the central part of the State therefore provides the basis for satisfying water needs in all areas.

The central Arizona project plan, which provides for the import of 1.2 million acre-feet per year of Colorado River water to central Arizona would, on the face of it, not satisfy all demands that now exist in the area. The situation, however, is not as bleak as it would first appear, since other means are available for improving the overall water situation. Probably the most significant factor is the urbanization of the area. As farmlands within central Arizona are urbanized, the water which is appurtenant to the lands involved becomes available for municipal and industrial purposes. On a per-acre basis, the quantity of water used by urban developments does not exceed the quantity used for irrigation of crops and may be somewhat less. However, large areas of desertlands, which have no irrigation water supply available, are now being urbanized. The water needs of such areas, therefore, must be supplied from new sources. This situation is particularly pronounced in the Tucson area, where practically all urban development takes place over desertlands for which no water supply has heretofore been available.

The total needs for municipal and industrial water are, therefore, increasing in central Arizona despite the fact that irrigation water supplies are being converted to municipal and industrial use as the area grows. An important aspect of the urbanization of the area is that approximately one-half of all water diverted for municipal and industrial purposes is returned near the lower end of the developed area as sewage effluent. The central Arizona project studies indicate that it is essential that these flows be upgraded and reused to augment the irrigation water supplies.

Other compensating means for reducing the imbalance between water supply and water demand include possibilities for conservation of water within the area through construction of impervious linings for all irrigation canals and distribution systems, the improvement of farm practices under which available water supplies can be extended to a greater irrigated acreage, the conservation of water by the clearing of phreatophytes and other nonbeneficial vegetation along streambeds, the improvement of watershed management practices to increase the yields of the local watersheds, and the adoption of new techniques for the reduction of evaporation on the numerous reservoirs in this area.

In summary, the basic need of the area is for an import water supply to augment the local supplies and an intensive program of fully implemented water management to conserve and extend the supplies that are available from whatever source.

It should be emphasized that the project proposed for authorization by S. 1658 would provide supplemental water to sustain the economy that now exists in central Arizona and to provide for future growth of this area. In other words, the proposed central Arizona project is vital and essential to preserve the economy that is now established—it is not a proposal to bring any new lands under irrigation.

THE PLAN OF DEVELOPMENT

As I previously pointed out, the central Arizona project plan of development is described in the Bureau's 1947 report and its appendixes. In our updating studies, we have made only such changes in the plan as were required; (1) to eliminate some features of the plan whose functions have been accomplished by subsequent developments; (2) to take advantage of engineering and technological developments which have taken place since the original report was written; (3) to modify the canal location as required to bypass urban developments which have grown up along the original canal route; and (4) to expand the conveyance system to provide for the growing municipal and industrial needs of the city of Tucson.

First, I would like to point out the features of the original plan which have been eliminated due to developments since 1947.

Bluff Dam on the San Juan River was included in the 1947 report for sediment control purposes, but these functions are now more adequately served by Glen Canyon Dam, which has been constructed as a unit of the Colorado River storage project.

Coconino Dam on the Little Colorado River has been eliminated since its incremental sediment control is not vital to the plan as a result of the construction of Glen Canyon Dam.

Horseshoe Dam enlargement on the Verde River has been eliminated because the city of Phoenix utilized this site to provide additional storage for the city's municipal and industrial water supply system. The powerplant at Horseshoe Dam has also been eliminated.

Buttes powerplant at Buttes Dam on the Gila River has been eliminated because more recent water-supply studies indicate that reservoir storage levels would not be capable of providing a firm power supply.

Safford Valley improvements, which consisted of a well drilling program and a canal rehabilitation and betterment program, has been eliminated. The well drilling program has been accomplished by local water users. The canal rehabilitation and betterment program is considered in the updating studies as a program to be accomplished under separate financing by the local water users.

In discussing the various features which are included in the plan of development, I will try to point out modifications that have been made because of technological developments or population growth since the 1947 report.

The first basic requirement of the project plan is for a source of electrical energy for pumping the water to central Arizona and to produce revenues needed to assist in payment of project costs. The source of power assumed in the 1947 and updating report would be Bridge Canyon Dam, located on the Colorado River at the headwaters of Lake Mead. This dam would be comparable in size to Hoover or Glen Canyon Dams. About one-third of the energy generated at the Bridge Canyon powerplant would be used for pumping water into central Arizona. Approximately two-thirds of the energy would be sold commercially to provide for the ever increasing power demands in the growing Pacific Southwest and to provide revenues to assist in payment of project costs.

Bridge Canyon Dam has been completely redesigned to take advantage of significant advancements in technology that have occurred since 1947. It has been redesigned as a variable-radius, thin-arch structure, with a minimum thickness at the base of about 148 feet as compared to an original base thickness of over 600 feet. This dam would have a structural height of about 740 feet above foundation.

In redesigning Bridge Canyon Dam as a thin arch, the quantities of concrete were reduced from 5,700,000 cubic yards to 2,650,000 cubic yards. The cost of the redesigned dam is estimated at about \$119 million at current price levels, as compared with an estimated cost for the original design of about \$261 million at these price levels. The installed capacity of the powerplant was increased from 750,000 to 1,500,000 kilowatts. This change was made to take advantage of the upstream regulation provided by the subsequent construction of Glen Canyon Dam upstream. With the river controlled upstream at Glen Canyon Dam and immediately downstream at Hoover Dam, Bridge Canyon powerplant can be operated at high head as a peaking operation.

The Bridge Canyon powerplant would have a load factor of about 37 percent for commercial generations. By operating Bridge Canyon powerplant as a peaking facility, under normal operations the reservoir will fluctuate only about 4 feet. Thus a stable pool of deep, still water in one of the most spectacularly scenic canyons of the world will be maintained. Its recreational potential is accordingly of great national significance. The powerplant and transformers would be located underground near the left abutment of the dam. The switchyards would be located nearly 10 miles south of the canyon rim near the construction townsite.

As for the backbone canal system, the water would be pumped from Lake Havasu by three in-series pumping plants having a total static lift of 969 feet. The Granite Reef aqueduct would extend 219 miles from Lake Havasu to Granite Reef Dam. It would have a capacity of 1,800 cubic feet per second, and would be concrete lined.

Due to urban expansion which has occurred north of Phoenix since 1947, the original canal location through this area would be imprudent. An additional pumping plant was therefore installed on the east side of the Hassayampa River with a static lift of 115 feet. This additional lift permitted the entire canal location east of the Hassayampa River to be revised to bypass the urban developments north of Phoenix. Due to the higher location, a power drop with 94 feet of head was added at the Agua Fria River, through which water deliveries to the area west of the river would be made.

The Granite Reef aqueduct is designed for uniform flow throughout 11 months of the year to minimize the size of the aqueduct required. The plan provides that only that portion of the water needed in the Salt River Valley would be delivered at Granite Reef. The remaining flow would be siphoned under the Salt River and would be transported south through the Salt-Gila aqueduct. This aqueduct, extending from the Salt River to Picacho Reservoir in Pinal County, would have a capacity of 1,275 cubic feet per second.

The final portion of the aqueduct system would be a closed conduit extending from near Picacho Reservoir to the city of Tucson to deliver 100,000 acre-feet of water annually to augment that city's municipal and industrial water supply. The Tucson aqueduct would have a capacity of 150 cubic feet per second and be 56 miles in length. It would include a series of pumping plants with a total static lift of an additional 920 feet. The total length of the backbone canal system from the Colorado River to Tucson would be about 341 miles, and the total static lift of the final increment of water reaching that city would be 2,081 feet.

In the 1947 report, Salt River water would have been diverted from Saguaro Reservoir above Stewart Mountain Dam and conveyed through the Granite Reef aqueduct to the southern part of the service area in exchange for Colorado River water delivered to the Salt River project at Granite Reef Dam. In the updating studies this proposed exchange arrangement has been eliminated, and water would be supplied to the Salt-Gila aqueduct directly from the Granite Reef aqueduct. This change was made possible through relocation of a portion of the Granite Reef aqueduct around the Phoenix metropolitan area.

The operation of the central Arizona project canal system would be integrated with the Salt River project storage system through the provision of terminal storage at Maxwell Reservoir, which would be located at the junction of the Salt and Verde Rivers about 3 miles upstream from the Salt River project's Granite Reef diversion dam. A flat-grade canal, extending from Granite Reef Dam to a combination power and pumping plant at Maxwell Dam, would provide for this integration. Most of the time, water demands in the Salt River project area would be met by combining flows from Granite Reef aqueduct with flows released from Maxwell Reservoir through the powerplant. However, when the flow through the Granite Reef aqueduct exceeds the demand on the system, the excess Colorado River water would flow toward Maxwell Dam where it would be pumped into storage until needed.

In addition to Bridge Canyon and Maxwell Dams, three other dams would be included in the project to conserve and regulate the local water supplies. These would be Buttes Dam, located on the Gila River about 14 miles upstream from the town of Florence, Ariz.; Charleston Dam on the San Pedro River southeast of Tucson; and Hooker Dam on the main stem of the Gila River in western New Mexico.

The project plan contemplates the construction of a high-voltage transmission system which would make possible the delivery of power and energy to project pumps, the sale of commercial power and energy at load centers, and the integration of operations at Bridge Canyon with other plants on the Colorado River for maximum utilization of the hydroelectric power potential.

In all areas an improvement in conveyance and distribution system efficiency is essential to obtain optimum water conservation. Toward this end, the project plan contemplates that all present and future water distribution systems will be constructed with impervious linings. Such work will be the responsibility of local water user organizations.

It is contemplated that approximately two-thirds of the Colorado River water diverted would be supplied for existing irrigation purposes and that about one-third would be supplied for municipal and industrial purposes under project conditions. This is a change in water use from that shown in the 1947 report as, in that report, only about 1 percent of the project water was assigned for municipal and industrial use.

The central Arizona project plan does not provide for bringing any new lands under cultivation. All additional water would be used to supplement the demand of presently developed areas.

As I previously explained, had the project works been constructed exactly as set forth in the 1947 report, they would be capable of providing the same service to the affected area. The expansion of the aqueduct system to the city of Tucson is a new requirement which could have been readily made at any time had the project facilities been constructed during the past decade. The aqueduct system from Charleston Dam to Tucson is retained as shown in the 1947 report.

The assignment of water between irrigation and municipal and industrial purposes must be considered tentative. If the more optimistic projections of the area's population growth should materialize in future years, a far greater proportion of the water would be needed for municipal and industrial purposes. Should this situation occur, a reallocation of costs could be made so that a greater proportion of the Federal investment would be interest bearing.

The control, use, and disposal of the return and effluent flows which will occur in the future will require additional studies to evaluate the facilities needed and the benefits accruing from reuse and drainage.

WATER SUPPLY

Present water supply

The firm and safe yield from the local water supply available to the central Arizona project area is estimated to average about 2.3 million acre-feet annually at the farmer's headgate and at the head of municipal and industrial water systems. Slightly over 1 million acre-feet of this supply is from surface water sources, and the remaining from the safe yield of the ground water basin underlying the area.

The source of the surface water supply is the Gila River and its tributaries. Major impounding reservoirs control and store most of the available runoff for diversions at the points of use. Only in the very exceptionally wet year, or a series of exceptionally wet years, do surface waters escape the area. The last spill of consequence occurred during 1941. Runoff originating below impounding dams (usually from intense summer storms) sometimes escapes past diversion dams, and is mostly lost to evaporation and stream channel vegetative growth.

The alluvial valleys of the Gila River Basin afford groundwater reservoirs which are being used excessively to supplement available surface-water supplies. The present use of ground water is about 3.5 million acre-feet annually, compared to an estimated safe yield of 1.3 million acre-feet. This overdraft, totaling 2.2 million acre-feet per year, or approximately one-half of all water used, has enabled the economy to continue at the expense of a continually lowering water table and increasing pumping costs. Depths to ground water range from 20 to over 600 feet, with the average close to 250 feet. Ground-water depths increased as much as 180 feet during the 7-year period 1952-59. This decline in water levels is continuing, with local areas experiencing 30 to 35 feet annual lowering.

Future water supply

Present water supplies in the central Arizona project area available for use may be enhanced by curbing present losses to nonbeneficial vegetation and evaporation, and reuse of sewage effluent and other return flows. Additional regulation controlling stormflows, improvement of irrigation practices, and the reduction of distribution losses provide the means to enhance the local supplies.

In addition, the recent opinion by the Supreme Court in the case *Arizona v. California et al.* affirmed the allocation of Colorado River water made by the Secretary of the Interior's contract to deliver to Arizona 2.8 million acre-feet annually for beneficial consumptive use, not diminished by tributary uses, out of the first 7.5 million acre-feet of main stream water available for lower basin consumptive use. The Supreme Court further held that the Secretary had discretion to apportion water shortages. It should be noted that a formal decree has not been issued and that the State of California has been permitted by the Court to file a petition for rehearing.

The runoff of the Colorado River and its tributaries is probably the most important factor affecting the availability of water for distribution to the lower basin States. The year-by-year variable flow will be controlled by the Colorado River dams; however, the cyclic periods of high and low runoff must necessarily produce either spills partially lost to the service areas in the United States or periods of deficiency.

Upper basin development, and the abilities of the lower basin to reduce non-beneficial channel losses by channelization, to effect phreatophyte control, and salvage subsurface ground-water flows, are also factors of consideration.

Conservative estimates of the Colorado River water available to the lower basin States, using a period of subnormal runoff (1930-62), and a rather optimistic estimate of buildup of upper basin uses, indicate that the lower basin States will have a Colorado River water supply in excess of 7.5 million acre-feet prior to 1975. Should a minimal water supply condition prevail after this date,

the Secretary of the Interior will be required to allocate this minimal supply among all the lower basin users. However, under any reasonable prediction of yield in the river a supply for the central Arizona project would appear to the assured.

Predictions of future water supply are always subject to the problems of future runoff and future water use. Since 1930, runoff of the Colorado River into the lower basin has been substantially lower than the previous similar period of record. Our estimates are based on runoff since 1930, and are conservative relative to historic record. Future water uses by upper basin States and our abilities to reduce main channel losses in the lower basin are based primarily on our best judgment of future events. In my judgment, we have been conservative in our estimates. Hopefully, should Colorado River runoff repeat as in the 1910's and 1920's, the available supply to the lower basin users will be considerably greater than we have estimated.

Summarizing the central Arizona project water supply, 1.2 million acre-feet of water available from the Colorado River will allow this arid but fertile area to continue its present economy and provide the waters necessary to supply its ever-expanding urban and industrial growth. Ground water overdrafts will be reduced but not halted.

EFFECTS ON OTHER AREAS

The construction and operation of the central Arizona project would have no adverse effect on existing or proposed developments in the upper Colorado River basin. The water supplies for the project would be obtained from Arizona's entitlement to lower basin water under the recent opinion of the Supreme Court.

Hydroelectric power developed by the proposed project could be utilized fully within the lower basin and southern California and would not interfere with any Colorado River storage project power to be delivered into the area.

Completion of the central Arizona project would affect water users in California because California has, for many years, been diverting Colorado River water in excess of 4.4 million acre-feet per year.

As I indicated earlier, the Pacific Southwest water plan, of which the central Arizona project is an integral part, has as its long-range objective the firming up of the water supplies of the entire Pacific Southwest without detriment to any part of the area. Under the concepts advanced by this proposal the implementation of plans for salvage of water along the main stream and tributaries of the Colorado River, for the reduction of evaporation from the extensive reservoir systems, for the provisions of impervious linings or sealants for the canal and lateral systems of the area, for the reclamation of sewage effluents and for the adoption of many other conservation measures could do much toward improving the water status of all lower basin States. This plan, of course, provides for the import of additional water to the Pacific Southwest from areas of water surplus in northern California. The desalting of sea water and brackish water is also contemplated.

The concept of water exchanges was advanced in the original 1947 report on the central Arizona project, and the changing conditions in tributary areas require further emphasis on water uses in areas other than the central part of the State. Domestic and industrial water supplies for these areas have only recently begun to feel the impact of the large metropolitan area growth. This trend can be expected to continue at an accelerated pace, and these water demands cannot be met from the overappropriated tributary streamflow.

The water supply picture throughout the State of Arizona and western New Mexico would be enhanced through construction of the central Arizona project since, by bringing in Colorado River water to central Arizona, avenues are open for exchange arrangements with other areas of Arizona and western New Mexico to increase their local water uses.

ECONOMIC AND FINANCIAL FEASIBILITY OF THE PROJECT

The central part of Arizona has experienced a phenomenal economic growth since the time of first hearings on the project report. The agricultural economy received impetus during World War II and continued to grow until just recently to satisfy the Nation's demands for food and fiber. The yearlong growing season provides opportunity for the production of winter vegetables and other off-season crops not commonly grown in other areas of the Nation. The project service area includes about 1,200,000 acres developed for irrigation of which

some 300,000 acres are idle due to water shortages. In 1962 the value of agricultural products, including livestock, was estimated at \$550 million for the State of Arizona, with \$360 million of it being produced in Maricopa and Pinal Counties. The average annual crop value per acre has increased from \$83 in 1945 to \$335 today. Much of this value is made up of choice winter or early spring vegetable or fruit crops which are seldom, if ever, in surplus.

With the influx of people and attendant industries following the midcentury, the State, with the metropolitan areas of Phoenix and Tucson as the hub, has also enjoyed other substantial economic growth. The population of the State has doubled in the last 15 years and is now about 1,400,000 people, of which slightly over a million live in the central part of the State. Assessed valuation of properties in Maricopa and Pinal Counties is nearly a billion dollars, and bank deposits in the State as a whole are about \$1½ billion. The State population contributes over \$155 million a year in Federal taxes from an annual income of about \$2.9 billion. Manufacturers employ about 50,000 people, most of whom are located in the Phoenix and Tucson areas. Nationally known companies, such as Goodyear Aircraft Corp.; AiResearch Manufacturing Co.; Hughes Aircraft Co.; Reynolds Metal Co.; Phelps-Dodge Corp.; Kennecott Copper Corp.; Motorola, Inc.; Sperry-Rand Co.; Cudahy Packing Co.; and subsidiary companies of these, have located plants in the Phoenix and Tucson metropolitan areas since World War II. These companies supply commodities to meet the missile-age requirements and other needs for the Nation's economy. The charts which have been distributed to you show graphically these and other items of the economic growth in the State and service areas.

From an economic and financial standpoint the present analysis of the central Arizona project shows it to be one of the very best investigated by the Bureau of Reclamation in recent years. The estimated project construction costs subject to allocation to various functions of some \$997 million, with an annual operation, maintenance, and replacement cost of \$8,611,000, will generate about \$125 million worth of benefits annually. This results in a very favorable benefit-cost ratio of 3.03 to 1. The benefit-cost ratio in 1947 was only 1.63 to 1, which shows the project is economically more favorable today than it was 15 years ago, largely because of the changed economic conditions including the increased value of water in the area. However, the present analysis also reflects current procedures set forth by Senate Document 97.

At this time I would like to point out that recent criteria have been issued which have a bearing on the economic analysis of the project. Among these are a new interest rate of 3 percent for fiscal year 1964 and revised benefits and costs for fish, wildlife, and recreation facilities. The results of these recent changes have not yet been analyzed fully but we are certain that they will have no significant effect on the project.

The project, which includes five proposed dams and reservoirs with attendant water conveyance facilities, is multipurpose in nature, and based on our most recent analysis, benefits in the following amounts would accrue to these purposes annually:

	<i>Annual equivalent</i>
Irrigation.....	\$71,494,000
Power.....	43,027,000
Municipal and industrial water.....	7,624,000
Flood control.....	780,000
Fish and wildlife.....	684,000
Recreation.....	1,528,000
Area redevelopment.....	331,000
Total.....	125,468,000

The annual benefits from the project were estimated at about \$42 million in 1947.

Area redevelopment benefits are something new in name which have been added to reclamation projects since Senate Document 97 was issued. This represents employment dollars that would be paid to workers coming from the local depressed areas during the construction years and for several years thereafter for operation of the project facilities. Many of these people would be Indian laborers who have demonstrated their abilities for such type activities. Our records indicate that during the construction of Glen Canyon Dam about 7 percent of the labor force was Indian.

The financial feasibility of the project is just as favorable. The total estimated project cost is about \$1.1 billion, of which \$100 million is required for distribution facilities which conceivably might be financed by other funds; \$1,857,000 are non-reimbursable investigation costs, leaving \$999,474,000 to be allocated among the project functions. The reimbursable portion of these costs can be repaid within 50 years as required by reclamation law.

The costs of the project have been allocated by the separable costs-remaining benefits method, which assures that no function served will pay more than its benefits or the cost of providing a single-purpose alternate project to provide equivalent benefits, whichever is lesser. By using this method, the construction costs were allocated as follows:

Reimbursable:	
Power-----	\$401, 013, 000
M. & I.-----	210, 763, 000
Irrigation-----	335, 390, 000
Subtotal-----	947, 166, 000
Nonreimbursable:	
Flood control-----	15, 291, 000
Fish and wildlife-----	10, 645, 000
Recreation-----	22, 513, 000
Area redevelopment-----	3, 859, 000
Subtotal-----	52, 308, 000
Grand total-----	999, 474, 000

After providing enough energy for pumping Colorado River water to its points of use, the remaining electric energy from the proposed powerplants could be sold at 6 mills per kilowatt-hour to repay all allocated power costs in 50 years at 2½ percent interest and give a small financial assistance to irrigation. Untreated municipal and industrial water sold at the main aqueducts for about 13 cents per thousand gallons would repay the costs allocated to this function in 50 years, with interest. Irrigation water sold to the farmers at the main aqueducts for \$10 per acre-foot, which is considered to be about the maximum payment obtainable from project farms over a long-range period, would repay 83 percent of the costs allocated to irrigation. The remaining 17 percent representing \$57,997,700 could be paid from power revenues during the 50-year payout period. The project analysis assumes that the cost of distributing water beyond the main aqueduct delivery points would be the responsibility of the local water-using entities.

By using these values the project users would repay not only the investment costs but would also return over \$533 million in interest to the Federal Treasury during the payout period.

The 1947 report envisioned repayment by a single State body and necessitated legislative action to permit an extended repayment period. Under the present concept, repayment could be made within the time provisions of reclamation law by contracting with a single State body or, if this proves impractical, by separate contracts with individual legally constituted repayment entities.

SUMMARY

To summarize, the central Arizona project for which authorization is sought by S. 1658 is the same project originally outlined in the Bureau of Reclamation report of 1947, except for changes made necessary by developments which have occurred since that time. The project facilities, insofar as water service is concerned, also are the same as those included in the Secretary of the Interior's recently announced Pacific Southwest water plan.

The doubling of the population since 1947 has greatly increased the area's water problems and needs. The economy that exists today is supported by the overdrafting or mining of the available ground-water resources at the rate of about 2.2 million acre-feet per year. This figure represents almost 50 percent of the total water used annually in the area.

Unless additional water is made available, water use must ultimately be reduced and economic retrenchment would appear inevitable.

Although the project plan is essentially the same as formulated 15 years ago, water uses within the area would, under present conditions, differ substantially from those contemplated when the original plan was developed. In 1947 it was estimated that only about 1 percent of the total supply would have been used for municipal and industrial purposes whereas it is now estimated that under project conditions approximately one-third of the import water supply will be needed for these purposes.

Approximately two-thirds of the import water supply would be used for irrigation, but all of this water would be used to supplement the inadequate supply available to lands which are already developed. In other words, the import water supply is needed to sustain the economy that already exists and to provide for future population growth. No new lands would be brought under cultivation by the import water supply.

Our recent studies have forcibly brought to attention the fact that water shortages now exist or are imminent in nearly all areas of Arizona and western New Mexico.

Under the plan proposed by S. 1658, these areas could benefit from the project through exchange arrangements since Colorado River water could be used to replace appropriated water diverted upstream in the watershed areas.

The import water supply would benefit many Indian reservations throughout the area and would also provide area redevelopment benefits.

The water supply problems of Arizona and western New Mexico have increased in severity throughout the more than 10 years that the case of *Arizona v. California, et al.*, has been in litigation. During this period the cost of pumping water in the face of declining ground-water levels has increased progressively year by year. Should the project be authorized in this Congress under S. 1658, it would probably be 10 years or more before water would be flowing through the system to help alleviate this situation.

As a consequence of the recent Supreme Court opinion in the case of *Arizona v. California, et al.*, a water supply for the project has been assured. While the cost of the project has increased since 1947 in accordance with the trend of the times, the benefits to be derived from the project and the ability of water users to repay the costs have increased at a far greater rate. Colorado River water is more urgently needed to sustain the present development and provide for future growth of this dynamic area today, and the central Arizona project is also far more feasible from an economic and financial standpoint.

In our most recent studies the benefit-cost ratio for a 100-year period of analysis is estimated to be more than 3 to 1.

As I stated in my opening remarks the water delivery features of the central Arizona project are an integral unit of the Pacific Southwest water plan. A report on this plan was forwarded yesterday to the Governors of the affected States and Federal agencies for 90-day review pursuant to the provisions of section 1(c) of the Flood Control Act of 1944.

Senator Moss. The committee will be in recess until 10 a.m. tomorrow.

(Whereupon, at 11:55 a.m., the committee recessed, to reconvene Wednesday, August 28, 1963, at 10 a.m.)

CENTRAL ARIZONA PROJECT

WEDNESDAY, AUGUST 28, 1963

U.S. SENATE,
SUBCOMMITTEE ON IRRIGATION AND RECLAMATION
OF THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C.

The subcommittee met, pursuant to recess, at 10:05 a.m., in room 3110, New Senate Office Building, Senator Frank E. Moss presiding.

Present: Senators Moss, Hayden, Anderson, Burdick, Kuchel, Allott, and Jordan.

Also present: Senators Goldwater and Bible.

Jerry Verkler, staff director; Roy M. Whitacre, professional staff member; and Stewart French, chief counsel.

Senator Moss. The subcommittee will come to order. We will continue with the hearing on S. 1658, called for the purpose of hearing Commissioner Dominy, Commissioner of Reclamation, and other members of the Bureau of Reclamation.

At the beginning, just to make the beginning of the record on the bill that is before the subcommittee, yesterday, Commissioner Dominy testified in part before the subcommittee and at the conclusion of that session, his entire printed statement was entered into the record and the members of the committee have had overnight to read it in full.

Today I think we will proceed by putting questions to Commissioner Dominy. We will ask first if there is any particular part he wants to highlight before we start the questioning. Then we will have questions from the subcommittee.

Are there any parts you would care to highlight, Commissioner Dominy, before we begin the questioning?

STATEMENT OF FLOYD E. DOMINY, COMMISSIONER OF RECLAMATION; ACCOMPANIED BY WILLIAM I. PALMER, ASSISTANT COMMISSIONER OF RECLAMATION; AND C. A. PUGH, AREA ENGINEER, PHOENIX DEVELOPMENT OFFICE—Resumed

Mr. DOMINY. I believe not, Mr. Chairman, I feel that the committee should guide the discussion this morning in any manner it sees fit.

Senator KUCHEL. May I make two brief observations, Mr. Chairman?

Mr. MOSS. The Senator from California.

Senator KUCHEL. No. 1, let me observe that the reclamation bill sponsored by our colleagues from Nebraska scheduled for hearing tomorrow will not be heard tomorrow because the report from the

Department of the Interior is not available yet. The unusual procedure we are following on the central Arizona bill presents quite a contrast.

No. 2, my able friend from Arizona yesterday referred to the distinguished Chief Justice of the United States and to a statement he made at the time he was Governor in 1948. My able friend quoted Governor Warren at that time as follows:

Whenever it is finally determined what waters belong to Arizona, it should be permitted to use that water in any manner or by any method considered best by Arizona.

That quotation, I say with great respect, does not include all the words in the sentence. I should now like to read the entire sentence which Earl Warren, as Governor of California, uttered publicly in 1948:

Whenever it is finally determined what waters belong to Arizona, it should be permitted to use that water in any manner or by any method considered best by Arizona, so long as that use does not conflict with the rights of California to use its water from the Colorado River system.

Senator HAYDEN. That is exactly the same thing.

Senator KUCHEL. All right.

Senator MOSS. I think the Senator is entitled to make his comment here and we will proceed with this matter.

Senator HAYDEN. I would like to ask some questions.

Senator MOSS. The Senator from Arizona.

Senator HAYDEN. Mr. Chairman, it was stated to this committee yesterday that the report on the central Arizona project had not been transmitted to the affected States in accordance with the Federal Flood Control Act of 1944. So that the record will be clear on this point, let it be shown that the Secretary of the Interior's report on the project was sent to the affected States in 1948 and each and every one of them had full opportunity to comment on it and has commented.

After the Senate had first passed the bill to authorize the central Arizona project, it did not consider that it was necessary that the report on the project be recirculated among the affected States before it took the bill up a second time.

Of course, it was not necessary any more than it is necessary now for a report on the project to be recirculated among the States when the project is the same and all that has been done is to bring the figures up to date.

Mr. Dominy, you have stated that the central Arizona project has been updated, in a report on June 7, 1963?

Mr. DOMINY. Yes, sir, the regional director has, with the funds made available by the State and through Federal appropriations to the Bureau of Reclamation, completely updated the economic and engineering features of the project.

Senator HAYDEN. Mr. Chairman, I consider this report necessary to the proper consideration of the bill now before us by this committee. Will you please instruct the witness to file a copy thereof with this committee and deliver a copy thereof to each member of the committee?

Senator MOSS. I think that is a proper request. It must be recognized that this is just the regional director's report and does not constitute the official report of the Secretary of the Interior because of

the necessity of coordinating it and finally establishing a policy. But I think it is proper for this committee to look at it and I would therefore request the witness to file with the committee a copy and we can prepare duplicates here in the committee.

Senator KUCHEL. Will the chairman yield?

Senator ANDERSON. I hope he is going to be ready to do that on every irrigation project from here on out, because this is an extremely unusual procedure.

I agree with the Senator from Arizona that the report is ready and cleared, it ought to be here. But I don't believe this committee should instruct the Bureau of Reclamation to do something over the head of the Secretary of the Interior and I would want to put my protest in on that procedure.

Senator HAYDEN. Well, let the Secretary do it, then.

Senator ANDERSON. That is different. If you let the Secretary do it, fine.

Senator MOSS. Then if you will amend your request, we will get the Secretary of the Interior to forward to this committee a copy of the regional director's report with any immediate comment he has to make.

Senator HAYDEN. Yes.

Senator MOSS. Or if at this time, he is prepared to submit the official report, why, of course, that would then complete the reporting to this committee.

Senator ANDERSON. Mr. Chairman, an old bureaucrat never recovers, you know, and I was in the Department of Agriculture at one time and if somebody had instructed the Forestry Service to report directly to Congress, I would have been mildly annoyed, to say the least.

Senator KUCHEL. Will the chairman permit me to make a comment before he gives that directive?

Senator MOSS. All right; you may comment.

Senator KUCHEL. It is rather important.

Commissioner, in your recollection, has a similar directive ever been issued to you by the chairman of this committee or any other member of this committee?

Mr. DOMINY. No, sir; I do not recall any circumstances exactly parallel.

Senator KUCHEL. Actually I don't know that I have any objection to anything coming out, but I raise this question most respectfully. From the time any study is made in any department until it finally reaches the Secretary, the assumption is that at different levels, the pros and cons are argued, debated, so that when the Secretary reports to the Congress, presumably, his report will have been arrived at because of the discussion in his Department.

Now, we have a unique situation here with the Secretary only 2 days ago sending to the Governors of the Colorado Basin States his proposal for development of the whole Pacific Southwest.

To direct the Commissioner now to furnish this committee, or to direct the Secretary, if this committee can direct a Secretary, which I question—maybe it can—to bring before this committee a report on this bill could place the Secretary in a situation where he would be furnishing staff papers that could damage, if not destroy, his basin

plan. While I have no right to tell the chairman of this committee what to do—he is my friend, like all the rest of my colleagues are—I simply object to that procedure. I object to it because I do not believe it is reasonable.

Senator ANDERSON. I support that and I want to say I want to support what the Senator from Arizona has suggested in asking for the report when it is ready. I don't believe the report on the central Arizona project should be held back until any other report is ready for submission if the central Arizona report is ready, and it is ready if the Bureau of the Budget has approved it.

Senator KUCHEL. I agree with that.

Senator ANDERSON. I think the most the chairman should do is request this witness to urge the Secretary of the Department of the Interior to supply us with a report as soon as possible.

Senator HAYDEN. That is entirely satisfactory with me.

Senator MOSS. It is a request and not a directive and we will make that clear. Secondly, if the Secretary saw fit to permit this committee to examine a director's report, it would be just that. It would certainly not constitute any official position in the Department until it has had the clearance that it has to have.

Senator HAYDEN. I am sure the Secretary of the Interior will say that the central Arizona project is an integral part of the plan, an expanded plan.

Senator KUCHEL. Yes, sir.

Senator HAYDEN. And that that report will be a part of the plan. There is no getting away from that.

Senator MOSS. Well, I will undertake to speak with the Secretary myself and see if we can get this resolved so that we can get a report before us.

Senator HAYDEN. All right.

Senator MOSS. Do you have any further questions, Senator?

Senator HAYDEN. The 1947 report of the Bureau of Reclamation on the central Arizona project pointed out that there was no water available for land that did not have a history of irrigation. Does the report of June 1963 adhere to this principle of no water for land of no history of irrigation?

Mr. DOMINY. Yes, sir; it is strictly for supplemental water for the lands already being irrigated.

Senator HAYDEN. The 1947 report contained a ratio of how water is to be used to supply domestic and agricultural requirements except for 12,000 acre-feet of water which have been developed on the San Pedro River as a source of delivery to the city of Tucson. Is this same ratio of agricultural and domestic water supply in the central Arizona project set forth in the June 1963 report?

Mr. DOMINY. No, Senator; the great influx of population that I reviewed yesterday has required a shift in the uses of water. Approximately a third of the water to be supplied under this proposed project would now go for municipal and industrial uses and two-thirds for irrigation. It is anticipated that over the project payout, there would be additional shifts from irrigation to municipal and industrial uses.

Senator HAYDEN. Would other areas than the central part of the State of Arizona benefit from the central Arizona project?

Mr. DOMINY. Yes; as you are well aware, today's projects are very complex and there is a great shifting of water on an exchange basis.

By this principle, upstream cities in Arizona, like Flagstaff and Williams and Prescott, can all benefit directly as a result of this project.

Senator HAYDEN. They are going to ask about areas such as Kingman, which needs direct diversion of water to meet their expanding domestic requirements.

Mr. DOMINY. Kingman also could be served by direct diversion under this project plan.

Senator HAYDEN. How would New Mexico benefit from this project?

Mr. DOMINY. Well, Hooker Dam would provide streamflow irrigation to downstream acreages in New Mexico. It would, in addition, provide much needed and extremely valuable recreational benefits in this very beautiful mountainous area. There would be some flood control benefits and there would be a source of domestic water for the city of Silver City and for Tyrone under this plan.

Senator HAYDEN. As you know, we have a serious flood problem in the city of Phoenix. Does the central Arizona project make any provision for flood protection of Phoenix and adjacent developed areas?

Mr. DOMINY. Yes; Maxwell Dam is an integral part of this plan that is quite close to Phoenix. It would give it badly needed local flood protection benefits and would create tremendous benefits from recreational use.

Senator HAYDEN. I know you have submitted your written testimony for the record. However, for the benefit of the subcommittee, would you please briefly describe the physical features of the central Arizona project, with particular emphasis upon the difference, if any, between the project as set forth in 1947 and the report of June 1963?

Mr. DOMINY. This is described in my prepared statement, starting with page 15. As I previously pointed out, the central Arizona project plan of development is described in the Bureau's 1947 report and its appendixes. In our updating studies, we have made only such changes in the plan as were required; (1) to eliminate some features of the plan whose functions have been accomplished by subsequent developments; (2) to take advantage of engineering and technological developments which have taken place since the original report was written; (3) to modify the canal location as required to bypass urban developments which have grown up along the original canal route; and (4) to expand the conveyance system to provide for the growing municipal and industrial needs of the city of Tucson.

First, I would like to point out that the features of the original Bluff Dam on the San Juan River were included in the 1947 report for sediment control purposes, but these functions are now more adequately served by Glen Canyon Dam, which has been constructed as a unit of the Colorado River storage project.

Senator ANDERSON. Was Glen Canyon not under contemplation at the time this was contemplated?

Mr. DOMINY. No, sir; not in 1947. It was not authorized.

Senator ANDERSON. It was not authorized. Was it in contemplation?

Mr. DOMINY. It was only being considered as part of the upper basin plan, but it was not in existence nor authorized. Therefore, we had to proceed.

Senator ANDERSON. This will be fully met by the situation at Glen Canyon?

Mr. DOMINY. Yes; the sediment control we needed at Bridge Canyon—you see, Bridge Canyon Dam has relatively little storage behind it. So we had to watch carefully for the sediment. So we had two sites, one on the San Juan River and one on the Little Colorado River at Coconino, which two streams are heavy silt contributors. One is above Glen Canyon. The Little Colorado is below, but it alone will not bring enough silt down to impair the effectiveness of Bridge Canyon. The two heavy silt-carrying streams together would.

Senator GOLDWATER. Mr. Dominy, does not the Little Colorado contribute about 20 percent of the silt?

Senator ANDERSON. I bet it does.

Senator GOLDWATER. Twenty-two percent, I think.

Mr. DOMINY. Even so, there is sufficient storage behind the Bridge Canyon Dam over the long term since that will be used primarily for power head.

Senator ANDERSON. But is it economic to go ahead and allow this silt to be dumped in there and shorten the life of Bridge Canyon Dam when you can build a small dam at Coconino and stop it? You have been over the Rio Porco land as I have. You know what's there.

Mr. DOMINY. I do agree that Coconino would be a desirable addition; yes, sir.

Senator ANDERSON. Since this has such a high benefit ratio, 3.03 to 1, which is way above what most any other project is, why not put Coconino in?

Mr. DOMINY. Of course, when we draw up these project proposals, we try to get them down to the minimum cost possible to perform the function adequately.

Senator HAYDEN. I am inclined to agree with Senator Anderson on that.

Senator GOLDWATER. What are we talking about in Coconino?

Mr. PUGH. We didn't reestimate the cost.

Senator ANDERSON. It was very low in the beginning.

Senator GOLDWATER. A very small dam.

Mr. PUGH. The sediment problem was carefully looked into and it was felt it might be desirable to put in sediment control provisions after payout, but it would not be needed before the payout was accomplished. It would be beneficial.

Senator ANDERSON. You do not have a figure on it?

Mr. PUGH. I can provide one for you.

Mr. DOMINY. We'll submit it.

Senator ANDERSON. I believe it was a very small amount and it does not pay in these areas to contribute so much silt. At the time they built the Elephant Butte Dam, if they had stopped the infiltration of silt from Rio Porco, we would have much less trouble than we now have.

Senator MOSS. That figure will be supplied for the record.

(The information requested is as follows:)

The cost of Coconino Dam, indexed to July 1961 price levels, would be \$13,894,000.

Senator GOLDWATER. Off the record.

(Discussion off the record.)

Mr. DOMINY. We have also eliminated the Horseshoe Dam enlargement of the Verde River because the city of Phoenix utilized this site to provide additional storage for the city's municipal and industrial water supply system. The powerplant at Horseshoe Dam has also been eliminated.

Buttes powerplant at Buttes Dam on the Gila River has been eliminated because more recent water-supply studies indicate that reservoir storage levels would not be capable of providing a firm power supply.

Senator GOLDWATER. You have eliminated Buttes?

Mr. DOMINY. The dam is in, but we have eliminated the powerplant.

Then we have eliminated some Safford Valley improvements, a well-drilling program and canal rehabilitation. This is being accomplished by local water users. We feel this is something that should be financed locally and not put in this plan.

Senator GOLDWATER. How about the Camel Back Dam? That was not in the original plan, was it?

Mr. DOMINY. No, sir.

In discussing the various features which are included in the plan of development, I will try to point out modifications that have been made because of technological developments or population growth since the 1947 report.

The first basic requirement of the project plan is for a source of electrical energy for pumping the water to central Arizona and to produce revenues needed to assist in payment of project costs.

The source of power assumed in the 1947 and updated report would be Bridge Canyon Dam, located on the Colorado River at the headwaters of Lake Mead. This dam would be comparable in size to Hoover or Glen Canyon Dams. About one-third of the energy generated at the Bridge Canyon powerplant would be used for pumping water into central Arizona. Approximately two-thirds of the energy would be sold commercially to provide for the ever-increasing power demands in the growing Pacific Southwest and to provide revenues to assist in payment of project costs.

Bridge Canyon Dam has been completely redesigned to take advantage of significant advancements in technology that have occurred since 1947. It has been redesigned as a variable-radius, thin-arch structure, with a minimum thickness at the base of about 148 feet as compared to an original base thickness of over 600 feet. This dam would have a structural height of about 740 feet above foundation.

In redesigning Bridge Canyon Dam as a thin arch, the quantities of concrete were reduced from 5,700,000 to 2,650,000 cubic yards. The cost of the redesigned dam is estimated at about \$119 million at current price levels, as compared with an estimated cost for the original design of about \$261 million at these price levels.

Senator GOLDWATER. Could you give a very quick description of what that dam will be like?

Mr. DOMINY. Well, it is just a thin-arch construction, relying on the strength of the arch to replace a lot of the strength that was obtained before from the weight of a more massive structure. This is a simple explanation of it.

Senator Moss. Is it like Glen Canyon?

Mr. DOMINY. It is like Glen Canyon, only it is a little more extreme than Glen because we have a little different rock and a little different width of canyon and so on.

Senator GOLDWATER. Did you use these techniques at Glen Canyon?

Mr. DOMINY. Yes. We are using them also on the Gunnison River at Morrow Point. This dam is a double curvature dam at Morrow Point. It curves upstream, of course, and also curves downstream at the top.

Senator GOLDWATER. Like Coolidge?

Mr. DOMINY. No; not like Coolidge.

Senator ALLOTT. The idea of the thin structure is that you actually use the weight of the water as a compression factor in the dam, is that it?

Mr. DOMINY. Yes. The techniques employed in thin-arch construction have developed very rapidly in the past 10 years.

Senator ANDERSON. The report published in 1949 says the Coconino Reservoir would cost \$7,485,000.

Mr. DOMINY. Even if it were indexed up, it would still be a modest structure.

Senator ANDERSON. And you predicted at that time it would greatly prolong the life of Glen Canyon Dam. It is still going to prolong the life of some dam.

Mr. DOMINY. That is true. I don't like to see sediment being washed down a stream, either.

Another feature of the redesigning of Bridge Canyon Dam is increasing the installed capacity from 750,000 to 1,500,000 kilowatts.

Senator ANDERSON. Will you be able to market that power all right?

Mr. DOMINY. We definitely feel that we can.

Senator ANDERSON. Do you realize the Salt River cooperative is talking about putting a steamplant all the way up the Colorado?

Mr. DOMINY. Yes; they are doing this.

Senator ANDERSON. Why would they do that if all this power is coming in?

Mr. DOMINY. They need it right now, for one thing.

Senator ANDERSON. They have it in Glen Canyon.

Mr. DOMINY. No, sir; they have not. As I have said, Glen Canyon is already oversubscribed and under our marketing criteria, most of it is withdrawable as soon as our upper basin users, including the New Mexico users—

Senator ANDERSON. Some was allotted to New Mexico out of Hoover Dam. Would you put in the record how much power has gone to New Mexico from Hoover Dam? If it is over "000" I am going to challenge your statement.

Mr. DOMINY. I will say right now it is zero.

Senator KUCHEL. What are you trying to prove by that, my friend? I don't understand.

Senator ANDERSON. I am trying to say that the old yardstick by which we said 6-mill power is attractive may be disappearing. They have developed so much technology of taking coal at the mine, as they are doing in the San Juan area now. Public Service of Arizona and Public Service of New Mexico are both building plants in the Navajo country to take this at the mine. That is cheaper to them than the use of the water power at 6 mills. I am only asking if he has a market for this increased capacity at Bridge Canyon Dam?

I am willing to take the expert testimony of the Bureau of Reclamation on that. I am just wondering if somebody is going to buy it at 6 mills when they can make it for 4.

Mr. DOMINY. Senator, they cannot make peaking power for 4 mills.

Bridge Canyon is being designed, particularly if Marble is built, and I personally think Marble will be built and should be built. When Marble is added to the river, then Bridge Canyon power can be devoted entirely to peaking power.

You can't build thermal plants that you turn off and on at these low costs. They are low cost if they are loaded around the clock and if they have other sources to take care of the peaks. That is why hydroplants will always be important, because you can turn them on and off and you don't have to keep them fired up and have your energy being utilized needlessly in the off-peak times.

I would like to point out that we have an underground powerplant here—

Senator ALLOTT. Before you go at that, is any of the electricity from Glen Canyon going to Colorado as a part of the upper Colorado River development.

Mr. DOMINY. Indeed it is. The great bulk of the power produced at Glen Canyon Dam and other power units of the Colorado storage power, of which Glen Canyon is the principal producer, is earmarked to be sold to preference customers in the upper basin States.

In early years, we do provide for some of it to be sold in the lower basin States, but to be withdrawn as the upper basin is developed.

Senator ALLOTT. Do you think that is ever going to occur?

Mr. DOMINY. Yes; it is occurring very rapidly. As a matter of fact, we will have these plants fully loaded right on the completion of the units.

Senator ANDERSON. Could you furnish us with a statement showing us what rate you are getting for all the power you are delivering? I wonder how much is being sold at dump rates?

Mr. DOMINY. You mean Missouri Basin or just—

Senator ANDERSON. Just the Colorado storage project.

Mr. DOMINY. We will supply that.

(The information requested is as follows:)

The rate for the Colorado River storage project power is set forth in schedule B4-F1, which is the schedule of rates for wholesale firm power. The monthly rate for the capacity charge is 3 mills per kilowatt-hour. We anticipate marketing storage project power at a maximum of 58½ percent load factor which would result in 427 hours of use per month and an average rate, for both capacity and energy, of 6 mills per kilowatt-hour.

We are going to have an underground powerplant at Bridge Canyon and the switchyards will be located 10 miles back. This will be where our camp will be.

We recognize this is beautiful country, presently completely inaccessible. We know when the dam is there, it will be accessible, however, and will attract millions of people to a fine recreational area. We are doing everything we can to preserve it in its natural beauty. The Bridge Canyon powerplant will have a load factor of about 37 percent for commercial generation. By operating Bridge Canyon powerplant as a peaking facility, under normal operations, the reservoir will fluctuate only about 4 feet. Thus a stable pool of deep, still water will be maintained for recreational purposes.

As for the backbone canal system, the water would be pumped from Lake Havasu by three in-series pumping plants having a total static lift of 969 feet. The Granite Reef aqueduct would extend 219 miles from Lake Havasu to Granite Reef Dam. It would have a capacity of 1,800 cubic feet per second, and would be concrete lined.

Due to urban expansion which has occurred north of Phoenix since 1947, the original canal location through this area would be imprudent. An additional pumping plant was therefore installed on the east side of the Hassayampa River with a static lift of 115 feet. This additional lift permitted the entire canal location east of the Hassayampa River to be revised to bypass the urban developments north of Phoenix. Due to the higher location, a power drop with 94 feet of head was added at the Agua Fria River, through which water deliveries to the area west of the river would be made.

The Granite Reef aqueduct is designed for uniform flow throughout 11 months of the year to minimize the size of the aqueduct required. The plan provides that only that portion of the water needed in the Salt River Valley would be delivered at Granite Reef. The remaining flow would be siphoned under the Salt River and would be transported south through the Salt-Gila aqueduct.

This aqueduct, extending from the Salt River to Picacho Reservoir in Pinal County, would have a capacity of 1,275 cubic feet per second.

The final portion of the aqueduct system would be a closed conduit extending from near Picacho Reservoir to the city of Tucson to deliver 100,000 acre-feet of water annually to augment that city's municipal and industrial water supply.

The Tucson aqueduct would have a capacity of 150 cubic feet per second and be 56 miles in length. It would include a series of pumping plants with a total static lift of an additional 920 feet. The total length of the backbone canal system from the Colorado River to Tucson would be about 341 miles, and the total static lift of the final increment of water reaching that city would be 2,081 feet.

In the 1947 report, Salt River water would have been diverted from Saguaro Reservoir above Stewart Mountain Dam and conveyed through the Granite Reef aqueduct to the southern part of the service area in exchange for Colorado River water delivered to the Salt River project at Granite Reef Dam.

In the updating studies this proposed exchange arrangement has been eliminated, and water would be supplied to the Salt-Gila aqueduct directly from the Granite Reef aqueduct. This change was made possible through relocation of a portion of the Granite Reef aqueduct around the Phoenix metropolitan area.

The operation of the central Arizona project canal system would be integrated with the Salt River project storage system through the provision of terminal storage at Maxwell Reservoir, which would be located at the junction of the Salt and Verde Rivers about 3 miles upstream from the Salt River project's Granite Reef diversion dam.

A flat-grade canal, extending from Granite Reef Dam to a combination power and pumping plant at Maxwell Dam, would provide for this integration. Most of the time, water demands in the Salt River project area would be met by combining flows from Granite Reef aqueduct with flows released from Maxwell Reservoir through the powerplant. However, when the flow through the Granite Reef

aqueduct exceeds the demand on the system, the excess Colorado River water would flow toward Maxwell Dam where it would be pumped into storage until needed.

In addition to Bridge Canyon and Maxwell Dams, three other dams would be included in the project to conserve and regulate the local water supplies. These would be Buttes Dam, located on the Gila River about 14 miles upstream from the town of Florence, Ariz.; Charleston Dam on the San Pedro River southeast of Tucson; and Hooker Dam on the main stem of the Gila River in western New Mexico.

The project plan contemplates the construction of a high-voltage transmission system which would make possible the delivery of power and energy to project pumps, the sale of commercial power and energy at load centers, and the integration of operations at Bridge Canyon with other plants on the Colorado River for maximum utilization of the hydroelectric power potential.

I think, sir, that that gives you a pretty good rundown of the present plan and the major differences.

Senator HAYDEN. Now I would like to ask you to summarize for us the economic and financial feasibility of the central Arizona project and tell us whether in your opinion the project is a better project in 1963 than it was in 1947.

Mr. DOMINY. This is covered in my prepared statement on page 30.

From an economic and financial standpoint the present analysis of the central Arizona project shows it to be one of the very best investigated by the Bureau of Reclamation in recent years. The estimated project construction costs subject to allocation to various functions of some \$997 million, with an annual operation, maintenance, and replacement cost of \$8,611,000, will generate about \$125 million worth of benefits annually. This results in a very favorable benefit-cost ratio of 3.03 to 1.

Senator ANDERSON. There was an article in some magazine a while ago about pork. At that time it picked out the upper Colorado project. This is \$997 million. Is this more than the total cost of all the upper Colorado River projects, covering the States of Wyoming, Colorado, Utah, and New Mexico?

That was \$991 million, I think.

Mr. DOMINY. That was the original authorized plan. If the addition to the plan Congress also authorized are added, the present authorized project, including the San Juan, the Navajo, and the central Utah and the others that are authorized as soon as we can get around to building them, will make a total project cost of almost \$1.3 billion. You are quite right; Glen Canyon Dam, the Flaming Gorge and the participating units we are working on, are less than a billion dollars.

Senator ANDERSON. I just wanted the size of this to get in also, because I am sure some of us felt embarrassed about how expensive the upper Colorado River project was.

Mr. DOMINY. As a matter of fact, I too have had a good many letters and telephone calls and comments about the Life article. I think in general it will be beneficial to reclamation, because when we get the story told, everybody will see how misleading this national magazine article was and how incomplete and inaccurate it was.

Senator ALLOTT. It is too bad the authors could not have discussed it with somebody who understood resources.

Senator GOLDWATER. It is too bad when you consider the editor lives in the Salt River Valley.

Senator MOSS. We will turn the projects over to him, then.

Senator ANDERSON. I would not suggest any such thing at all, but I would suggest the subsidy paid to some of these magazines is greater than the subsidy paid to the projects under the upper Colorado project.

Senator GOLDWATER. This has been said, too.

Senator MOSS. I made that statement on the Senate floor.

Senator ANDERSON. Well, I'm too late again.

Mr. DOMINY. I made that statement about benefits but I do not want that to apply to the fact that the editor of Life lives in the Salt River Valley. I want that to apply to the fact that this project brings \$125 million worth of benefits annually and it applies to the benefit-cost ratio of 3.03 to 1.

Senator ANDERSON. That is an extremely favorable ratio, is it not?

Mr. DOMINY. Indeed it is. In fact, the benefit-cost ratio in 1947 was 1.63 to 1, which shows the project is economically more favorable today than it was 15 years ago, largely because of the changed economic conditions including the increased value of water in the area. However, the present analysis also reflects current procedures set forth by Senate Document 97.

Senator ANDERSON. Haven't we had a good many projects before this committee where the ratio was less than $1\frac{1}{2}$ to 1?

Mr. DOMINY. Yes; there have been a number of projects built with benefit-cost ratios of that magnitude.

Senator ANDERSON. And the real test is that the majority that are below 2 to 1 are very substantial, are they not?

Mr. DOMINY. I think this is correct.

Senator ALLOTT. May I enter into the record there the fact that many of the smaller reclamation projects that we have authorized in this committee in the past 2 or 3 years have been in the neighborhood of 1.20 to 1?

Mr. DOMINY. That is correct.

Senator ALLOTT. The Baker project in Oregon, which I still think should never be built is—what was the ratio on that?

Mr. PALMER. In the general range of 1.20.

Senator ALLOTT. That is my recollection, in that general area.

Mr. DOMINY. I think in summary, Senator, you can be reassured that the central Arizona project plan remains highly beneficial and that it can be demonstrated under the economic analyses that are used in all water resource development projects, to be a very favorable undertaking.

Senator HAYDEN. Thank you.

Are the physical features of the central Arizona project as set forth in the June 1963 report, all contained in the Secretary's Pacific Southwest water plan?

Mr. DOMINY. Yes, sir. They are mutually the same except that in the Pacific Southwest plan, Marble Dam is included and the financial programming is different. As far as the physical features are concerned, everything that is in the plan we have discussed here is also in the southwest water plan.

Senator HAYDEN. Now I ask you this question:

If the central Arizona project were authorized and constructed in accordance with the June 1963 report, could the physical features subsequently be included in the Secretary's southwest water plan as an integral part of it?

Mr. DOMINY. Oh, yes; no question about it.

Senator HAYDEN. Could this be done without any disadvantage to the southwest water plan?

Mr. DOMINY. Yes, sir.

Senator HAYDEN. I would like to ask you some questions now with respect to an interest of my own State? Did the State of Arizona participate with the Bureau of Reclamation in making studies and investigations concerning the proposed central Arizona project?

Mr. DOMINY. Yes, sir. I mentioned yesterday from 1947 up to date they contributed about \$350,000.

And they also gave us some guidance as to the areas where they wanted service to be included, and that sort of thing.

Senator HAYDEN. Were these studies and investigations made within restrictions provided for by the Arizona Legislature?

Mr. DOMINY. Yes; indeed they were.

Senator HAYDEN. Would you please place in the record the principal existing water delivery contracts between users in the State of Arizona and the Secretary of the Interior for the delivery of the mainstream Colorado River water in the Yuma Valley area? I do not mean that you would place in the record the Warren Act contracts and other contracts and contracts for comparatively minor uses.

Mr. DOMINY. I appreciate that. That would be quite a voluminous deal. But the ones you want, I am sure, are Yuma Valley, Yuma-Mesa and——

Senator HAYDEN. Yes, sir.

Mr. DOMINY. We will be glad to do that.

Senator Moss. They could be filed with the committee. I do not think we should reproduce them in full in the record. It would be quite voluminous to do that, would it not?

Mr. DOMINY. Yes, indeed.

Senator Moss. They could be made available to the committee as a part of this record and referred to by reference.

Mr. DOMINY. All right.

Senator HAYDEN. In determining the feasibility of the proposed central Arizona project, did you take these existing water delivery contracts or obligations, into account?

Mr. DOMINY. Oh, yes; very definitely.

Senator HAYDEN. What will be the effect of the construction and operation of the proposed central Arizona project upon the existing water users in Arizona having contracts with the Secretary of the Interior for the delivery of the Colorado stream water?

Mr. DOMINY. I consider that there will be no adverse effect whatever. The contracts they have with the Secretary of the Interior involve physical features and water supply to serve designated acreage within their districts and these contracts are valid documents between a local entity, created under State law, and the Federal Government acting through the Secretary of the Interior.

They will be honored, of course.

Senator HAYDEN. Thank you.

Senator MOSS. Are there questions from other members?

Senator GOLDWATER. Could I ask one technical question?

Senator MOSS. Yes; you may, Senator Goldwater.

Senator GOLDWATER. On the proposed Marble Canyon Dam, are you considering the Kanab Creek outlet, or will it be just a straight drop at the damsite?

Mr. DOMINY. The proposals up to this time involve just a powerplant of a conventional type at Marble and at Bridge. There is no plan to include Kanab tunnel as part of the power production feature.

Senator GOLDWATER. I ask that for reasons you are aware of, that I am afraid you would run into some strong opposition if you even suggested thinking of it.

Mr. DOMINY. This is true. Many people have maintained that were Kanab tunnel put in, the flow of water through the Canyon Park area would be reduced to the point of great harm to the scenic beauties of the area. It is interesting to note that the 1,000 second-feet which has been flowing through the park this summer, under controlled release at Glen, still provides quite a river, as you noticed when you flew over it. It was quite surprising, when we reduced it from 5,600 cubic feet per second down to 1,000 cubic feet per second, that the river profile as far as the amount of ground actually covered by the water didn't change very much.

Senator MOSS. Senator Anderson?

Senator ANDERSON. I have a letter from the State of New Mexico containing a resolution in which they refer to the proposal and our Interstate Stream Commission said the commission asked to direct me to advise you that the commission recommends you do not support the above-mentioned bills unless language having in effect the proposed amendment attached hereto is included. We are trying, as I said the other day, to get just a few crumbs that drop from the table.

Senator KUCHEL. You do all right, Senator.

Senator ANDERSON. I hope so.

Senator KUCHEL. You do pretty good.

Senator ANDERSON. The proposed amendment is that:

(a) Construction of project works other than Bridge Canyon Dam, reservoir, powerplant, and electrical transmission facilities shall not be initiated until—

(1) agreements satisfactory to the Secretary of the Interior shall have been concluded between the States of Arizona and New Mexico regarding the uses of Gila River water and between the upper and lower valley water users under the Gila River decree to establish coordinated reservoir operating criteria;

(2) reservoir operating criteria thus agreed upon by the States of New Mexico and Arizona and the upper and lower valley water users under the Gila River decree shall thereafter be followed and maintained by the officials responsible for the operation of the reservoirs to which the criteria apply.

I can remember when New Mexico sent its National Guardsmen out to the Gila River locations and when Arizona reciprocated by sending its National Guardsmen out there and we thought for a while we were going to have a civil war.

Does the Department have any knowledge of an attempt to agree upon some distribution of this water to give some portion of it to New Mexico, since it rises in New Mexico and the dam will be in New Mexico and the farms are in New Mexico? I know about the scenic benefits.

Mr. DOMINY. I testified a while ago that Hooker provides benefits to New Mexico for irrigation and municipal water supply to Silver City and Tyrone.

But I would like my area engineer, who has been over there and discussing this with these people in developing the Hooker plan, to comment.

Mr. PUGH. I am not sure I get the import of it.

Senator ANDERSON. The import is, it is like the quitclaim deed. It means you quit claiming what belongs to us and we would like to have Arizona quit claiming what belongs to us in the Gila River, that is all.

I will be glad to show you the language they would like to have included in the act.

Mr. PUGH. Has that not been done by the Supreme Court?

Senator ANDERSON. I regret to say that the Supreme Court entered into a verdict which we, like the State of California, do not completely subscribe to.

The Supreme Court said, for example, that in the whole matter of Colorado River water, the upper basin States limited themselves. Nothing can be more dishonest than that, even if the Supreme Court said it, because I handled the bill on the floor and made it quite clear we were not limiting ourselves.

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.

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.

Senator ANDERSON. Neither State is doing anything about it. We are willing to but nothing has happened. I am just wondering if the Bureau recommends that we try to pass a bill before some agreement is reached upon this? Because I am in a difficult situation, as I said the other day. I think I was as useful to Senator McFarland in reporting out the central Arizona project twice as any Member of the Congress and probably as useful to him in passing it on the floor as any Member of the Senate, maybe.

I would like again to support the project, which I think is a better project now than it was then. But I have a request from the interstate stream commission in my State to try to hold it up until we can get some agreement about the water in it.

Mr. DOMINY. If the Senator would permit, and the Chair, I would like to take this and examine it with counsel and submit a statement to the committee as to our view.

Senator ANDERSON. I would appreciate that.

Senator MOSS. That will be done and made a part of the record. (The information requested is as follows:)

Secretary Udall on September 4 addressed letters to Governors Fannin and Campbell referring to the question raised by Senator Anderson relative to Hooker Dam and Reservoir. In these letters the Secretary offered the full assistance of the Department of the Interior in resolving any questions that may now be present. The text of the Secretary's letter is as follows:

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., September 4, 1963.

HON. PAUL FANNIN,
Governor of Arizona,
Phoenix, Ariz.

DEAR GOVERNOR FANNIN: On August 28, 1963, during the hearings on S. 1658 before the Senate Subcommittee on Irrigation and Reclamation, Senator Anderson raised the question of how water could be made available for storage in Hooker Dam and Reservoir and ultimate use in New Mexico. It appears that Senator Anderson's question was prompted by a letter and its enclosure which he received from the New Mexico Interstate Stream Commission urging that he not support S. 1658 and other bills relating to the Buttes Dam and the central Arizona project unless satisfactory agreements between the States of Arizona and New Mexico and the upstream and downstream water users are reached regarding uses of Gila River water and reservoir operating criteria. Copies of the letter and its enclosure, which Senator Anderson filed with the subcommittee, are enclosed.

As you are aware, there have been discussions over the past few years among the upstream and downstream water users and representatives of this Department regarding operating criteria with respect to Buttes Dam and Reservoir. The prospect of Hooker Dam and the Arizona-New Mexico compromise agreement concerning the use of the water of the Gila River and its tributaries in New Mexico accepted by the Supreme Court in its opinion in *Arizona v. California*, *et al.* (opinion, p. 45) also presents elements of particular interest to the two States.

I am hopeful that the 90-day Pacific Southwest water plan review period will afford the opportunity for clarification of matters such as this and that appropriate officials of the two States can give it early consideration. Representatives of the Department stand ready to participate in discussions and otherwise render all appropriate assistance.

I am sure you share my hope that by mutual consultation regarding problems of this nature, what might otherwise be potential roadblocks to the consideration of authorizing legislation can be eliminated. I am sending a similar letter to Governor Campbell, and I am also sending copies of this letter to the congressional delegations of both States in order that they may be kept currently informed.

Sincerely yours,

STEWART L. UDALL,
Secretary of the Interior.

I wish to reiterate the Secretary's hope that problems of this nature can be resolved during the present review period. In view of the prospect of consideration of this issue by the two States concerned with participation by representatives of this Department, we are deferring the expression of any substantive views at this time.

Senator ANDERSON. On page 12 you say:

Water levels are dropping at an alarming rate with an indicated present ground water overdraft of about 2.2 million acre-feet annually.

You testified it would take about 10 years to build this operation and get it in working order. Will these underground waters last 10 years at the rate they are now being mined?

Mr. DOMINY. Yes. They will last. There will be a great deal of extra expense to the people as they lower their wells.

Senator ANDERSON. They will have to keep dropping their pumps with regularity.

Mr. DOMINY. In a few cases there will have to be some wells abandoned when they get down too far or to poor quality water. But basically they could survive for many years; however, the economy won't survive indefinitely with mining water from the ground aquifer.

Senator ANDERSON. The reason I asked the question was I was somewhat disturbed to have in the record the assurance that this project will take 10 years. We authorized, based upon the speed at which Glen Canyon was constructed, it might be ready to yield some benefits to the State of Arizona before that.

Mr. DOMINY. We are a conservative outfit, as you know. It can be built faster. Taking into account all the things that occur on a project of this magnitude, 10 years is a conservative estimate of progress. I do not think there is a project that has gone any faster than the Colorado storage project once it really got launched.

We really rolled that project in fine shape. We do have estimates on the central Arizona that we can build and get it constructed in 7 years under optimum construction procedures.

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 Streams 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.

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.

Senator ANDERSON. I merely wanted to be sure there was something in the record about this exchange of water.

Senator HAYDEN. We have the same situation with respect to exchange of water between the irrigated lands in Graham County and Pinal County, Ariz.

Mr. PUGH. That is the same thing.

Senator ANDERSON. You said on page 24, the middle paragraph, the bottom part of it:

Depths to ground water range from 20 to over 600 feet, with the average close to 250 feet. Ground water depths increased as much as 180 feet during the 7-year period from 1952 to 1959.

You point out that it is adding to it about 30 to 35 feet annually. Isn't this becoming pretty close to marginal, any more of this pumping—

Mr. DOMINY. Indeed it is.

Senator ANDERSON. I gave up a farm in eastern New Mexico because it started to drop 10 feet a year.

Mr. DOMINY. If all the water they are using had to be pumped from depths like this, it would be uneconomical.

The fact is they are getting water from the Salt and the Gila Rivers and the Verde. Their present water supply is all that is saving them now. But as their present economy develops and as their water drops from this overdrafting of the aquifer, the problem grows more and more acute.

Senator HAYDEN. We will present, I hope, at a later date, accurate information assembled in Arizona about various areas of the State, how the water table has gone down.

Mr. DOMINY. Very good.

Senator ANDERSON. You show on page 31 some annual benefits. Actually, when they figured out fish and wildlife and flood control, you had some pretty good figures on this; did you not?

Do you have the fish and wildlife and flood control figures?

Mr. PUGH. They are shown on page 31.

Senator ANDERSON. I have some figures on page 33; none reimbursable flood control—

Mr. DOMINY. Oh, our allocations; yes, sir.

Senator ANDERSON. Recreation, \$22,513,000.

How does that compare with the figure for the entire Upper Colorado River storage project which includes all western Colorado, great sections of Wyoming, Utah, and New Mexico? What is the figure there?

Mr. DOMINY. As soon as we get a chance to apply the same procedures of evaluation to the Upper Colorado River project as we did here, the figures for the upper basin will be considerably different from what they are now.

Senator ANDERSON. I take it from that you recognize the figure is pretty small now?

Mr. DOMINY. I certainly do. At the time we authorized the Colorado storage project, we did not have the idea, nor did anyone, as to the importance of water recreation to the economy. As a matter of fact, it staggered everybody. We are getting estimates from recreation experts on the annual use of our reservoirs and we are exceeding that use the first 2 or 3 months.

We get an annual use estimate and the first 2 or 3 months the water is there, it is exceeded.

Senator ANDERSON. Do I understand from that answer that there is a possibility that at a later date they should take that million dollars they put in for all the Upper Colorado storage project and revise it upward a little bit?

Mr. DOMINY. I certainly do and I think the Congress is going to get an opportunity to give us some directives on that as soon as this cost-sharing report that Congressman Aspinall requested is made available to Congress.

Senator ANDERSON. I am glad you said that, because I agree with you, these recreational values are tremendous. I have been trying to get into certain areas of the country where recreation is a more highly profitable crop than the irrigation of any crop we now know.

Senator GOLDWATER. Will the Senator yield?

Senator ANDERSON. Yes.

Senator GOLDWATER. I believe I am correct in this, that the recreational use of Glen Canyon Reservoir, even as low as the lake is now, is exceeding \$1 million.

Mr. DOMINY. I am satisfied it is. Even before the water got up to the level of the access roads and the docking facilities, people were managing to get in there somehow and get a boat in that lake.

We don't know how they did it in some cases, but they wanted to be the first to get into some of those canyons that were formerly completely inaccessible.

Senator ANDERSON. Now, on page 33 again, you say "Repay all allocated power costs in 50 years at 27/8 percent." That is not a figure that is comparable to anything we now have, is it? That is the figure on Glen Canyon because of the particular conditions of the market at the time Glen Canyon is approved. But the present cost is about—

Mr. PALMER. The last certification of the Treasury is about 3 percent. What it would be next year, this is strictly conjectural.

Senator ANDERSON. Three percent?

Under what formula?

Mr. PALMER. Under the Water Supply Act formula.

Senator ANDERSON. Is that the same as the formula for the project in the Upper Colorado River?

Mr. PALMER. Yes.

Senator ANDERSON. That is the average of 15-year maturities?

Mr. PALMER. All obligations not subject to call for 15 years.

Senator ANDERSON. That is as low as 3 percent now?

Mr. PALMER. It was 3 plus. I don't remember the fraction.

Senator ANDERSON. What happens to this if you increase this figure to 3 percent? You know that the Hoover Dam was feasible at the price they put on if the figure were just increased a little bit. It looked at the time as though it would be increasable. It looks all right today.

Mr. PALMER. This would be completely feasible and the payout would be solvent without any appreciable adjustment in the rates, because you have some surplus on the end of the 50-year period. You would absorb most of that surplus.

Senator ANDERSON. Have you checked what would happen if this were increased to 3 1/8 percent?

Mr. PALMER. No, sir.

Senator ANDERSON. I think it would be advisable, because if it gets to the Congress, the figures—I am not sure it is as low as 3 percent.

Senator MOSS. Would you provide for the record the figures at $3\frac{1}{8}$?

Mr. PALMER. The payout period and the water rates, the power rates, we would have to assess it against each.

(The information requested is as follows:)

Since the June 7, 1963, supplement report on the central Arizona project was prepared, new criteria have been issued which have a bearing on the economic analysis of the project and, in addition, revised benefits and costs for fish and wildlife and recreation facilities have been obtained. These changes have resulted in a different allocation of costs than that presented in the June report. For comparison, however, the repayment situation was computed on the same basis as that shown in the June 1963 report except that the interest rate was computed at $3\frac{1}{8}$ percent. At this rate, all of the surplus revenues would be absorbed; however, an adjustment in the repayment rates would provide for the required repayment. At $3\frac{1}{8}$ percent, with irrigation water rates set at \$11.67 and municipal and industrial water rates set at 13 cents per thousand gallons, \$67.8 millions would be used to aid in repayment of the irrigation allocation with a \$30 million surplus.

Senator ANDERSON. You say $3\frac{1}{2}$. You would agree there is hardly an irrigation project in America now built that is feasible at $3\frac{1}{2}$, don't you?

Mr. PALMER. I agree with that.

Senator KUCHEL. Why is it $2\frac{7}{8}$ here?

Mr. DOMINY. Because at the time we updated this report, the rate provided by the Treasury on the basis of the formula prescribed by the Congress in recent authorizations resulted in a figure of $2\frac{7}{8}$ as the cost of money to the Federal Government on their long-term bonds.

Senator ANDERSON. It is only since we have been in this competition to hang on to our gold and therefore increased our short-term obligations which have had an effect upon our long-term obligations that this figure has gone up. This figure was all right at the time they did it but is not all right today.

Mr. DOMINY. That is right. This is the problem we have because under that formula, it changes periodically and we have to use whatever current figures there is as the only available figure we have to work with.

Senator ANDERSON. I have nothing else.

Senator MOSS. Senator Kuchel.

Senator KUCHEL. Mr. Commissioner, you answered some questions earlier for the senior Senator from Arizona relative to existing contracts in Arizona with the Bureau. When the Arizona Legislature passed the law under which moneys were provided to the Bureau to continue updating this project, it went on to say, and I quote from section 2 of that State of Arizona Act making appropriation of \$150,000:

Provided, That not to exceed the sum of \$100,000 should be used for the investigation of Bridge Canyon Dam and works necessary for the diversion of Colorado River water to the central Arizona project area and provided further, that the contract with the Bureau of Reclamation shall provide that the investigation and studies shall be restricted to only that quantity of water which may be available for use in Arizona after the satisfaction of all existing water delivery contracts between the Secretary of the Interior and users in Arizona for the delivery of the mainstream water.

That is part of a sentence. You answered Senator Hayden's question and said that of course, the existing contracts between the Department of the Interior, acting through the Bureau of Reclamation, and the water users in Arizona, would of course be respected and carried out. You have contracts with water users in California, do you not?

Mr. DOMINY. Yes, sir.

Senator KUCHEL. How much water is contracted by the Bureau for use in California now?

Mr. DOMINY. Do you have the figure, Mr. Palmer?

Mr. PALMER. Senator, the contracts are in excess of California's self-imposed limitation act, in excess of 5 million acre-feet.

Mr. DOMINY. About 5.4 million, I think.

Senator KUCHEL. Do you propose to honor those contracts with water users in California?

Mr. DOMINY. A complete answer to the question that I answered a while ago, of course, should have included the added phrase, "to the extent that Arizona's entitlement permits."

Of course, this is the answer I must give you. When the plan is established, to the extent that the contracts can be carried out within the entitlement of each of the two States involved here in the lower basin, they of course will be met. Physical facts will, of course, have bearing on the problem, as the Senator is well aware.

Senator KUCHEL. Then your answer to the question of Senator Hayden a few moments ago was not an accurate statement of the Bureau's responsibility with respect to existing water contracts in Arizona?

Mr. DOMINY. I failed to add, to the extent, of course, that the entitlement of water on the river permits. But in the case of Arizona, the total use at the moment is a different pattern with respect to the prospective entitlement as announced by the court in June than is true in California.

The present uses in Arizona of diversion from the river amounts only to 971,010 acre-feet.

Senator KUCHEL. And the amount of water encompassed in this project is what, 1,200,000?

Mr. DOMINY. 1,200,000.

Senator KUCHEL. What is your understanding of the entitlement of Arizona?

Mr. DOMINY. 2.8 million of the first 7½ million.

Senator KUCHEL. Now, let us assume that the problem would arise with respect to existing uses in California and proposed consumptive use under any new project such as this. Do you have any conclusion on how you would treat existing uses as opposed to proposed new uses in the event of an insufficient supply of water to accommodate both?

Mr. DOMINY. Well, of course, the users in California have themselves agreed to a priority of use in the State. So within the State's entitlement, I assume that that priority of use would hold until California interests themselves have made an adjustment in it.

Senator KUCHEL. What kind of adjustment do you contemplate would have to be made?

Mr. DOMINY. As I stated yesterday, I do not contemplate any kind of adjustment will have to be made. I think we can solve his problem

by putting our energies to work to see there is sufficient water there for all proper use and development.

Senator KUCHEL. Supposing we fail?

Mr. DOMINY. Well, at that time there would have to be some decisions made.

The way the Supreme Court left it, of course, the choice would be up to the Secretary of the Interior to prescribe some rules and regulations and procedures. It left him, as I understood it, quite free to establish the criteria by which he would attempt to solve it and solve it equitably. Mr. Rifkind recommended in his report to the court a specific formula for sharing shortages.

Senator KUCHEL. He was overruled.

Mr. DOMINY. He was, as I understand it. The Secretary, of course, could still adopt that as his own method, if he wished. The court left it wide open.

I feel there is nothing to be gained by trying to decide now, years in advance of the problem occurring, recognizing that there are many opportunities for wise men and prudent men working with a cooperative government and a cooperative attitude, to solve it and prevent it from occurring.

Senator KUCHEL. Well, I hope you are right. I sincerely do. That is why I have been a coauthor of saline water legislation which I think is most important.

On the other hand, the apprehension of the people in California, who have a responsibility of furnishing water to our people and to our lands, arises from their feeling that in periods of scarcity their existing and historic uses would be endangered by contemplated uses under new projects. Is there any way you can suggest that that apprehension might be allayed other than in the hope you express, with which I join, that scientific breakthroughs might provide an answer?

Mr. DOMINY. Of course, as I testified yesterday, I do not know of any way that anyone can positively guarantee that any of these things will occur. I have been in this water resource business for 30 years now, starting as a county agent, in a drought-ridden county of Wyoming, and I have seen area after area that I thought was in the most desperate circumstances, with the aid of the Federal Government and their own energy, pull out of distressed conditions and survive and prosper and grow and gain economically.

I certainly do not think that the limits on the Colorado River—and it is a limited stream, and yet it is a big stream—should control development. It is certainly not a picayune stream at all. But it is limited. It is limited, however, beyond any possibility, without man's able assistance, to meet all of the prospective water needs of the people that it serves. We know this. In order to make it reach as far as possible, we need the central Arizona project to put waters that are now wasted to work for the benefit of people. Then we will need all the other things we have talked about. We will need phreatophyte control to add water that is now wasting. We will need canal linings where the canals leak seriously. This will save water and make it available for use.

We need desalinization. It will come. We certainly do not stop where we are. We do not analyze what is going to happen 50 years from now based on what we have today. In my own lifetime of 54

years, just look at the changes that have taken place, from the horse-and-buggy days to jet aircraft and space vehicles. We will solve this problem, because it has to be solved.

This is the kind of assurance I have, this is the kind of assurance that makes me feel pretty good each day as I rise that there are things to be done of benefit and that we will do them.

Beyond that, Senator, we cannot have positive assurances of how the water pail is going to be filled 30 years from now.

Senator KUCHEL. I want to help the Government in that quest. But it is not a need 50 years in the future. You testified that this project would be completed in 7 years. Suppose Congress did authorize it. Suppose it was completed in 7 years. Suppose you had a regrettable continuation of the dry cycle to the point where there was not enough water to satisfy existing water delivery contracts, in my State and in the State of Arizona. But then you brought in an opportunity for new contracts.

Where in the absence of a scientific solution, where would we be able to solve the question as to what you are going to with respect to existing contracts?

Mr. DOMINY. I think the Secretary of Interior in his announcement of the Pacific Southwest water plan report has given aid and comfort to your people, Senator. It points up many things that we discussed yesterday.

Where is that chart showing the nature of the erratic flow of the river, Mr. McCarthy?

Because of the very erratic runoff history of the Colorado River, a man would be most imprudent to undertake to guarantee in any terms what the future holds as to runoff. You can see from this chart that this stream is most erratic from year to year.

Senator KUCHEL. Can we have one of those in the hearing, by the way? I think that is a terrific chart. I mean just to be reprinted in the hearing.

Senator MOSS. Yes; we will ask the reproduction of this be made in the record, as a page in the record.

(The chart referred to is printed on p. 74.)

Mr. DOMINY. Now, the very erratic nature of this river is what gives me hope that next year we will get that snow on the mountains. You notice that there are no 2 consecutive bad years, one immediately following the other.

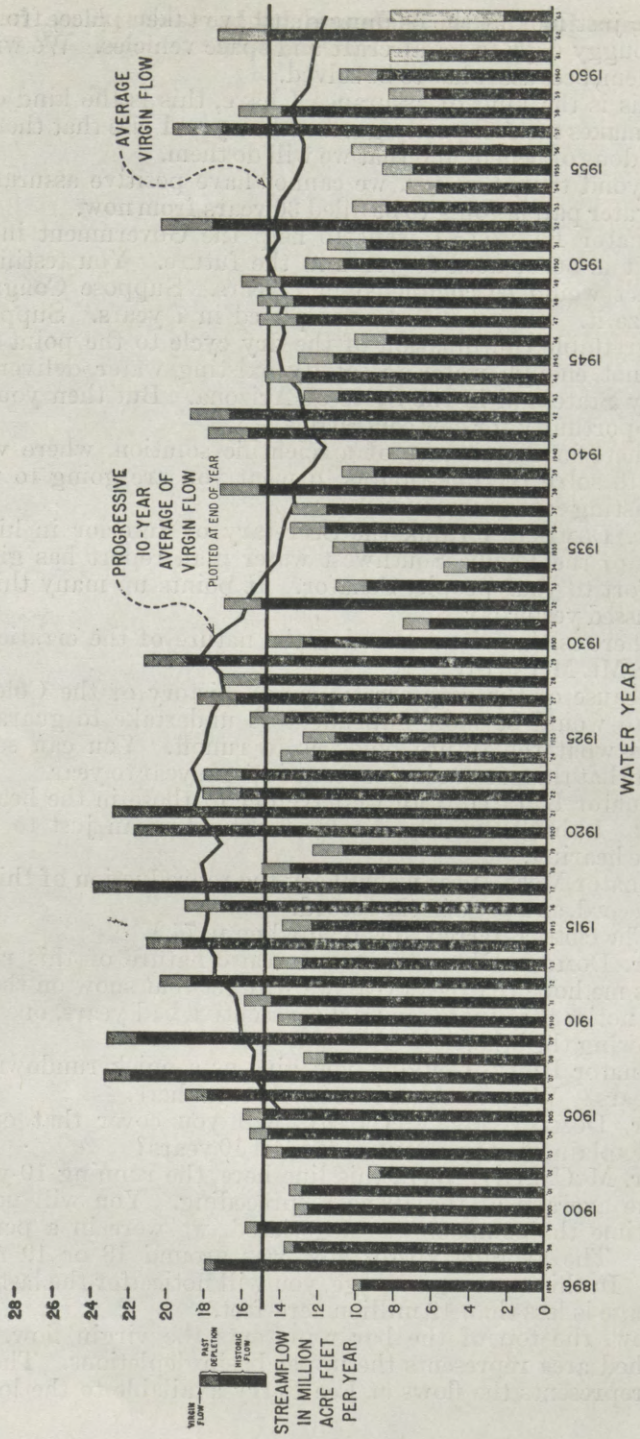
Senator BIBLE. Couldn't you give us a quick rundown of the last 10 years? We cannot see it too well from here.

Mr. DOMINY. Mr. McCarthy, will you cover that on the chart, and explain what you have on the last 10 years?

Mr. MCCARTHY. Well, this line here, the running 10-year average, is the average of the 10 years preceding. You will notice that at the time the compact was negotiated, we were in a period of high flow. The average virgin flow was around 18 or 19 million acre-feet. In this running average, you will notice for the last 10 years the average is less than 12 million acre-feet.

Now, the top of the bar represents the virgin flow. The cross-hatched area represents the upper basin depletions. The solid black bar represents the flows at Lee Ferry available to the lower basin.

COLORADO RIVER FLOW
AT
LEE FERRY, ARIZONA



Senator KUCHEL. In the last 10 years how much water has passed Lee Ferry?

Mr. McCARTHY. About 10 million acre-feet.

Mr. DOMINY. 9,985,000 is the actual figure for 1953 to 1962, inclusive.

Mr. McCARTHY. The average for the last 10 years is about 10 million.

Senator KUCHEL. What does that run to—1960 only?

Mr. McCARTHY. It extends through 1963. This year is an estimate. We do not have complete records.

Senator KUCHEL. Again your estimate for 1963 is what?

Mr. McCARTHY. The virgin flow is a little over 8 million. The flow at Lee Ferry would be about 3 million. But this reflects storage withheld in Glen Canyon, around 2 million acre-feet stored at Glen Canyon. So if Glen Canyon had not been filling, we would have had about 5 million available at Lee Ferry.

Senator KUCHEL. What was it in 1962 at Lee Ferry?

Mr. McCARTHY. At Lee Ferry it was about 14.6 million feet.

Senator KUCHEL. What was it in 1961?

Mr. McCARTHY. 1961 at Lee Ferry was around 6.8 million.

Senator KUCHEL. And the year before?

Mr. McCARTHY. 9.2 million.

Senator ANDERSON. Is there anything significant in the fact that the first part of your chart, the great body of it is up close to that line, and now it is all the way down below, and has been for 40 years, 30 years?

Mr. McCARTHY. You are referring to this line?

Senator ANDERSON. Yes.

Mr. McCARTHY. The significance is that during the early period the average flow of the Colorado River was considerably greater than it has been for the last 30-year period.

Senator ANDERSON. You do not think that the rising temperatures in this country have had anything to do with that?

Mr. DOMINY. Well, we do not know positively. As Senator Hayden brought out, this has been studied by hydrologists and others for many years. Tree-ring studies indicate that there have been periods similar to the one we are going through now many many years ago. The tree rings of trees 200 and 300 years old show this.

Senator ANDERSON. But nobody is able to measure those tree rings and decide how much moisture there was at any particular time.

Mr. DOMINY. Right; but dry and wet cycles can be noted.

Senator ANDERSON. We do know by scientific measurements that temperatures have been gradually rising in the continental United States, and that has had an effect on snowpack, and snowfall, and that is why some of us are interested in weather modifications. But the mere fact—the cold fact is that the average in these last 30 years is way below the average of the previous 30 years, is it not?

Mr. DOMINY. That is correct.

Senator ANDERSON. That is a fairly long swing.

Mr. DOMINY. That is correct.

Senator GOLDWATER. Mr. Dominy, do you have any opinion on the effect of runoff by forestry practices in the last 50 years? I know in our own watersheds of the Verde in the South, we have had sub-

stantially the same moisture. But because of the impaction of the forests caused by what you might call modern forestry procedures, the runoff has not been there. Senator Hayden has been able to get experiments performed on the shed.

I think the indications are that the runoff is there, but the forests won't let it get down. Is there any truth to that?

Mr. DOMINY. There are some evidences that with our increased concern with forest cover that we have held back more water than would have been true had we not been so solicitous of forest cover.

Now, to the extent that this is in a timber-tree area that produces valuable products, I think this is excellent. But to the extent that it is brush type, I think we ought to remove the brush and try to get grass cover which does permit runoff much sooner, more than with the brush type and with less erosion.

Many experiments have indicated this. The Salt River project has been very interested in doing some work on this thing.

Senator HAYDEN. If you remove all the chaparral, there will be no place for the deer to hide.

Senator ALLOTT. In order to be clear about this chart which you have introduced, do I understand that the gray shaded areas represent use of water above Lee Ferry?

Mr. DOMINY. Depletion above Lee Ferry, yes.

Senator ALLOTT. What do you mean by depletion?

Mr. DOMINY. Well, it is the actual depletion.

Senator ALLOTT. Well, it is a depletion. But it is also of beneficial use, is it not?

Mr. DOMINY. In most cases, yes.

Senator ALLOTT. As near as any irrigation is of beneficial use.

Mr. DOMINY. I would say that. I had reference to depletion for phreatophyte cover, and that sort of thing, as well.

Senator ALLOTT. This doesn't represent a long depletion for phreatophytes. It represents beneficial use also.

Mr. DOMINY. Yes; primarily beneficial use.

Senator MOSS. Further questions, Senator Kuchel?

Senator KUCHEL. Yes. What you are saying then, Commissioner, is that there is no way in which the Department of Interior can guarantee all existing water contracts in my State or in any State in the lower basin—cannot guarantee it.

Mr. DOMINY. Well, let me call upon my able assistant who has represented the Department for the past few weeks as chairman of the task force that devoted their energies directly to that question.

Mr. PALMER, how would you answer that question?

Mr. PALMER. Well, we cannot guarantee, because we do not control the authorization and legislative process. But we can assure you that a water supply is available within economic limits.

Now—

Senator KUCHEL. Just a moment now, Mr. Palmer. This is good. I think it is important.

Of course you do not control the legislative process. But what would you recommend that the legislative process do that might help? You say "Yes, we could guarantee existing uses."

Mr. PALMER. Well, this is what I was going to say. Chapter 6, page 9, of this Southwest report, seven sources of water are listed

where you can divert anywhere from 1.2 million to 2.4 million acre-feet of water southward within California, at prices that are in the ball park from the standpoint of economics.

Several years ago we ran a rather exhaustive study of water sources in the west coast area. In California—it depends on which figures you use, but it could be 20 million to 50 million acre-feet of water which runs relatively unused into the ocean that could be used southward by diversions, exchange—it could be moved on into the south-land.

If you carry this thing on north, this quantity adds up to between 200 million and 300 million acre-feet of water available between Golden Gate and Puget Sound.

I mention these figures solely to accent what the Commissioner just said.

What we need to do is apply our ingenuity and our genius and our energy to find a way of solving the problem, rather than bickering about how we share the shortage. This is why the assignment was given.

Senator KUCHEL. I think this is a great assignment. I have not studied this report. I just got it 2 days ago. But you are talking about answering my first question by a regionwide development, are you not?

Mr. PALMER. Yes, sir.

Senator KUCHEL. In which the Federal Government would participate along the lines that are outlined in Secretary Udall's report, in which he briefly discussed it with some of us here a couple of weeks ago.

Mr. PALMER. That is correct, sir.

Senator KUCHEL. And in the absence of any such basinwide development, then you could not give any assurance at all about your satisfying existing uses, could you?

Mr. PALMER. In the context of your original question, no.

Senator KUCHEL. What about another context?

Mr. PALMER. Well, if we had unlimited legislative support and unlimited appropriation support—

Senator KUCHEL. For what purpose?

Mr. PALMER. We can solve any problem of water in the Southwest.

Senator KUCHEL. Well, you could not create more water in the Colorado River Basin if we gave you all the money you wanted, could you?

Mr. PALMER. I am not even sure about that. Weather modification is a definite possibility. I think desalting is a definite possibility. It would add to getting more usable water in the Colorado. The one thing I do want to accent—I think making better use of the water that is there is a definite possibility. I think water is being wasted in California and in Arizona. And this has to stop.

This is the cheapest water you can get.

Senator KUCHEL. Am I correct in assuming that the advantage that you believe is present in your Pacific Southwest water plan is that it would help the people and the economy of Arizona, but it would also help the people and the economy of California, and it would not do damage to either—is that a fair statement of what you have in mind?

Mr. PALMER. This in essence is what we try to do in this report. But again, as the Commissioner has testified, it does include a central Arizona development.

Senator KUCHEL. Of course it does. Of course it does.

Now, let's take a look at the feasibility differences between this bill and what it envisions for the central Arizona project and the regionwide development which you have recommended in the Pacific Southwest water plan.

What bearing on the feasibility of the Arizona project standing alone is had by the recommendations in the Southwest plan that the revenues from Bridge Canyon be utilized for the economic feasibility or justification of the basin development? Does that make a difference with respect to the feasibility of the Arizona project?

Mr. PALMER. I do not think it does, if I follow your question correctly. The benefit-cost ratio is somewhat lower considering the entire basin plan as a plan than it is for the central Arizona project alone.

Senator KUCHEL. Your testimony will be that without utilizing the revenues from Bridge Canyon for the exclusive support of central Arizona, your testimony would still be that it would constitute a justifiable project with the payout in a 50-year period?

Mr. PALMER. Central Arizona would require financial assistance as contemplated in the bill now before the committee and as contemplated in the report, the Pacific Southwest report.

Senator KUCHEL. What I mean is the feasibility of the basin development depends on the use of the Bridge Canyon power revenues for the entire region, doesn't it?

Mr. PALMER. That is correct; yes, sir.

Senator KUCHEL. Whereas the power revenues of Bridge Canyon in this bill are sequestered entirely for the justification of central Arizona.

Mr. DOMINY. Well, let me put it this way, Senator. If the Congress were to authorize the central Arizona project now, exactly as this bill provides, just a straightforward single project, not tied to any other development, and earmarked Bridge Canyon revenues for pumping energy and for financial assistance—then let us assume that this is done in this session, for the sake of argument.

Senator KUCHEL. All right.

Mr. DOMINY. Let's assume that next January the State comments on the Pacific Southwest report are in, the Secretary bundles those up and recommends the Pacific Southwest proposal to Congress. Now he would modify it only to the extent that he would say, "I want to incorporate the existing authorized central Arizona project into this for financial purposes." Because it is still the same project, it still would need exactly the same pumping energy from Bridge Canyon or Marble Canyon as the case may be, if that were added, because of the basin plan approach. It would still need the same power revenue assistance to show the payout, if it is alone or if it is together with some basin projects. Really there is not any difference in this regard.

Senator KUCHEL. What you are doing, though, is presenting two separate problems to Congress—this one now before us, and then the basin development later.

It is conceivable Congress might pass this one, and then put the regional development down the drain. It seems to me we ought to be talking about the needs of the whole Pacific Southwest region.

I want to help the people of my neighboring State of Arizona. I don't want to stand here and try to prevent the people of Arizona from building an economy with sufficient water supplies for the future.

I simply say that the people of my State are apprehensive about hazards to the existing contracts and to the existing historic use of water. And to that extent, rather than sit here and discuss something that adds considerably to their concern, we ought to be talking about the entire regional development plan which your Department itself published 2 days ago. That's the point I make.

Senator Moss. Commissioner, if Congress authorized the central Arizona project this session, as we were saying, in an assumption, then—

Senator KUCHEL. I don't like to make that assumption.

Senator Moss. Well, for the sake of my question we will assume that. Then the Department, Bureau, could go ahead immediately, letting contracts and getting underway with this 7-year construction, 7- to 10-year construction cycle; whereas the basin plan might be 2 or 3 years in coming along. And then you would be ahead 2 or 3 years on building it. Is that right?

Mr. DOMINY. This is exactly why the people of Arizona have pressed for these hearings—because they know the critical nature of their problem. They know their project is already studied. It was studied in 1947. They know it has been brought up to date with money they helped to provide.

I am not in disagreement at all, Senator Kuchel, with what you have just said. I think the basin plan is the right plan ultimately.

On the other hand, as Commissioner of Reclamation I certainly cannot do anything but say that the central Arizona project is an integral part of it and ought to be built, and it is urgent. It ought to be built quickly.

Now, before I am interrupted let me point out that before the Colorado storage project was finally authorized, the Congress authorized two projects, one in Wyoming and one in Colorado, and the payout was predicated on the future possibility of the project.

Senator ANDERSON. Which were those?

Mr. DOMINY. The Eden project in Wyoming and the Paonia project in Colorado. They could not be justified as single-purpose projects without the aid of basin financing. So the Congress very wisely, recognizing that both were badly needed, desperately needed, to bail out the economy in those areas—areas admittedly not nearly as large as we are discussing here—said that in the case of the Eden project, they shall pay only up to their ability, and the balance would be returned from the basin account if and when it is authorized. A somewhat similar arrangement applied to the Paonia project.

Now, of course if the basin account had never been authorized, part of the project costs would have been nonreimbursable. The same language was used in the authorizing of the two projects.

So I submit that you could start the process of the basin plan right here by authorizing the first unit of it, if you so desire. That is entirely up to Congress.

Senator KUCHEL. But the fact of the matter is that the Secretary of Interior has officially, under the law, made a report not on central Arizona, but on the basin development. And he sent those reports in accordance with the law to the States involved—Arizona, New Mexico, Colorado, Nevada, California, Wyoming, and Utah. And he said: "I want you States to report within 90 days." But we are here today on a bill that your Department has not reported on. So rather than say consider this central Arizona project alone and then consider the Pacific Southwest water plan later we ought to wait for the latter proposal to come before us. That is the one on which progress has been made, that is the one on which your Department has the most up-to-date report endorsed by the Secretary, that is the one which the States are going to have to report back on in 90 days. Whereas, we do not know what the Department of the Interior will say about this project by itself. That is why I have objected to these hearings.

I won't belabor that. I just say that I think——

Senator GOLDWATER. Mr. Chairman, may I ask a question of Mr. Dominy?

Senator MOSS. Just let Senator Kuchel complete his.

Senator KUCHEL. Go ahead, Barry.

Mr. DOMINY. One moment, if you please. In connection with this discussion of the basin plan, I think there was a reference to 2 or 3 years—I want to make sure that the committee understands that the Secretary believes firmly, and I do not disagree with him at all, that the States cooperating, we would get the reports back in 90 days, that this proposal can be before Congress early next session, and with Congress moving on it, the project could get into construction very promptly.

Senator GOLDWATER. Isn't it true that before the basin plan can be brought to full completion, the Legislature of California will have to approve the diversion of waters totally within their own State?

Mr. DOMINY. Certainly there are some proposals in there to move additional water, and enlarge the aqueduct that the State is building.

Mr. PALMER. That is correct.

Senator GOLDWATER. It would require action of the State legislature.

Mr. PALMER. I do not know that it would require action by the State legislature beyond what they have already got in their California water plan.

Senator GOLDWATER. It would require some State action. The Federal Government could not move in and do it without the approval of either an agency or legislature.

Mr. PALMER. Well, the filing would have to be with the State to get the water, and that water would have to be approved—that application would have to be approved by State agencies.

Senator GOLDWATER. I would like to suggest in a very friendly way to my good friend from California if he really wants to help he can use his great influence in California in getting this approval accomplished quickly.

Senator KUCHEL. Barry, let me read you what the Secretary of the Interior has said in a letter to me on August 26.

DEAR SENATOR KUCHEL: I am pleased to enclose for your information a copy of my proposed report on the Pacific Southwest water plan. The report has been transmitted to the States of the Colorado River Basin for their views and recommendations pursuant to provisions of the Flood Control Act of 1944.

Following receipt of these views and recommendations, the report will be transmitted to the Congress for its consideration. I expect this to be accomplished early in 1964.

(Signed) STEWART UDALL.

Speaking for myself, I can say that in my judgment the water agencies of California and the State government of California will give earnest and speedy consideration to the report which the Secretary has sent to them. In 90 days the comments of the States involved will be available, and that report then will be transmitted to the Congress for action.

Meanwhile, the 90 days on a separate central Arizona project would not begin to run until the Department of Interior made its updated report. And it has not to date made that report. And I do not know when, or if, it will make such a separate report. But when it does, if it does, then 90 days will follow thereafter before the Congress would have a legal right to proceed with this particular bill.

I ask consent, incidentally, that the 1944 Flood Control Act sections on what I am talking about be put in the record at this point together with my comments thereon.

(The material referred to follows:)

**MATERIAL SUPPLIED BY U.S. SENATOR THOMAS H. KUCHEL IN
REGARD TO APPLICABLE PROCEDURES WHICH HAVE NOT BEEN
FOLLOWED IN REGARD TO S. 1658**

Senator KUCHEL. It is clear that the central Arizona project, which would be authorized by enactment of S. 1658, the bill upon which this subcommittee is holding hearings over my protest, is different in material respects from that described in the 1947 report of the Department of the Interior on the project. Indeed, the facts and figures available to this subcommittee are taken from a January 1962, report. This report has not been referred to or commented upon by the affected States and the other concerned Federal agencies. Moreover, it now comes to light that there is in existence a June 1963, report on the central Arizona project. Again, this report, evidently varying from what has heretofore been published in regard to this vast project, has not been referred to the affected States and other Federal agencies. In fact, it seems that it has not even been cleared by the Bureau of Reclamation, let alone approved by the Secretary of the Interior.

Also, not only have the pertinent reports on the central Arizona project been updated and revised, though not reviewed, but time and events have materially altered the situation since the affected States and other interested Federal agencies were last given an opportunity to review and comment on this project. In the 15 years since California commented on the 1947 report, California has experienced a staggering population growth, much of it in that area of my State which is primarily dependent upon the Colorado River for its water

supply. Ground water supplies have shrunk. The average runoff into the Colorado River itself has declined. An important lawsuit over the Colorado River waters in the lower basin has been waged, with present prospects of dire consequence for California in regard to her share of Colorado River water. Also, electric power market patterns have changed. Interest rates have changed. Recreation and fish and wildlife uses related to water projects have taken on a new significance and have altered accepted principles of project cost allocation.

All of these factors make it clear that it is foolish—as well as illegal, in my view—for this subcommittee to proceed with consideration of this bill in the absence of an up-to-date comprehensive report having been promulgated by the Secretary of the Interior and referred to the affected States and the interested Federal agencies exactly as Federal law intends and requires. Let me refer specifically to the applicable law on this subject.

I have already read into the record the letter to the chairman of the full Senate Interior Committee from the Executive Office of the President, Bureau of the Budget, dated August 21, 1963. That letter recommends that action on S. 1658 be deferred until a report is submitted to the Congress in accordance with established procedures.

Public Law 78-534, December 22, 1944, 58 Statutes at Large 887, popularly referred to as the Flood Control Act of 1944, states in its preamble that it is—

The policy of the Congress to recognize the interests and rights of the States in determining the development of the watersheds within their borders and likewise their interests and rights in water utilization and control * * * to preserve and protect to the fullest possible extent established and potential uses, for all purposes, of the waters of the Nation's rivers; [and] to facilitate the consideration of projects on a basis of comprehensive and coordinated development * * *.

That act goes on to spell out procedures by which this salutary policy shall be achieved. It states:

In conformity with this policy: (a) Plans, proposals, or reports * * * [of the Secretary of the Interior] for any works of improvement * * * shall be submitted to the Congress only upon compliance with the provisions of this paragraph (a) * * *. Such plans, proposals, or reports and related investigations shall be made to the end, among other things, of facilitating the coordination of plans for the construction and operation of the proposed works with other plans involving the waters which will be used or controlled by such proposed works * * * [The Secretary of the Interior] shall transmit a copy of his proposed report to each affected State and * * * [to the Corps of Engineers]. Within ninety days from the date of receipt of said proposed report, the written views of each affected State and [the Corps of Engineers] may be submitted to the [Secretary of the Interior]. The [Secretary of the Interior] shall transmit to the Congress, with such comments and recommendations as he deems appropriate, the proposed report together with the submitted views and recommendations of affected States and of the [Corps of Engineers]. The [Secretary of the Interior] may prepare and make said transmittal any time *following said ninety days period.* (Emphasis added.)

The Bureau of the Budget, in its letter of August 21 to Chairman Jackson, recommending no action on this bill at this time, specified that the Department of the Interior had not submitted a report to the Bureau of the Budget in accordance with the requirements of Executive Order No. 9384. I here quote the applicable provisions of that

Executive order, one which it is my understanding is complied with uniformly as to matters of this kind:

EXECUTIVE ORDER 9384

8 Fed. Reg. 13782

SUBMISSION OF REPORTS TO FACILITATE BUDGETING ACTIVITIES OF THE FEDERAL GOVERNMENT

By virtue of the authority vested in me as President of the United States, and particularly by the Budget and Accounting Act, 1921, as amended (Title 31, U.S. Code, Secs. 1-24), it is hereby ordered as follows * * *.

4. Before any department or establishment shall submit to the Congress, or to any committee or member thereof, a report relating to, or affecting in whole or in part, its advance programs, or the public works and improvement projects comprising such programs, or the results of any plan preparation for such programs or projects, such report shall be submitted to the Bureau [of the Budget] for advice as to its relationship to the program of the President. When such report is thereafter submitted to the Congress, or to any committee or member thereof, it shall include a statement of the advice received from the Bureau * * *.

6. The term "department and establishments" as used in this Executive Order shall be deemed to include any executive department, independent commission, board, bureau, office, agency, regulatory commission or board, Government-owned or controlled corporation, or other establishment of the Government and the municipal government of the District of Columbia, but shall not include the legislative or judicial branches of the Government * * *.

FRANKLIN D. ROOSEVELT.

THE WHITE HOUSE,
"October 4, 1943"

So, Mr. Chairman, I disagree with my friends, Senators Hayden and Goldwater, when they contend that the 1948 review and comments of the affected States concerning the 1947 report will suffice now for consideration of S. 1658, some 15 years later. I do not think that any previous successive consideration of the project by the Congress without recirculation of the 1947 report, many, many years ago, is any precedent at all for this committee now to proceed before a 90-day referral of the up-to-date report, if and when cleared by the Secretary. Senator Hayden himself acknowledges that the economic and engineering features of the project have been revised and completely updated.

It seems clear that the Bureau of the Budget agrees with me for it states in its letter of August 21 to Chairman Jackson that it "has no basis for appraising the merits of the proposed development."

Mr. Chairman, all I ask is compliance with the law in fairness to all interested parties. That is not too much to ask.

Moreover, at the very time this subcommittee commenced to take up S. 1658, the States of the Colorado River Basin had just been presented with a new proposal by the Secretary of the Interior who himself now calls not for a separate central Arizona project but for a comprehensive Pacific Southwest water plan to meet the needs of the entire region, including that which would be served by the central Arizona project alone. Therefore, by proceeding to take up S. 1658, embracing, as it does, differences in concept and financing from the Pacific Southwest water plan, we set upon a course at collision with what the Secretary of the Interior is now proposing. Consequently,

it is obvious that good practice as well as the law indicates the inappropriateness of these hearings.

Senator GOLDWATER. I disagree with your contention that we do not have the power to do anything we want to.

Senator KUCHEL. Well, I am not going to—

Senator GOLDWATER. As a Congress.

Senator KUCHEL. No, I will not quibble. I think that if the Congress of the United States wishes to tear up the statute that it adopted in 1944 for orderly procedure, it can do so. The fact of the matter is it has not done so while I have been on this committee. If I ask this committee to hear the Auburn Dam bill before the Secretary of Interior and the affected States commented and a report on the bill was submitted, they would laugh me out of this committee.

Commissioner, on page 27 you say that the construction and operation of the central Arizona project would have no adverse effect on existing or proposed development in the Upper Colorado River Basin.

Would you explain that? Is it your statement that it would never have any adverse effect on proposed developments in the upper basin?

Mr. DOMINY. Water supply for the project, diverted from the Colorado River, if this central Arizona project were to be authorized will be obtained from Arizona's share of the lower basin water required to be released by the upper basin under the existing Colorado River compact and other agreements.

The power developments of the proposed project can be utilized fully within the lower basin and would not interfere with any Colorado River storage project power that would be delivered into the area. And as I said a while ago, this is no problem in any event, because we already are oversubscribed, and there is every indication that the upper basin power load will absorb all the power that we can give it from the Colorado storage project.

So it is my judgment that construction and operation of the central Arizona project will have no adverse effect on existing or proposed development in the upper basin.

Senator KUCHEL. In that connection—in the third paragraph on that page of your statement you say:

Completion of the central Arizona project would affect the water uses in California because California has for many years been diverting Colorado River water in excess of 4.4 million acre-feet per year.

Now, under certain conditions which you outlined yesterday, you could not guarantee that the central Arizona project would not affect water users in California by reducing their share of Colorado River water below 4.4 million acre-feet, could you?

Mr. DOMINY. That is correct. It is not a positive guarantee. I can give a guarantee as the Commissioner of Reclamation that I think it can be avoided by prudent and proper action that can and will be taken.

Senator KUCHEL. Would you suggest any action by the Congress to write into a statute provision of law so that such potential difficulties for California could be avoided?

Mr. DOMINY. Well, I am quite certain that the Congress would be unlikely—it would be unlikely that the Congress would give a blank check authority. Under the 1939 Reclamation Project Act the Secretary of Interior does have very broad authority to find projects feasible and proceed without specific congressional authorization procedures. This has not been followed in recent years, although many projects of considerable magnitude did get started under that authority.

Senator KUCHEL. In periods of scarcity, would you urge Congress to continue to do nothing and to leave the Secretary of Interior with that terrible responsibility of determining what he would do?

Mr. DOMINY. Well, Congress sees fit to place tremendous responsibility on others, various commissions that you have created, various Cabinet-level positions. You frequently do create heavy loads for decision at Cabinet level.

Senator KUCHEL. You would not recommend any legislation.

Mr. DOMINY. I have no definite proposed legislation. I still say that the best way to share a shortage is to plan ahead and avoid it. And I still think this is practically possible.

Senator KUCHEL. Mr. Chairman, I ask consent that I may be permitted to file an additional statement of mine as part of this record.

Senator MOSS. That may be done. The record will be held open in any event, because there will be hearings at a later date.

Senator KUCHEL. When will those hearings be, can you tell us, Mr. Chairman?

Senator MOSS. I would suggest that it be filed within 10 days so that we can have this first part printed and available for the committee.

(The supplemental statement referred to was submitted at the hearing on October 1, 1963, and appears at that point in the record.)

Senator HAYDEN. I will be very frank with you, Senator. All I had in mind was—we have what is called the Central Arizona Project Association which has been promoting the project, trying to get water into Arizona. I would like to have them, representatives of that organization, here to state the actual conditions that are in existence in Arizona at this time—in other words, to fortify what the Secretary of Interior has said.

Senator KUCHEL. When would you want those, Senator?

Senator HAYDEN. I would like to see them some time about the next 3 or 4 weeks—no particular hurry. But that is a matter of record that will be made some time—I would like it to be made now. I spoke to the chairman yesterday of the full committee and told him I thought we ought to be able to agree on a date that we can do that.

My people would like to have a little time, of course, to prepare for it. They could not come in tomorrow.

Senator MOSS. I, of course, consult with the chairman of the full committee before any hearing date is set. At the present time there is no date that we talked about. But if you would like to put a statement in this record, Senator Kuchel, within the next 10 days it will be open for that purpose. I am sure that will be well in advance of any further meetings that we would have on this.

Senator KUCHEL. Well, I am not reputed to be an obstructionist. But I say most respectfully to my senior colleague from Arizona that this is a very bad precedent. I have people in my State who have a moral and legal duty to come forward and to give their views. But they should not do that until after the Department of the Interior and the State governments have commented on an updated basis. I simply would urge my able colleague from Arizona not to have any additional hearings in advance of what the law has set down as a prerequisite for this particular bill, S. 1658, and while progress is being made in reviewing the Pacific Southwest water plan.

Senator HAYDEN. I am simply talking about implementing what has been put forth here today. I would like to have it emphasized by people who live right there and know. What harm can that do to anybody in California?

Senator KUCHEL. Well, Senator, there are some——

Senator HAYDEN. We can do it in a day.

Senator KUCHEL. It is an unusual procedure. We have never——

Senator HAYDEN. It may be unusual. But that's the only way I can do it.

Senator Moss. It is unusual. But of course the circumstances here dictate a great deal of that. The testimony has been that this project was reported first in 1949. We have been through this again and again. It is not as though it were a brandnew thing. We are simply now considering the updated central Arizona project. There are some unusual features to it. But I think the testimony is very clear about the condition that is rapidly coming on the Phoenix and Tucson area, with the water table diminishing and the point of crisis arriving. So that dictates some element of speed in moving on.

Senator HAYDEN. I would like to emphasize that.

Senator Moss. Well, yes. I think it is clear that something must be done fairly soon or you are going to have a crisis there, water crisis that will be very severe on the residents of Arizona. And the other thing that has dictated moving now is that the Supreme Court finally ruled on a division of the waters of the Colorado.

Senator KUCHEL. No, sir, that is not correct, Mr. Chairman, the June 3 opinion is being protested through appropriate procedures and no decree will be entered for some time, in any event.

Senator Moss. Well, the decree has not been entered, but the decision has been announced. And this would indicate that Congress probably should bestir itself and begin to move.

Senator KUCHEL. But does not my chairman recognize that there is a water crisis in my State as well?

Senator Moss. Yes, I think in all of the Southwest.

Senator KUCHEL. I do not want the chairman of this subcommittee or the members of this subcommittee simply to write off the crisis that exists in one State of 17 million people. I think the honest and honorable thing to do is consider them both together.

Senator Moss. Well, I would agree that certainly the citizens of California are deserving of every attention that we can give to their water problem, too.

Senator KUCHEL. We are not second-class citizens.

Senator Moss. And I would hope that we would not drag our feet a minute in considering water projects for California.

Senator KUCHEL. Mr. Chairman, I will never come before you and ask you to hold hearings on any reclamation projects I have got until the law has been complied with. But you have gone ahead and held these hearings. And I have objected. My objections are overruled. I face that fact. But I just hope that we do not have any more hearings until after the Department has made its report and the States have made their comments.

Senator GOLDWATER. The States do not have to make their comments on the central Arizona project. They did in 1947, 1948, 1949.

Senator KUCHEL. Senator, we had a U.S. Supreme Court decision since that time.

Senator GOLDWATER. That you said you would abide by.

Senator KUCHEL. Well, we have got to abide by it.

Senator GOLDWATER. That's what I say.

Senator KUCHEL. And part of abiding by it is to recognize that the Secretary of Interior today, in a time of scarcity, has got an awesome responsibility permitting him the power to cut off existing uses and authorize waters of the Colorado River to be used for new purposes. That is a terrible responsibility. He has never had anything like that before. And all I say is that he ought to—you know what we ought to do? We ought to get together. We ought to try in good comradeship to try to have this Congress assist the people in the entire Southwest, in your State, my State and the other States involved—rather than sit here and try to jam down our throats a bill that would help Arizona and raise some hazards for California at the same time. But if we got together, we could help both.

Senator Moss. Well, I think hopefully we will. I think we will help both.

Senator ANDERSON. Can I ask one more question?

Senator Moss. Yes, certainly.

Senator ANDERSON. How far is this dam from Hoover Dam? Bridge Canyon.

Mr. DOMINY. The lake behind Hoover Dam is approximately 118 miles long. The Bridge Canyon Dam site is immediately upstream from the slackwater of Lake Mead.

Senator ANDERSON. I have many times gotten on this 6 mill question. I want to get on it one more time.

What is the average rate of return on electricity sold at Hoover Dam?

Mr. PALMER. About two and a half mills.

Senator ANDERSON. 2.4, is it not?

Senator BIBLE. 2.5 he said.

Senator ANDERSON. Well, I won't argue with you about one-tenth.

Mr. DOMINY. About two and a half mills.

Senator ANDERSON. If that is the going rate at Hoover Dam, why do you think 118 miles upstream you will get six mills?

Mr. DOMINY. But let me point out that rate is at the dam. Now, these other rates we are discussing—

Senator ANDERSON. Feasibility depends upon sale at the dam, not anything else. You are talking about getting 6 mills for this.

Mr. DOMINY. We are talking about 6 mills at load centers.

Senator ANDERSON. What are you going to get at the dam?

Mr. DOMINY. Well, minus your transmission cost it would be somewhat less. But Hoover Dam power is not being sold at load centers at two and a half mills. Parker Dam is 5.4 at the load centers. There has to be the transmission costs, the losses and everything else added on to the 2.5-mill Hoover rate. So it is not quite as extreme a difference as $2\frac{1}{2}$ is to 6. But it is something like the difference between 4 or $4\frac{1}{2}$ is to 6.

Senator ANDERSON. What about Marble Canyon?

Mr. DOMINY. Marble Canyon is also computed at 6 mills.

Senator ANDERSON. Now, you said you had all the Glen Canyon power committed.

Mr. DOMINY. Yes, sir.

Senator ANDERSON. Have you got it sold?

Mr. DOMINY. Yes. The contracts are being drafted now. But—

Senator ANDERSON. Who is going to buy it?

Mr. DOMINY. The preference customers of the basin States.

Senator ANDERSON. At 6 mills?

Mr. DOMINY. Yes, indeed, 6 mills delivered to load centers. They are very pleased to get it.

Senator GOLDWATER. Idaho Power and Arizona Public Service are buying it, too.

Mr. DOMINY. There is none going to nonpreference users, because the preference customers will take all of it from the very start. We had originally thought, Senator, in the buildup period we would have power to sell to nonpreference customers, and that Arizona Public Service and Utah Power & Light would take some. But the powerload buildup has been much more rapid than we had anticipated in projection of the plan.

Senator ANDERSON. On August 14 the Federal Power Commission released a National Power Survey Advisory Committee report forecasting a major roll for nuclear powerplants meeting electric energy needs of California beginning in the 1970's. You cannot get this dam finished until 10 years. So that runs to the 1970's.

Mr. DOMINY. That is fine. I do not care whether we have thermal power by atomic energy, by coal, by whatever heat source that uses up energy in creating the steam—hydropower will still fit into it masterfully as peaking power.

Now, this is the role of hydro as our power needs unfold. And it will still have that role, it will still have an economic role in the power picture—even if we do develop thermal energy cheaper than we now do by fossil fuel.

Mr. PALMER. This is particularly true in the case of thermal power because of the great difficulty of shutting it off and turning it on. You have got to have that at a very high load factor, and it has to be balanced out by hydro. You cannot afford to install enough capacity, thermally, to pull your entire power peak throughout the day or throughout the year.

Mr. DOMINY. How dramatic this is was driven home to me not long ago when I was at a powerplant when the noon hour was reached. The operator just pulled the switch and cut the generating units off for an hour to save water—because the factory shut down, and the peak use was closed out for 1 hour. And to save an hour's water, they cut the two generators and turbines off, and then an hour later threw the switch back on.

You cannot do that with steam.

Senator ANDERSON. I am just hopeful when we start talking about building the Marble Canyon Dam which would cost——

Mr. DOMINY. \$230 million.

Senator ANDERSON (continuing). That we are sure what the market is going to be. I would hate to see the Glen Canyon power go to waste.

Mr. DOMINY. I am confident that we can give you this assurance in more than words, but in actual evidence of marketing demand.

Senator ANDERSON. Frankly, when you see the dams that are now being built—the plant now being built in northwestern New Mexico, and the plants that are being proposed in Colorado and some that are being discussed in Arizona along with all this—you wonder where the load is going to come from.

Can I just put into the record this release of the Federal Power Commission?

Senator Moss. Certainly, that may go into the record at this point. (The material referred to follows:)

FPC NATIONAL POWER SURVEY ADVISORY GROUP EXPECTS NUCLEAR POWER TO BE MAIN SOURCE OF NEW ELECTRIC ENERGY IN CALIFORNIA BEGINNING IN 1970'S; COAL GENERATION SEEN OVERTAKING HYDROPOWER IN OTHER WESTERN REGIONS IN 1970'S AND 1980'S

WASHINGTON, D.C., August 14, 1963.—The Federal Power Commission today released a National Power Survey Advisory Committee report forecasting a major role for nuclear powerplants in meeting the electric energy needs of California beginning in the 1970's.

The report (No. 18) is entitled "Fuels for Electric Generation in Western United States." It was prepared by the West Coast Subcommittee of the Fuels Special Technical Committee. Chairman of the subcommittee is James S. Moulton of Pacific Gas & Electric Co. The report represents the views of the Advisory Committee and has not been approved by the FPC.

For the purposes of its study, the group divided the western United States into three regions: California; Pacific Northwest (Oregon, Washington, Idaho, and the western parts of Montana and Wyoming); and intermountain, (Arizona, Nevada, Utah, and western New Mexico).

In California, the subcommittee reported, increasing electric requirements are expected to be met mainly by plants burning natural gas until the early 1970's. After this, it predicted, nuclear generation will account for most of the increase in this high fuel cost area. Coal may be tried in the State for electric generation, perhaps in the early 1970's, the subcommittee said, but transportation costs, smog control, and declining nuclear generation costs are likely to prevent it from becoming important. Oil will continue in use in California, it said, with air pollution control tending to limit any growth.

In the Pacific Northwest, the report indicates that hydroelectric generation will predominate until past 1980 when coal generation will gradually catch up with and eventually surpass it. In the intermountain region, the subcommittee predicted that coal will be the largest single source of electric power by about 1975, replacing hydro. Gas use, it said, will continue to rise, but coal use will increase faster.

The subcommittee said its projections of natural gas requirements and reserves indicate that there will be adequate supplies of gas for electric generating plants built by the mid-1970's but that thereafter additional plants dependent upon natural gas as a fuel should not be contemplated. Oil reserves in the area are limited, it said, but for the next several decades imports, shale oil, and oil from tar sands in western Canada assure sufficient oil to meet total requirements at a moderate increase in price.

Coal reserves are ample for those regions close enough to the coal to pay for transporting it, the subcommittee continued. Nuclear fuel, it said, has an extremely low transportation cost per kilowatt-hour generated and so can be imported from any part of the world as well as from the western United States.

Despite large conventional fuel sources; the subcommittee said, nuclear generation will be necessary in California and other places located so far from coal or shale oil deposits that transportation costs for these fuels will price them out of the market. Petroleum and gas supplies alone cannot solve the future energy problem in such areas, it concluded.

The report includes 54 tables, charts, and maps, and an extensive bibliography.

The FPC instituted the national power survey last year to carry out its responsibilities under the Federal Power Act to encourage the Nation's electric systems to plan to meet growing power needs at a minimum cost through a fully interconnected and coordinated power supply system. The Commission expects to complete its survey report early in 1964.

The special advisory committees were formed by the FPC to assist it on technical matters in the survey. The groups, comprised of experts from all segments of the electric power industry, report on specific questions presented to them by the Commission. Reports of general interest are being released to the public as they are completed.

Copies of the reports may be obtained from the Office of Public Information, Federal Power Commission, Washington, D.C. 20426, without charge. A mailing list for copies of all technical advisory reports is maintained by the Office of Public Information.

Senator MOSS. Senator Allott, do you have a question?

Senator ALLOTT. I have several questions.

Senator MOSS. All right, sir, let's have them.

Senator ALLOTT. I would like to go back to one thing. I have always been informed by engineers, Mr. Dominy, that it is not possible to cut even hydrogenerators in and out so fast at will. I would just like to get this point straightened out in my mind.

It is my understanding that you have to get those up to a certain heat before you can put them on the line. Is this so or not?

Mr. DOMINY. Well, you have got to have them spinning, that is true. In other words, you put the water in and get the turbine spinning before you actually put the power on the line. It is only a matter of a few moments, however.

Senator ALLOTT. It does not require a warmup period of 10, 15, 20 minutes, a half hour?

Mr. DOMINY. No. Certainly they were not doing so at this plant that I observed. They started the water in, and as soon as the turbine was rolling they threw the switch and power from the generator was back on the line.

Senator ALLOTT. Well, that is a minor point I just wanted to clear up.

Now, turning to page 27 of your statement you say—

The construction and operation of the central Arizona project will have no adverse effect on existing or proposed development in the Upper Colorado River Basin.

If you remove the word "adverse" is it going to have any effect upon the operation of the Upper Colorado River Basin?

Mr. DOMINY. Well, of course, I do not see how it has any effect, because you have commitments on the river to make certain deliveries. That is why Glen Canyon Dam is built, so the upper basin plan can unfold and still be able to meet the commitments of delivery to the lower basin.

Senator ALLOTT. And it is not contemplated that anything that is proposed, either under this central Arizona project or the Southwest-Pacific Southwest water plan, would impose any burden on the upper river beyond that of delivery at Lee Ferry as provided by the Colorado River compact?

Mr. DOMINY. The answer is definitely none whatever.

Mr. PALMER. It might in fact have a beneficial effect by the integration of the two power systems.

Senator ALLOTT. But there would be no water flow up the river.

Mr. PALMER. No, sir.

Mr. DOMINY. Conceivably as the Pacific Southwest basin plan unfolds, by exchange you certainly might agree to modify and hold additional water in the upper basin if you had abundant supplies provided through the plan in the lower basin. This is not impossible. You could make it flow upstream in that way.

Senator ALLOTT. Now, may I get the point clear as to whether or not the feasibility provisions of this central Arizona depend upon the tapping with any funds such as we have done—was proposed for the Dixie project in Utah, the Baker project in Oregon and others.

Mr. DOMINY. Well, here is embodied the principle that Congress laid down quite early in the 1939 act, that the water user, the irrigator, shall pay up to his ability to pay and—

Senator ALLOTT. I am afraid I did not make my question clear.

Mr. DOMINY. I am coming to it, sir. And beyond that, if power revenues are available they may be applied. In this case the availability of power revenues would be from one of the project features itself, the Bridge Canyon. In the case of the Baker project the availability of power revenue was not in the project itself but it was from power dams in the area of the Columbia River.

So the Congress earmarked some surplus revenues from an already existing structure to assist the Baker project.

Senator ALLOTT. All right. Let me ask the question another way.

The feasibility of the payout of this particular project, then, is not dependent upon the existence of the tapping—upon the tapping of any existing funds.

Mr. DOMINY. No, sir. This is right on the feature of the project itself.

Senator ALLOTT. On page 33 I notice that the nonreimbursable features constitute 5.2 percent of the project. At least they do if my division is correct.

Mr. DOMINY. That is very close, sir.

Senator ALLOTT. Well, it is almost a billion dollars, and you can just put a decimal point right at the first and you get these. I divided one out.

Now, I would like to ask about the area redevelopment nonreimbursable feature. From what is the authority secured that you can put area redevelopment as a nonreimbursable feature in a reclamation project?

It is a very small item, relatively. But it could be a significant one later.

Mr. DOMINY. Mr. Palmer.

Mr. PALMER. In the President's proposals of economic criteria printed by Senate Documents 97 and 197 of the last Congress, the use of area development in project justification was permitted.

This was a device used in area redevelopment programs—to the extent you have a stagnated economy and you are using an idle labor force, that idle labor force can be put to work on the development program and benefits equal to the value of that labor are used to determine a nonreimbursable allocation.

Now, it has been applied here to a very minor degree. And we believe that when the project is operated this would be covered by specific authorization.

Senator ALLOTT. Well, I hope to see the day when it would not in any way, even a very small way, affect the feasibility of this project. But even if it were, I would have to certainly have a lot of information which is not available to me before I would consider that area redevelopment is a proper element of nonreimbursable projects, even though it be signed by the President, by his fiat, that this can be considered.

Mr. PALMER. I would think, Senator Allott, that Senator Hayden would be very glad to give up that item.

Senator ALLOTT. Well, I do think it is a basic change in our concept of these matters, that although very small I think should be considered by the committee.

Mr. DOMINY. Well, before the committee reaches a conclusion on this, I just want to point out—

Senator ALLOTT. I think we are years away from this.

Mr. DOMINY. I don't like Reclamation to always be the last to be permitted to use a tool that others are using.

Now, if area redevelopment is a nonreimbursable function in Iowa and Ohio and Illinois, and they are getting funds under this very principle, nonreimbursable, the Corps of Engineers does it, then I say let's treat all project proposals on an equal footing.

If the Congress permits it in one area, then let's permit it under exactly similar circumstances in the West.

Now, this particular one is primarily a redevelopment problem within otherwise an economically sound area—primarily Indians that would be involved.

And we applied what we thought was existing regulations that are being used in the area redevelopment plan.

Senator ANDERSON. Will the Senator from Colorado yield?

That is exactly what happened on fish and wildlife and all the rest of these things. They started out very minor. Then when they got down to the project, they said it is so many millions short, you cannot justify it. Charge it to Reclamation—Reclamation, Fish and Wildlife—and build up \$12 million or \$10 million in each one. And the project is all right. And that is what happened.

The next thing you know we will get a project that is no good and somebody will say, "area redevelopment," and then it will go for 30 percent of the total cost of the project.

Mr. DOMINY. Senator, I am disappointed that a former chairman of this committee would say on the record that you think projects are formulated in that fashion. They are not formulated in that fashion.

Senator ANDERSON. We had some testimony that indicated that the Norman project had a very substantial increase—when it was found it was not feasible they resurveyed the fish and wildlife resources.

Mr. DOMINY. And the material was presented to Congress, and the manner in which it was appraised and evaluated was presented to Congress.

Senator ANDERSON. Well, this is an old story. You may remember the former chairman of the committee got a little exercised on the way it was handled on the floor, commitments were made that were not kept and so forth.

But it is all right.

Senator ALLOTT. You have emphasized in your statement the depletion of the ground reserve, and Senator Hayden has indicated he wanted to offer testimony as to the actual situation in the various areas.

Are there any specific provisions or concepts in this project for the restoration of that ground water, other than what would accrue from municipal or irrigation use?

Mr. DOMINY. Well, actually there is nothing here to restore the ground water. As a matter of fact, this project, 1.2 million acre-feet diversion, will not even balance the present mining of the aquifer. There should be, and I hope ultimately will be, in the Pacific Southwest basin proposal additional water from some source—desalinization, or whatever may develop as the most economic, so that we can bring water into central Arizona area over and above what would be available under this proposal.

Senator ALLOTT. You do not think, then, that the restoration of the ground water level will be in any way raised by the bringing of all of this water into the central Arizona area?

Mr. DOMINY. No, sir. It is actually only a diminution of the mining process, which prolongs the life of the aquifer by relieving it.

Senator ALLOTT. From what you said, these figures you quote, they are already at the losing end of this matter, and it cannot be done very much longer.

Mr. DOMINY. This is true.

This is why this is extremely important.

Senator ALLOTT. In your studies, have you been provided any tables or any figures which would give us an idea, if this project were completed within a period of 10 years, what the shortage would still be in order to start the replenishment of the underground reserve?

Mr. DOMINY. The overdraft is running currently around 2.2 million acre-feet annually. And this project would put into the area 1.2 million—which would leave, if all of the present uses continue, about a million acre-feet of continued overdraft.

Now, as the metropolitan area expands, Senator, they retire irrigated lands. And an acre of irrigated land, in its water requirements, offsets an acre of industrial and housing. So, to that extent, as the population gains, it gains on irrigated land. I think over the long pull this is unfortunate, because I can see the day when we wish we had kept our good valley lands from being covered up with cities and towns and airports.

I wish we could zone and push those developments out into the class 6 land rather than on the good class 1 irrigated land, particularly in the Southwest, where you have a year-round growing season. These are the kinds of land that no nation can afford to give up over the long pull.

Nevertheless, we are doing it. And to the extent that it is done, this does provide for an industrial and municipal water need. But even with this project in being, I foresee that some of the agricultural enterprises of Arizona would gradually dry up, by reason of too costly pumping as they continue to mine the underground aquifer. It will be prolonged when this project is built.

Senator HAYDEN. Not only would that happen in the future. That has happened already.

Mr. DOMINY. Oh, yes; we have already had some of it occurring.

Senator ALLOTT. Now, I would like to ask you just one further question.

What are the longrun potentials right now for the use of, say, saline plants in the Lower Colorado Basin for the relief of this situation?

Mr. DOMINY. I will ask Mr. Palmer to comment on it.

We have looked into it, and there is a proposal for one plant in the plan already out for review.

Mr. PALMER. In this Southwest water plan we have proposed a 50 million gallons per day plant, which would cost about \$37 million. This would be proposed primarily as a pilot plant, to more fully probe this great potential.

We think it is an area of tremendous potential for demineralization.

Also, we point in this same report to the need for sharpening up research in demineralization—taking advantage of modern techniques, alternate fuels, and all of the other avenues that must be explored in meeting this water crisis.

Senator ALLOTT. Of course, does the answer to this question really lie in a breakthrough in methodology of demineralization?

Mr. DOMINY. I think perhaps there may be additional breakthroughs in methodology. I think, however, at the moment it is the fuel cost that is the critical factor. I don't know whether we will gain much greater knowledge in methods that won't require heating and energy in the process. So it is actually the energy process that is the economic burden to overcome.

I mentioned yesterday, in the colloquy with Senator Anderson that there are those who feel definitely that if a plant of proper size were built, with atomic energy as the source of heat, that a substantial reduction, even using present methodology of the desalinization process—a substantial reduction could be made, particularly if it were combined with a thermal powerplant, and using desalinization as a byproduct in the cooling process. And I think this offers real opportunity. And we are going to be exploring it very carefully.

May I go off the record just a minute?

Senator MOSS. All right.

(Discussion off the record.)

Senator ALLOTT. Mr. Chairman, those are all the questions I have.

Senator MOSS. Thank you.

Senator BIBLE?

Senator BIBLE. Mr. Chairman, I think these sessions have been very helpful. I think they have pointed up a great sense of urgency. As I was seated here and reflecting, I recall that 25 years ago I first started out working on the problems involving Arizona, California, and Nevada in the lower basin. And this is 25 years later.

And I hope we are getting very close to where we are going to score a breakthrough. And I feel hopeful. I think the sessions have been very informative, and very helpful in that direction.

I have two questions.

No. 1, for the record—and I want to be cleared up on this, you were talking yesterday about evaporation suppressants.

Now, as I understand it, the loss from evaporation in Lake Mead is something in the neighborhood of 800,000 or 900,000 acre-feet a year. Is that substantially correct?

Mr. DOMINY. I think it would be. The estimate at Lake Powell which is in more of a canyon is roughly 600,000 acre-feet.

Senator BIBLE. Are there any breakthroughs in cutting down this evaporation, because once this is lost, does it ever come back in the form of snow or rain, back into the Colorado, or is this gone from the system?

Mr. DOMINY. We think this is gone. It goes into pretty dry atmosphere, and pretty dry country. We think it transpires on up rather than down again.

Senator BIBLE. What would be the total losses along the Colorado River in the lower basin?

Mr. DOMINY. We could salvage in all the reservoirs of this Colorado River system, when we are through—if we had only 10 percent effective control of evaporation, we would probably salvage several hundred thousand acre-feet a year.

Senator BIBLE. So that is a loss of something like 3 million, then?

Mr. DOMINY. I would guess pretty close to that—with all the reservoirs on the Colorado River drainage.

I suspect in the channel itself—of course I don't see how we could get suppressant on the channel itself because of the moving water.

But we know from laboratory experience we can be as much as 40 percent effective, if we can just keep the seal there.

But, unfortunately, we are windy people out West.

Senator BIBLE. I am told you cannot keep it on Lake Mead.

Mr. DOMINY. The wind piles it up on one shore, and we have not found a way to keep it in place, except at a cost that would be prohibitive. This is our problem.

There is another use of evaporating suppressant that offers even greater potential, as I see it, and this is applying it to the land, so that you don't need as much irrigation water. We are learning that hexadecanol suppressant applied to the land is absorbed by the plant, goes up into the tissues in the chlorophyll process, and the plant doesn't require near as much moisture.

Maybe we can save water by supplying the suppressant to the land rather than to the reservoir.

Senator BIBLE. Thank you very much.

Mr. Chairman, I want to underscore what Mr. Palmer said about the potential value of the weather modification. I am delighted he mentioned that. I think this offers great opportunities in this Pacific Southwest problem, as well as the desalinization projects.

Now, I am very, very vitally interested, as you know, Mr. Commissioner, in the southern Nevada water project. And this, I think, has as high a priority as any project anywhere on the system.

If I am correctly advised, this is one project in which our neighbors apparently gave no objection. We were in a rather unusual position. And though the pleadings may have changed over the course of the Supreme Court decision—where Arizona freely admitted in its complaint that we were entitled to 300,000 acre-feet, where California in its first answer at least admitted we were entitled to 300,000 acre-feet, the referee said we were entitled to 300,000 acre-feet, the Supreme Court said we were entitled to 300,000 acre-feet.

And all we are trying to do is get a little water into an area that is in great, great water shortage.

I hope that this project can move along without any undue delay. We are moving just as quickly as we can.

I understand the report is in from the region, and it is ready to go. And I hope we can move this along with the same sense of urgency as I can feel in these other projects.

As I understand it, this project is 100 percent repayable. There are no nonreimbursables in it, with the exception of a very, very small amount for recreation. I think it is a matter of just a few thousand dollars.

As I would view it, this project can stand as an absolutely independent project. Why is this interrelated to the complete Pacific Southwest projects? And I think there is considerable merit in the Secretary's suggestions.

Mr. DOMINY. Well, just like central Arizona—it can stand on its own feet. But it can also fit into a regional proposal.

Senator BIBLE. Does it contribute anything back into the overall plan?

It is not going to produce any revenues, other than pay itself out—isn't this true?

Mr. PALMER. The initial phase of southern Nevada is an excellent project, standing in and of itself.

But if you think ahead to the ultimate size of this project, where you use your full entitlement it may have a revenue requirement to meet the 50-year concurrent payout criteria established by Congress, and it might also have a potential source of future revenue into the basin account. So it has to be measured not only in terms of the initial phase, but in terms of the ultimate project.

Senator BIBLE. But the initial phase is the one in critical need at the present time, as both you men recognize.

They are cutting off water right now. The underground water supply is gone. They are monitoring water at the present time in Las Vegas and Henderson and north Las Vegas, and Boulder City. And this is for domestic water use.

This is of top priority, I think, and recognized by everybody.

So I would hope we could move along with that project without delay.

Mr. DOMINY. I share your hope.

Senator BIBLE. Thank you, Mr. Chairman.

Senator Moss. Thank you, Senator Bible.

Thank you, Commissioner, Mr. Palmer, Mr. Pugh, and all who have been here.

I think we have started to build a record.

This part of the hearing will now be in recess. Sometime later, we will have further hearings. But this is to get this much of the record put together.

The hearing is in recess.

(Whereupon, at 12:25 p.m., the subcommittee recessed, subject to the call of the Chair.)

CENTRAL ARIZONA PROJECT

TUESDAY, OCTOBER 1, 1963

U.S. SENATE,
SUBCOMMITTEE ON IRRIGATION AND RECLAMATION
OF THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C.

The subcommittee met, pursuant to recess, at 10:10 a.m., in room 3110, New Senate Office Building, Senator Frank E. Moss presiding.

Present: Senators Moss, Hayden, Burdick, Kuchel, and Jordan.

Also present: Senator Mechem, and Senator Goldwater.

Jerry Verkler, staff director; Roy M. Whitacre, professional staff member; and Stewart French, chief counsel.

Senator Moss. The subcommittee will come to order.

This is a further hearing on S. 1658.

On August 27 and 28, the subcommittee heard testimony from the Department of the Interior witnesses on the central Arizona project, the subject of this bill.

The hearings today and tomorrow were scheduled at the request of the distinguished dean of the Senate and member of this committee, Senator Carl Hayden, for the purpose of receiving testimony on the proposal from Arizona citizens and officials.

The witness list indicates that 24 persons are to be heard. I trust that we will be able to finish the testimony of the group in the 2 days set aside for this purpose. I would suggest that where feasible, statements be submitted for the record and the witness highlight the salient points of his testimony.

I do, however, want to assure you people who have traveled so far to take part in these proceedings that no one will be cut short and you will have ample time to present your case.

We are pleased to have sitting with the subcommittee this morning Senator Goldwater from Arizona, who is a cosponsor of the bill and Senator Mechem from New Mexico, who has a great interest in this subject since his State is directly involved also in the proposal that is before us.

I am going to at this time ask Senator Carl Hayden, who made the request for the hearing and who invited so many of you Arizona citizens to come here, to introduce the witnesses and call them in order.

I am happy to see that all of the Arizona Congressmen are here.

The Governor of the State of Arizona is here and many officials from that great State. So, Senator Hayden, will you introduce the first witness?

Senator HAYDEN. Mr. Chairman.

On August 27 last at the opening of the first 2 days of hearings on S. 1658, the bill which my colleague, Senator Goldwater, and I intro-

duced to authorize the central Arizona project, I made a brief statement in which I set forth the urgent need of Arizona for the central Arizona project.

I announced to the committee at that time my expectation that, at a later date, further hearings would be held for the purpose of obtaining testimony from Arizona witnesses.

Some 20 witnesses have come from Arizona for the purpose of testifying in support of S. 1658. I have asked them to organize their testimony in such a way as to present a general picture of the statewide need for the central Arizona project; the economic aspects of this project, both from the agricultural and from the general economic viewpoint; and the effect upon our State of the ever-lowering ground water table. I have planned for the information of this committee a presentation which will also deal with specific conditions in particular areas of the State and the reasons why those conditions in those specific areas require the prompt authorization and construction of the central Arizona project.

In the light of the sizable number of witnesses who are here to testify and the need to complete the hearings on this aspect of the matter without unreasonable expenditure of time, I have asked them to be as brief as possible while doing justice to their subject.

Now, the first witness will be the Governor of Arizona, Paul Fannin.

STATEMENT OF HON. PAUL FANNIN, GOVERNOR OF ARIZONA

GOVERNOR FANNIN. Thank you, sir.

Senator Moss. Welcome to the subcommittee, Governor. We look forward to your testimony.

GOVERNOR FANNIN. Thank you, sir.

Mr. Chairman and honorable Senators, as Governor of the State of Arizona, I feel a great personal burden of responsibility for the development and full utilization of the State's share of Colorado River water. My responsibility is not to an impersonal State government, but rather to the people—each individual man, woman and child—almost 1,500,000 of them now—who hope and work for honest security and opportunity in the desert State of Arizona. It is their land of promise, and it is my duty as their elected Governor to do everything in my power to make sure that they have the required productive resources available with which to bring their hopes and ambitions for a good life to full fruition in the land of their choice.

Arizona is blessed by nature with an abundance of potential productive resources—fertile soils, desirable climate, minerals, timber forests stretched across the northern counties. But water is the limiting productive resource. To unlock these other resources for use by our people we must have an adequate supply of water where it is needed.

Arizona is what it is today, with a more than \$3 billion annual economy, because the National Reclamation Act of 1902 made it possible for our courageous pioneers to concentrate and put to use a very meager natural water supply.

Those who will testify after me today will tell you in some detail what our present water problems are. In order to sustain our way of life in Arizona we are forced to pump ground water at an ever increasing rate to supplement our limited surface water supplies.

Today we are withdrawing ground water at such a rate that the shadow of resource exhaustion lies heavily upon our future.

Arizona has not been blind to this threat of water bankruptcy. More than 40 years ago an Arizona Engineering Commission outlined a plan for diverting Colorado River water into the interior of the State. Only our financial limitations in those early days prevented our putting such plans into effect.

Twenty years ago Arizona contributed funds for a study with the Bureau of Reclamation of a plan that became known as the central Arizona project. It was found feasible and was so reported to the Congress by the Department of the Interior in 1947.

In the latter 1940's, Arizona, having in mind the need to conserve her rapidly dwindling reserves of ground water, wisely enacted the first of a number of ground water laws, the object of which is to prevent the development of new lands, in critical ground water areas.

When, in 1951, the Congress advised Arizona to clear its title to Colorado River water, we proceeded to do so in the Supreme Court. Now that it seems certain that title is cleared, Arizona again comes before the Congress with a plea to authorize a water project that is desperately needed by all of our people; a project that is completely feasible from every point of view; a project that can be built within the existing pattern, scope, and authority of the Reclamation Act of 1902.

It is a project that would conform to the policies and criteria that have been established for general application to all reclamation projects. It is a project that will repay its costs; return more than half a billion dollars of interest on the construction investment; and assure the soundness of an Arizona economy which even now contributes nearly \$400 million annually to the Federal Government through collected Federal taxes.

The project about which we are talking to you today, though essentially the same as it was in 1947, is vastly better than it was then. It has a remarkably favorable benefit-cost ratio of 3.03 to 1 as compared to a ratio of 1.63 to 1 in 1947. Annual benefits as set forth in the Bureau of Reclamation's most recent project report are \$125,468,000 in contrast to only \$41,971,000 as reported in 1947.

Project construction costs, in spite of constantly rising wages and prices for materials, have increased by only about one-third since 1947. Improvements in the techniques of earth moving and changes in the design and construction of dams through research account for most of the cost saving.

At the same time the repayment potential of the project has greatly increased. Agricultural economists find that the repayment capacity of farmers has increased approximately $2\frac{1}{2}$ times per acre-foot of supplemental water delivered.

The rate for which electrical energy can be marketed has also risen very substantially in the 16 years since the project plan was originally reported.

In addition to this increase in the unit value of project power, it is possible to generate 25 percent more power at Bridge Canyon Dam now because the completion of Glen Canyon Dam Reservoir has made it possible to maintain a maximum average annual generating head of water at the Bridge Dam Reservoir. This lower reservoir need not

be pulled down to accommodate flood flows in the river. Flood flows are controlled above at Glen Canyon.

The central Arizona project proposed to the Congress in 1947 was designed to rescue Arizona's agriculture from a threatening water shortage. That shortage is now being felt in reality. More than 300,000 acres of our productive irrigated farmland are now out of production each year for want of adequate water.

Our ground water is disappearing at an increasing rate to sustain other types of growth, too. The value of our manufacturing output was only about \$87 million annually in 1947. Today, the output of our manufacturing industry is valued at approximately \$800 million yearly. Other facets of our economy have increased in value similarly.

The central Arizona project we ask you to consider and act favorably upon now has a much greater rescue mission than it had when we first proposed it in 1947, and the rescue is more urgently needed.

Arizona's growing cities must have more water. In the 1947 report slightly less than 2 percent of the water developed was scheduled for municipal use, whereas in the 1963 report almost one-third was scheduled for this purpose. The benefits of the water will extend into every part of the State. Power from the hydroelectric generating facilities of the project is needed throughout Arizona for expanding industries and growing cities. The recreation potential of the project's five reservoirs—at Bridge Canyon, Maxwell, Buttes, Charleston and Hooker Dams—has a very real and substantial value to the people of Arizona, California, New Mexico, and the entire Nation. The National Park Service estimates that 500,000 people would visit the magnificently scenic lake behind Bridge Canyon Dam each year.

During the construction period a large part of the costs of the project will flow through economic channels of most of our counties in the form of wages and the purchase and transport of materials.

It has been difficult for us to deal with the water needs of Arizona communities that are outside the direct service area of the central Arizona project, because there has been no precise knowledge of current and projected uses or of potential water sources and the means of developing them.

Now, however, studies are being conducted in these northern areas to develop water data and possible small projects to serve municipal needs which are of great concern to all Arizonians.

Senate bill 1658 is broad enough in scope to permit solution of many, if not all, of the municipal water supply problems of the communities in the northern half of our State. These solutions are in nearly all instances dependent upon the construction of the central Arizona project as a first essential step. We recognize that in Yuma County in the southwestern part of Arizona, the city of Yuma and a number of reclamation projects have contracts with the United States for the delivery to them of main stream Colorado River water and these contracts have heretofore been made a part of the record of this hearing. I am pleased to note that Mr. Dominy, the Commissioner of Reclamation, has stated that these contracts will be honored.

Unlike California, our good neighbor to the west, Arizona has no source other than the Colorado River to which it can turn at this time for additional water. We have no rivers within our State pouring fresh, unused water into the sea. Every river, every stream, every rill in Arizona has been controlled and put to full use for our people.

We have, through private enterprise with private capital, and at tremendous expense, developed our ground-water resources far beyond their limits as a permanent supply. Millions upon millions of dollars have been invested by our farmers, our cities, our industries to conserve the dwindling water supplies.

Our farmers have lined thousands of miles of their ditches to prevent seepage losses. Our mines, which supply more than half of the Nation's copper production, have spent vast sums to reduce ore processing water requirements. Sewage effluent from the Phoenix and Tucson treatment plants is lawfully put to beneficial use in the ways that are feasible at this time.

It is the united conviction and policy of all Arizona and it is my position as Governor that water is Arizona's prime and overriding need.

This project is the only hope we have of ever being able to relieve our water shortages throughout the State.

We have faith that you gentlemen, and all Members of the Congress, will be moved by the facts presented in these hearings by representatives of our people to approve the central Arizona project as proposed in Senate bill 1658 which is now before you under the sponsorship of both Senator Carl Hayden and Senator Barry Goldwater.

The people of Arizona await your decision. We bring to your attention the facts of our case, the urgency of our need. We are running out of water and we are running out of time.

Thank you.

Senator Moss. Thank you, Governor, for a very fine statement. We appreciate your coming here to testify before the committee today.

I don't have any questions. Do you have any questions or comments, Senator Hayden?

Senator HAYDEN. No.

Senator Moss. Senator Kuchel?

Senator KUCHEL. Just a few. First, though, in accord with the permission earlier granted on the second day of our hearings, I submit for the record to be printed at this point in the hearings as though read, a prepared statement and then I will ask Governor Fannin some questions.

(The statement is as follows:)

STATEMENT OF HON. THOMAS H. KUCHEL, A U.S. SENATOR FROM THE STATE OF CALIFORNIA, AT RESUMED HEARINGS ON S. 1658

Senator KUCHEL. In pushing their proposal calling for \$1 billion of Federal money to divert 1.2 million acre-feet per annum of Colorado River water away from present users in California, the sponsors of S. 1658 seem to have generated two prime difficulties for themselves and thereby, regrettably, for this subcommittee.

One difficulty is the fact that these hearings on the Hayden-Goldwater bill are obviously premature. The Executive Office of the President (Bureau of the Budget) has told us that the administration has made no report on the central Arizona project and it recommends deferring action on this bill. We know that there has been no compliance with the law that requires that project reports be submitted to the Governors of the affected States for comment. In fact, the most recent report on the central Arizona project is one of June 1963, made by the regional director of the Reclamation Bureau, not yet even ap-

proved or cleared by the Commissioner of Reclamation, the Secretary of the Interior, or the Bureau of the Budget.

The other trouble is the obvious attempt to make an end run around Secretary of the Interior Stewart Udall and frustrate the public interest by staging hearings on the central Arizona project while the Secretary is referring his Pacific Southwest water plan to all the Governors of the Colorado River Basin for comment in compliance with the statutory procedure.

We have learned enough in 2 prior days of hearings to know that the two plans—the provincial central Arizona and the broader Southwest—are in collision. It is patent that you cannot dedicate the Bridge Canyon power revenues simultaneously to the exclusive benefit of central Arizona, as the Hayden-Goldwater bill would do, while dedicating them, together with those of an additional dam at Marble Canyon, to the financing of this project and also projects in Nevada, Utah, New Mexico, and California, as Secretary Udall would.

The testimony immediately poses this question: Should the Bridge Canyon cash register be tapped for the sole benefit of one State or does prudence dictate its contents finance developments vital to human existence and progress in five?

The Secretary's plan is entitled to careful consideration by us after review by the affected States, as the law requires. It should not be short circuited by premature piecemeal consideration of component parts which seek to earmark certain public assets for themselves alone.

California's basis of concern is clear and reasonable. I think it is in accord with the public interest generally. We want to see water development for all the States of the Pacific Southwest region. But we want it to be accomplished in an orderly fashion, with optimum benefits assured. Also, and quite understandably, I feel precisely like the Legislature of Arizona feels—I do not think a new project should create any hazard for existing uses. In California's case I am dutybound to insist upon protection for uses now perhaps rigidly limited to 4.4 of the 5.2 million acre-feet we are currently using.

Just as California's Governor has said: "California will not attempt to win by obstruction what it has not won by litigation," Governor Brown at that same time made clear that we have "full expectation of sustaining the right to divert for use in southern California 4.4 million acre-feet of water a year from the Colorado River" and that "it is essential that the priorities of California's existing projects, up to 4.4 million acre-feet, be respected as against any new lower basin project."

This same position was reiterated by California's Attorney General Mosk, upon filing, on September 16, California's petition for a rehearing in *Arizona v. California*.

I think it regrettable that Arizona has chosen to chastise its neighbor at the outset of what, in the best of circumstances, will be a difficult set of deliberations. I had hoped we would have no recriminations.

I will not undertake here to cover all the points made by the Arizona Senators on August 27. I do wish to point out some of their most grievous errors, for the record will show that California has not conducted a deliberate campaign of delaying the litigation.

The Arizona Senators accuse California of delays that dragged out Arizona's suit from 1952 to 1963. Let's look at the record.

Arizona fails to tell you that from 1947 to 1951 California sought, and Arizona successfully opposed, legislation to grant the consent of

Congress to the joinder of the United States as an indispensable party in a suit that California offered to bring to resolve the questions then at issue.

Finally, Arizona filed her complaint in the summer of 1952, while the court was not in session. California at once filed a response saying it would not object to the court taking jurisdiction of that suit.

Arizona's complaint asked adjudication of three issues. But, after 9 years of litigation, Arizona, in her final brief in the Supreme Court, confessed error on all three of these points.

Much of the 9 years from 1952 to 1961 had been taken up by Arizona's litigating the issues on which she finally conceded error. Arizona filed amended pleadings in 1958 and she did not get around to confessing error to the Supreme Court until 1961.

Arizona's confusion and delay imposed a burden on the other parties. Naturally, the United States, California, and Nevada had to introduce evidence to rebut the Arizona evidence, and this they did, before Arizona abandoned her three pleaded contentions. Moreover, many months were consumed in the quarrel between the United States and Arizona over Indian water rights. This resulted in the United States putting in detailed proof of water rights on some 30 Indian reservations.

But not all the time consumed can be blamed on any of the parties. The first special master appointed by the Supreme Court died and his successor had to start over again. But it is patently unfair to attribute delay to California.

At another point the Arizona Senators complain that California moved to implead Utah, New Mexico, Colorado, and Wyoming. This is correct. The master held that Utah and New Mexico were indispensable parties, and the Court ordered them joined. Colorado and Wyoming were not. But it is perfectly clear that if Arizona had made the contentions in her original pleadings in 1952 that she made in her briefs before the Supreme Court in 1961, Colorado and Wyoming, as well as Utah and New Mexico, would not only have been indispensable parties, they would have been pounding on the Supreme Court's door to get into the suit to defend their contention, only belatedly and unsuccessfully challenged by Arizona, that the Colorado River compact includes the tributaries. Arizona, so far, has won the tributary issue with California by the Court's interpretation of the Project Act, rather than on the compact as Arizona urged.

The other big issue in that litigation is whether, in the event of shortage, the shortage should be prorated or the priorities of existing projects should be respected, including California's up to 4.4 million.

On this, the one issue on which the eight Justices were unanimous, the Court rejected the proration formula for which Arizona was contending and decided instead, by a vote of 5 to 3, that the Secretary of the Interior or the Congress should establish a shortage formula.

That is a little of the story of the past.

Now, my Arizona colleagues say that California seeks further delay by insisting that no action be taken by Congress on the central Arizona project until a formula for allocation of water during periods of shortages be fixed by negotiation among the States, or failing such agreement by the States, by an act of Congress, or by regulations promulgated by the Secretary of the Interior.

Of course, we want a shortage formula established. So did Arizona. That is why she went to court. If there were plenty of water for everyone, there would be no controversy. The court has refused, so far, to decide this issue and has sent it back to the Secretary and Congress.

Of course, we are opposed to the construction of any new large lower basin project until we know its effect on California's existing uses. After all, it is the same principle that Arizona's Legislature itself legislated in 1961, when it stipulated that the water rights of the central Arizona project should be junior to those of existing projects in Arizona.

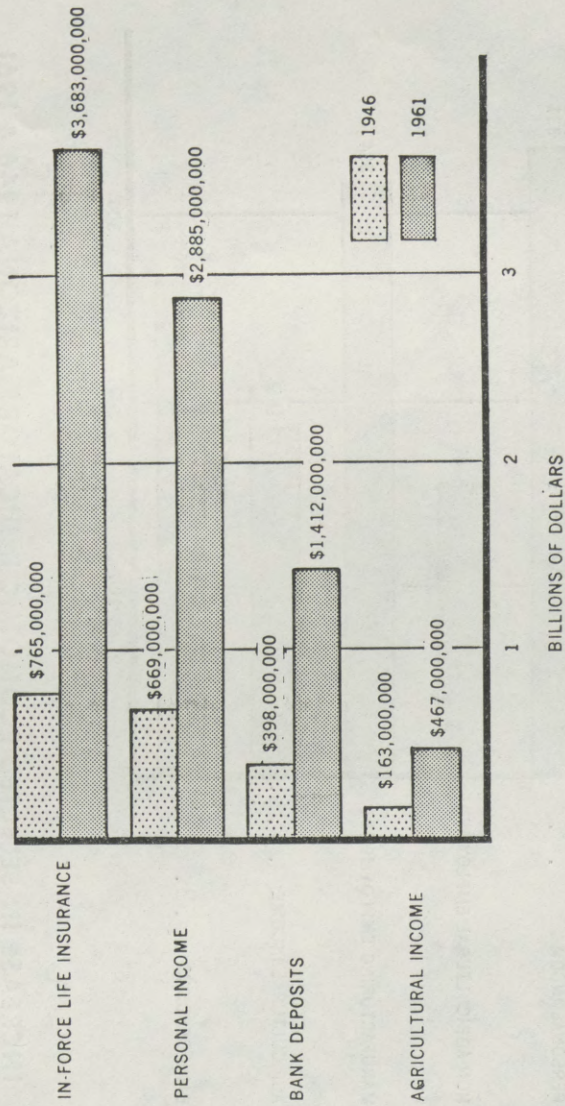
If Senators Hayden and Goldwater are willing to concede that the existing uses in Arizona and, in addition, those in California of at least 4.4 million acre-feet of Colorado River water are to be respected and protected against new projects in the lower basin, and such language is written into any legislation authorizing new diversions from the Colorado River, that issue can be settled in 10 minutes. Otherwise, any delay they now seek to blame on California because of that issue will be of Arizona's own making, just as was the delay caused by Arizona's reversal of positions in her own lawsuit.

In conclusion, let me point out again that the water rights issue on which this project turns has not been finally determined. The State of California and interested California defendants have filed their petitions for rehearing in the Supreme Court litigation. I have reviewed the three petitions filed and find they raise substantial issues. We should await the entry of a decree in that case before continuing without consideration of any new projects on the Colorado River. To show that California raises substantial issues in her request for reconsideration, I submit, for inclusion as an appendix to the printed record of the first 4 days of hearings on this bill, a copy of the State of California petition for rehearing in *Arizona v. California* (see app.). Even if the Court should deny that petition, it is valuable to us in showing issues which must be resolved either in the Court's decree or by the Congress in legislating on any proposal such as is before us now.

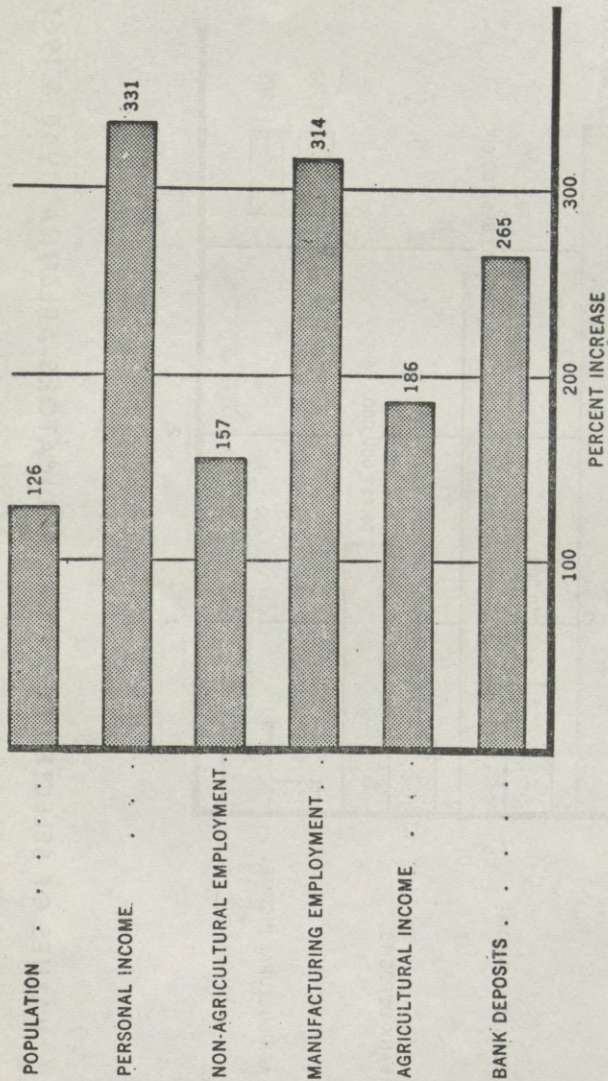
The burden of the Arizonian's case, in rushing this subcommittee's deliberations on their project, is their immediate need for the water which would be taken from California users by this bill. They preached the same then—immediate need in the late forties and predicted dire results if any time elapsed before passing the bills then pending. However, I submit for the record of these hearings some indices showing that 15 years time has seen nothing but growth and prosperity in Arizona. These charts were left with our subcommittee by Senator Hayden's office at the conclusion of our earlier hearings on this bill.

More important, there appears much doubt as to the need for the haste-makes-waste approach again urged upon us at this time. I submit for the record a statement of an informed Arizonian which leads me to believe someone is again crying "wolf" about the urgency of water needs in Arizona.

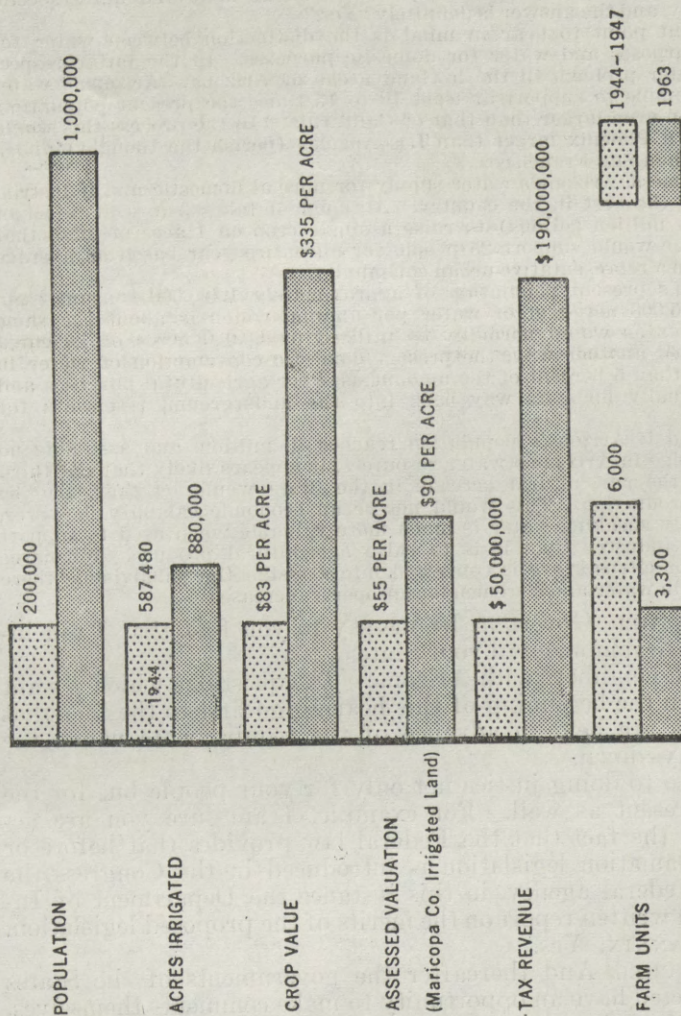
I remind everyone that California is presently dependent upon the water in issue here. Arizona claims, at the most, future dependency. I think this subcommittee should await the review of the Pacific Southwest Water Plan to see what can be forthcoming to help Peter if you are going to take from him to help Paul.



VALUES OF SELECTED ECONOMIC INDICATORS-ARIZONA 1946 & 1961



INCREASE IN SELECTED ECONOMIC INDICATORS-ARIZONA 1946 & 1961



CONDITIONS IN THE CENTRAL ARIZONA PROJECT AREA
MID 1940's AND PRESENT

[Extract from Arizona Highways, February-March 1962 (p. 57)]

ARIZONA, THE NATION'S FASTEST GROWING STATE

(By Herbert A. Leggett, Arizona's witness in Arizona versus California, on the Arizona economy)

Arizona's location in one of the most arid sections of the United States often gives rise to questions as to whether its water supply is sufficient to permit of substantial population growth. This question can be answered quite specifically and simply, and the answer is definitely "Yes."

The important point to bear in mind is the distinction between water for agricultural purposes and water for domestic purposes. In the latter respect there is no water problem in the lowland areas of Arizona. Arizona's water resources are ample to support at least 10 to 15 times the present population, i.e., a population even larger than that of California. In the process this would probably mean a Phoenix larger than Los Angeles (perish the thought) and a Tucson larger than San Francisco.

In all seriousness, Arizona's water supply for normal domestic and industrial usage is one of the best in the country. Although it takes 3 to 4 acre-feet of water (about a million gallons) to raise a single crop on 1 acre of land, that amount of water would support 25 people for an entire year based on average per capita use in a representative urban community.

Thus Arizona's present population of approximately 1,400,000 consumes approximately 175,000 acre-feet of water per annum, which is about the same amount of water as would normally be utilized on 60,000 acres of irrigated cropland. Stated another way, the present domestic consumption of water in Arizona is less than 5 percent of the amount used for agricultural purposes and much of it actually finds its way back into the underground reservoirs for reuse.

When, as, and if Arizona's population reaches 10 million, and assuming no substantial change in Arizona's water resources, it appears likely that one-third to one-half of the agricultural acreage in the State would by that time be forced out of production. This would not be an economic calamity, however, because generally speaking water is much more valuable when used to support population and industry than it is to raise agricultural produce. Whenever a cow pasture or citrus grove is converted into a residential subdivision, there is both a saving in water and a tremendous property increase.

Senator KUCHEL. Governor, let me say to you first that I am interested in the development of your State.

We are good neighbors with Arizona. The questions which I want to raise here in the beginning of this hearing go first to the fact that these hearings are held in advance of the requirements which the Federal law lays down.

They go also to doing justice not only for your people but for the people I represent as well. For example, I am sure you are acquainted with the fact that the Federal law provides that before or after any reclamation legislation is introduced in the Congress the appropriate Federal agency, in this instance the Department of Interior, makes a written report on the merits of the proposed legislation.

Governor FANNIN. Yes.

Senator KUCHEL. And thereafter the governments of the States which are affected have an opportunity to make comments themselves.

In this instance these hearings are held before the Department of the Interior has made any comment on this legislation and obviously before any comment has come from you to this committee until today.

And that also goes for the State of California. My State has not had an opportunity to study this legislation and of course has had no opportunity to have the benefit of the views of the Department of the Interior.

I made the point or tried to make the point earlier in these so-called hearings that in my judgment they were therefore invalid. They should not take place until every affected State and the Secretary of the Interior has advised this committee as to the views which each holds with respect to this legislation.

Surely, the people of Arizona are entitled to the full utilization, as you say, "of the State's share of the Colorado River water."

Is it not true, however, Governor, that the ruling of the Supreme Court of the United States, with respect to the dispute between Arizona and California, has not yet become final?

Governor FANNIN. Yes, sir.

Senator KUCHEL. There is a petition by representatives of my State for further hearings.

So that using the Supreme Court decision as a basis to determine what the people of Arizona and what the people of California are entitled to, we do not know the answer to that question, do we, until the Supreme Court has rendered a final decision?

Governor FANNIN. I understand your point.

Senator KUCHEL. And do you not agree with me?

Governor FANNIN. Senator Kuchel, first may I say that we have a great concern for the needs of the State of California.

We certainly have cooperated through the years.

We have a very critical need in Arizona and perhaps the critical need has prompted us to advance our activities to the basic steps possible.

We have a survival need in parts of our State. So that I am sure that you understand why we are so anxious to bring this matter before you and I am sure that many of your questions will be answered as our testimony proceeds.

You will have additional information with regard to why we are coming before you and what our needs are in the State of Arizona and I am sure that you will be impressed with the information that will be disclosed to you during these hearings.

Senator KUCHEL. What are the the purposes of the central Arizona project?

What would the water be utilized for from the central Arizona project, Governor?

Would it be utilized for a variety of purposes and if so, would you spell them out to the committee?

Governor FANNIN. Yes. The water will be utilized for a variety of purposes. We have a great need in our cities and towns.

If you could be in my office and have the people contacting you as they do me, reporting that their wells have gone dry, you could see the great need we have in our land, not for additional land to be irrigated, because that is not our intent, but for the supplemental water that is needed just for some of the farmers to be able to survive.

We also have a great need in the cities of our State.

When this project, as I stated, was first visualized, it was 2 percent of the water for commercial and domestic purposes. Now almost one-third of it is considered to be needed for those purposes.

By the time the project is realized, which we hope will be before 10 years passes by, perhaps a greater amount will be needed in that respect.

Senator KUCHEL. So that it would be fair to say that this is a project which is multipurpose in character which would furnish additional water supplies for agriculture, for municipal purposes, and industrial purposes?

Would that be a correct statement?

Governor FANNIN. That would be correct, inasmuch as we will not be placing additional agricultural lands into utilization.

We will only be trying to maintain what we have and it is going to be very difficult to even do that.

Senator KUCHEL. You say you will not put additional lands into agricultural production?

Governor FANNIN. It is not our intention to put additional lands into agricultural production.

Senator KUCHEL. I don't think that your legislation spells that out.

Would you approve an amendment to this pending bill prohibiting the use of water from this project to new agricultural ventures in your State?

Governor FANNIN. Perhaps with the reservation regarding the Indian lands.

I understand that the Indian people do have a great need insofar as, and I would not be in a position to pass judgment on that matter at this time—

Senator KUCHEL. All right. I suppose the only reason there is any problem with respect to additional water projects is the hazard of a shortage of water from the Colorado River, enough to go around.

Would you recognize, Governor, the principle of western water law, that is, first in time, first in right, with respect to those waters which are available to your people?

Governor FANNIN. Senator Kuchel, this has been carried through the courts and I do feel that I should abide by the decision of the courts.

Senator KUCHEL. What is your understanding of the decision of the courts?

Governor FANNIN. The understanding that I have of the decision of the courts is that we have been allotted the 2,800,000 acre-feet of water which was determined after many years of study as the amount to which we were entitled and California, 4,400,000 and Nevada, 300,000 acre-feet.

Senator KUCHEL. Now, suppose in a given period of time there was not enough water in the Colorado River to supply Arizona and California and Nevada with their allocable share? Then what is your understanding as to who should sit in judgment as to where this available water supply should be placed?

Governor FANNIN. Senator, that is a very complicated procedure.

The decision or the report, rather, by the special master provided for a percentage allocation. The decree provides for the Secretary of the Interior to make that decision.

Senator KUCHEL. So that we have here a problem where, in a period of drought or following implementation of excessive demands on the river, the Secretary of Interior would be compelled to determine where the limited supply of water should go. Is that not correct?

Governor FANNIN. That is correct.

Senator KUCHEL. And I think that, in connection with that problem, on page 7 of your statement you point out that you have in your State

some pending contracts with the Federal Government for the delivery of Colorado River water.

Governor FANNIN. Yes, sir.

Senator KUCHEL. And you go on to say that you were pleased to note that Mr. Dominy, the Commissioner of Reclamation, has stated that these contracts will be honored.

Well, by that, as I understand your testimony, Governor, and I certainly agree with you, the contracts that are in existence today for Colorado River water will continue to be honored under any such legislation as is now before this committee.

Governor FANNIN. Senator, if they exceeded the amount of our allotment we would not expect them to be honored.

Senator KUCHEL. Now, supposing you got less than your alleged allotment. Would these contracts receive their full supply of water?

Governor FANNIN. I would say that that depends upon—there are many contributing factors involved in making that decision. If the amount were slightly less, yes; I would not be in a position to speak upon that determination at this time.

Senator KUCHEL. Well, Governor, in 1961, your legislature appropriated a sum of money to be utilized by the Bureau of Reclamation to continue studying the problem of the central Arizona project.

You were Governor in 1961?

Governor FANNIN. Yes, sir.

Senator KUCHEL. The legislation which was signed into law, in March of that year, read in part as follows:

The sum appropriated under the provisions of section 1 shall be used under contract with the Bureau of Reclamation for the purpose of making investigations and studies of a dam at the Bridge Canyon site on the Colorado River and the works necessary for the diversion and transportation of water from the Colorado River to areas in Arizona, provided that not to exceed the sum of \$100,000 shall be used for the investigation of Bridge Canyon Dam and of works necessary for the diversion of Colorado River water to the Central Arizona River Project: *And provided further*, That this contract with the Bureau of Reclamation shall provide that the investigations and studies shall be restricted to only that quantity of water which may be available for use in Arizona after the satisfaction of all existing water delivery contracts between the Secretary of Interior and users in Arizona for the delivery of mainstream water.

That bill was signed by you into law.

Governor FANNIN. Yes, sir.

Senator KUCHEL. Governor, is that not a clear statement of the position of the people of Arizona speaking through their government that all existing water delivery contracts shall be first satisfied before any other waters, resulting from this reclamation project, shall be made available to your people?

Governor FANNIN. Senator Kuchel, that is an amount that is considered equitable and would be a part of the 2,800,000.

The amounts that have been contracted are far below the amount that has been allotted to us and you are right in your statement that we consider that the contracts should be honored.

But of it were an unreasonable amount and would not be within the concept of the overall program they could not be honored.

Senator KUCHEL. What do you mean when you use the word, an "unreasonable" amount?

Governor FANNIN. If the amount of contracts exceeded the amount of water that we were to receive then it would be an unreasonable amount.

Senator KUCHEL. Well, but assume that water is delivered to your State after the central Arizona project is completed——

Governor FANNIN. Yes.

Senator KUCHEL (continuing). In an amount less than that which is necessary to satisfy the needs of your people. Is it not true that existing water delivery contracts will first be satisfied before any of the other requirements of the central Arizona project water delivery would be met?

Governor FANNIN. I think that is true.

Senator KUCHEL. That is fair, isn't it?

Governor FANNIN. Yes; that is a fair statement for you to assume.

Senator KUCHEL. Now, would you object to any amendment of this legislation that would provide that existing water contracts in California should likewise be satisfied first?

Governor FANNIN. Where there has not been such amount of water to take care of the contracts, I don't see how you could expect them to be satisfied.

Senator KUCHEL. Now give me that again. I didn't understand it.

Governor FANNIN. Where there is not a sufficient amount of water allocated to California to take care of the contracts I don't see how you could expect them to be satisfied.

Senator KUCHEL. Well, with respect to existing contracts in California, Governor, you signed into law a bill which provides that your Arizona existing contracts shall first be satisfied.

Governor FANNIN. That is a small percentage of the total amount that is involved.

Senator KUCHEL. Well, regardless of what percentage it is, if the percentage were changed this would still be the law in your State; wouldn't it?

Governor FANNIN. We did not contract to exceed the 2,800,000 acre-feet of our allotment.

Senator KUCHEL. You did not contract——

Governor FANNIN. We did not contract—we of course got excesses. I am not stating a fact of the law.

I am stating that as far as the percentage of water that has been contracted for with the Secretary of the Interior, it is a small percentage of the total amount of our allocation.

Senator KUCHEL. What do you understand the allocation to California is, Governor?

Governor FANNIN. I couldn't give you the exact figure.

Senator KUCHEL. Let's assume that the existing contracts, however, in California, are not in excess of the amount allocable to California.

Governor FANNIN. I could not speak on that matter. I have not studied it as far as California is concerned.

I know the amount that is involved as far as the press is concerned.

I have read that it is approximately 900,000 acre-feet in excess of what would be available but I cannot make that determination for you at this time.

Senator KUCHEL. Well, sir, we are dealing with waters in an interstate stream. They are important to the entire Southwest.

And what I am trying to get you to comment on is the fact that those contracts for delivery of water from the Colorado River, whether those contracts are in Arizona or in California, ought first to be satisfied before any other available waters are utilized for beneficial purposes.

Governor FANNIN. Well, where it is impractical to do so I don't see how they can be satisfied.

Senator KUCHEL. I wonder under what circumstances that would be true?

Governor FANNIN. If the amount is greater than the amount allocable to California.

Senator KUCHEL. Suppose there is a shortage of water? Suppose there is not enough water to fulfill the allocation to Arizona and not enough water to fulfill the allocation to California?

Would it not be fair first to consider existing contracts for water in both States on the same basis?

Governor FANNIN. Well, that is a matter of law and I would not be in a position to speak upon that subject at this time.

Senator KUCHEL. At least, from the standpoint of the people of Arizona, the legislature has made clear that existing water contracts shall first be satisfied.

Is that not true?

Governor FANNIN. The existing contracts must first be satisfied; that is true.

Senator KUCHEL. Governor, will someone from your State government comment in detail on the power features of the central Arizona project?

Governor FANNIN. There will be, I think, a full coverage before the hearings are completed.

Senator KUCHEL. Thank you very much, sir.

Governor FANNIN. Yes, sir.

Senator Moss. Thank you, Senator.

Senator Goldwater?

Senator GOLDWATER. Just one point.

I am sure my good friend from California will raise this point and I think we ought to make our assumption clear.

Under the Flood Control Act of 1944 there is a requirement under (a) that any works of improvement for navigation or flood control, not heretofore or herein authorized, shall be submitted to the Congress only upon compliance with the provisions of this paragraph.

And one of the provisions calls for 90 days from the date of receipt of said proposed report, the written views and recommendations of each affected State and of the Secretary of the Interior shall be submitted to the Chief of Engineers.

Now, it has been Senator Hayden's and my contention that this matter has been authorized. It has been discussed very thoroughly back in the late 1940's and we are in full compliance with the law.

So I just wanted to make that assumption on our part a part of the record because I feel the question will be asked of other witnesses.

Senator KUCHEL. Barry, will you go over that again?

Are you telling this committee that the central Arizona project has already been authorized?

Senator GOLDWATER. The central Arizona project was authorized twice by the Senate back in the 1940's.

Senator KUCHEL. Well, it may have been approved but when you used the word "authorized" I thought you meant enacted into law.

Senator GOLDWATER. No; it was passed by the Senate and this does not refer to the whole Congress.

It merely refers to the bodies of the Congress and we feel that we are in compliance with this and your raising the point is extraneous because we have had hearings and we have had the authorization of the Senate on this and we have complied with the 90 days.

Senator KUCHEL. Are you telling me then that your interpretation of the word "authorization" as used in the statute merely means approval by one House of Congress of a piece of legislation?

Senator GOLDWATER. That is my assumption in this case; yes.

Senator KUCHEL. Well, I ask consent, if I may, to first call the attention of the committee to the letter of the Bureau of the Budget dated August 21, 1963, which says in part that the Department of the Interior has not submitted a report on the project proposed—that is, the Hayden-Goldwater bill—of authorization in this bill to the Bureau of the Budget under procedures set forth in the executive order.

Until a report is received, together with the views and comments of the concerned Federal agencies, the Bureau of the Budget has no basis for appraising the merits of the reported development.

And I want to say also and I ask consent that the entire text of the letter of August 30, 1963, from the Secretary of the Interior to the chairman of this subcommittee be inserted in the record and call particular attention to the part of that letter which says in part:

As was made clear in Commissioner Dominy's testimony the report represents an updating under the supervision of the Regional Director West of the central Arizona project essentially as outlined in detail in the 1947 planning report.

The updated report has not been cleared through the final clearance procedures either with the Bureau of Reclamation or the Department.

It is now being revised within the context proposed of the specific Southwest water plan of which the central Arizona project is an important integral part.

(The letter referred to is as follows:)

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., August 30, 1963.

HON. FRANK E. MOSS,
Chairman, Subcommittee on Irrigation and Reclamation, U.S. Senate.

DEAR SENATOR MOSS: At the hearing before the Subcommittee on Irrigation and Reclamation, August 27, 28, on S. 1658, inquiry was made as to the availability to the committee of the June 7, 1963, report of the regional director of region 3 of the Bureau of Reclamation entitled "Supplemental Report on Central Arizona Project, Arizona-New Mexico." I am glad to make that report available to the committee and copies are enclosed.

As was made clear in Commissioner Dominy's testimony, the report represents an updating, under the supervision of Regional Director West, of the central Arizona project essentially as outlined in detail in the 1947 planning report. The updated report has not been cleared through the final clearance procedures either within the Bureau of Reclamation or the Department. It is now being revised within the context of the proposed Pacific Southwest water plan of which the central Arizona project is an important integral part.

Insofar as water service to the central Arizona project area is concerned, the features set forth in the enclosed regional director's report are the same as proposed in the Pacific Southwest water plan. However, under the concept of coordinated regional development proposed by the latter, there are differences

of concept and financing between the plan embraced in the regional director's report and the project plan as included in the Pacific Southwest water plan. These differences of concept and financing were developed in Commissioner Dominy's testimony. Mainstem power developments, for example, are not, under the Pacific Southwest water plan, features of the central Arizona project; rather they are units of the overall regional project similar, in essence, to the status of the storage units of the Colorado River storage project authorized by the act of April 11, 1956 (70 Stat. 105).

Sincerely yours,

STEWART L. UDALL,
Secretary of the Interior.

Senator KUCHEL. And I simply want to say that the Senator from Arizona is completely wrong. When the legislation uses the word "authorized" it means an authorization by the Congress signed into law by the President.

It is an idle act for the Senate to pass anything and have it die in the House.

That is a nothing. It is a zero.

And I simply say that on the basis of the law, this hearing is invalid. Senator GOLDWATER. You assume that and we assume the opposite.

Senator KUCHEL. Well, I assume it. The Budget Bureau assumes it. The Department of the Interior assumes it, and I have never heard anyone either contend anything else in the 11 years that I have been on this committee and I want to make the point additionally, that there never has been in the 11 years that I have been in the U.S. Senate, serving on this committee, a hearing on a reclamation project before the Department of the Interior has passed judgment on it and the affected States have passed judgment on it.

This is the first time that this has ever happened.

Senator MOSS. We are following the theory of concurrency here. We are going ahead and making this record while the departments are also working on their reports.

Senator KUCHEL. The Senator can say that if he wants to but I still make the point that it has never been done before.

Senator HAYDEN. Mr. Chairman—

Senator MOSS. Senator Hayden?

Senator HAYDEN. The committee has in the 1947 report on the central Arizona projects as required by the Flood Control Act. Since that report there have been two supplemental reports to bring this project up to date. One was paid for by the State of Arizona and one by Federal funds.

There is no requirement under the Flood Control Act that the affected States and Federal agencies comment a second time on a bill when introduced. We are just bringing the original report up to date.

Senator KUCHEL. Well, Senator, are you going to say to me that because almost 15 years ago the Senate approved a somewhat similar, not completely identical bill, and that forecloses the government of my State, 15 years after their only review and comment under the law, from taking another look at it?

Senator HAYDEN. No. The State of California can make any objection to this bill that it sees fit at any time.

My purpose in holding these hearings is to save time and to develop the facts.

And if the facts are unpleasant to the Senator, I can't help it.

Senator KUCHEL. Well, I will tell you what is unpleasant, Senator.

What is unpleasant to the Senator from California is that the two Senators from Arizona are attempting to ramrod this legislation through this committee in advance of any compliance with the law passed by the Congress.

That is what is disconcerting.

Senator HAYDEN. The committee has control of that.

Senator MOSS. Well, I can assure the Senator from California again that this committee will not undertake any sort of action on the bill until all of the reports have been filed and certainly until California has had every opportunity to present its case.

I understand the position of the Senator and he has made it clear in the preceding hearings that we have held and this hearing, that he enters his objection to our proceeding before the reports have all been filed anew on the latest bill that has been introduced.

But let me state again that his rights and the rights of his State will be preserved fully and we will set aside as many days as need be for witnesses from California to come and present their case.

And having discussed this before, I think that the record is clear on it.

Did you have any questions, Senator?

Senator KUCHEL. No.

Senator MOSS. Are you through, Senator Goldwater?

Senator GOLDWATER. I am all through.

Senator MOSS. Thank you very much, Governor.

Governor FANNIN. Thank you.

Senator MOSS. We appreciate your coming here today.

Let me say to you who are standing that we are trying to get some more chairs and I think we will have seats for all in a few moments.

Senator KUCHEL. I simply deny that the rights of the Senator from California or the people from California are being protected.

I just want that in the record. I will not belabor it.

Senator MOSS. All right.

Will you introduce the next witness, Senator Hayden?

Senator HAYDEN. I would like to call on Congressman Udall to testify.

Senator MOSS. Congressman Udall, will you come forward, please?

**STATEMENT OF HON. MORRIS K. UDALL, A U.S. REPRESENTATIVE
IN CONGRESS FROM THE SECOND DISTRICT OF ARIZONA**

Mr. UDALL. Mr. Chairman and members of this distinguished subcommittee, I unfortunately expect to be in this wicked city until near Christmas and I have a number of my fellow Arizonians who do not expect to be here that long.

They have come a long distance to testify.

I have here what the author considered a very eloquent oration but I won't take the time of the committee to read it.

I will ask leave for it to be filed and printed in the record of these hearings.

Senator MOSS. That will certainly be done. It will be printed in full at this point.

(The complete prepared statement of Hon. Morris K. Udall follows:)

PREPARED STATEMENT OF HON. MORRIS K. UDALL, A REPRESENTATIVE FROM
THE SECOND DISTRICT OF ARIZONA

Mr. Chairman and members of the subcommittee, thank you for the opportunity to appear in support of a project which is virtually a life or death matter for the people of Arizona.

We all know the importance of water and how great civilizations have shriveled when something happened to drastically curtail their water sources. The ancients possessed great knowledge of the ways of water and performed remarkable engineering feats to utilize it. Nevertheless, there were times when the water supply could not be maintained and farms and cities faded before the drought. Today, although we still follow the teachings of the past in such practices as irrigation, we are blessed with a technology that should permit man to virtually insure himself a never-ending flow of water.

The financial and technical feasibility of the project envisioned in S. 1658 (the central Arizona project) will be discussed by others far more knowledgeable than I.

I want to stress today the reasons why Arizona desperately needs the water the central Arizona project would bring to an area containing three-fourths of the State's people and taxable wealth, 60 percent of its irrigated land, and 90 percent of its manufacturing industry. Much of the area within the proposed project is in the congressional district I represent and, therefore, I am here today on behalf of my constituents who regard the central Arizona project as their only hope of avoiding water bankruptcy.

Every year this area uses $4\frac{1}{2}$ million acre-feet of water. Some $3\frac{1}{2}$ million acre-feet of this is drawn from underground, the rest comes from surface sources. As we take this $3\frac{1}{2}$ million acre-feet from our underground bank, nature is replacing only $1\frac{1}{4}$ million acre-feet. Thus, the people of central Arizona are ringing up a water deficit of $2\frac{1}{4}$ million acre-feet a year. The water table is dropping, the costs of pumping are rising. We are headed for water bankruptcy.

The Colorado River has been characterized as Arizona's last waterhole. This is true. There aren't any more untapped surface sources. To meet the rising demands for our growing population and economy we have to contemplate further depletion of our underground water supplies.

We can look at Tucson, southern Arizona's largest city, to see prospects. Tucson has no surface water. Its entire supply comes from underground. Presently, the city's uses for domestic and industrial purposes, when added to the uses for farming operations, far exceeds even the most optimistic estimates of recharge to our underground reservoirs.

Whenever new reclamation projects are proposed, the question is always raised: "Why should we spend money to irrigate more land to grow more surplus crops?"

I would like to make these points:

(1) None of the central Arizona project water will be used to bring new lands under cultivation.

(2) A very large part of the central Arizona project water will go to cities and towns, and the amount so used must increase as population continues to grow.

The people of Arizona right now are getting the water they need only by borrowing to the limit from underground supplies. Through S. 1658 they are asking Congress to loan them enough money to buy the labor and materials needed to fully use their rightful share of the Colorado River water. I urge the committee to extend this credit. Virtually all of the planning, development, and construction costs will be repaid. And the benefits in terms of growth and prosperity will be many times the initial outlay.

Mr. UDALL. And I will say that I have introduced companion legislation on the House side.

If there is any question about it, I want water for Arizona.

I represent the southern part of the State, Tucson, the 50th largest city in the Nation.

It is probably the only city of that size that does not have a surface water supply. We don't have a creek, lake, river, or anything else.

All of our water comes from underground and about 10 percent of this water we think would be allocated to Tucson.

We have had probably the fastest growth in this area of any part of the country. Our population in this Tucson area is in this neighborhood of 300,000 now.

With our present water supplies we don't believe that this community can go much beyond 400,000.

With the water that we would be allocated under this legislation we can probably stand a growth of up to perhaps 800,000.

So as has been indicated by our Governor, the time is running out. The water is running out. We need it.

And I hope that the Senate and the Congress will take action on the Colorado River problem just as soon as possible.

Senator MOSS. Thank you, Congressman UDALL.

Are there any questions of the Congressman?

Senator HAYDEN?

Senator HAYDEN. No.

Senator KUCHEL. I have a couple.

Congressman UDALL, I would like to help the people of Arizona. I just don't want the people of California to be damaged in their rights while we are helping Arizona.

Are you acquainted with the proposal by the Secretary of Interior for a basinwide development which would include assisting the people of both States?

Mr. UDALL. Yes, sir; I am familiar with this proposal.

Senator KUCHEL. That has been recommended by the Secretary of the Interior and now the 90 days are running and the Governors of your State and my State have 90 days in which to respond to that.

Is that not correct?

Mr. UDALL. This is my understanding of the situation, Senator.

Senator KUCHEL. Are you acquainted with the regional proposal of the Department of the Interior?

Mr. UDALL. I have studied it in some detail.

Senator KUCHEL. Do you believe it might constitute a basis for the Congress of the United States to help the States in the Lower Colorado River Basin together at the same time?

Mr. UDALL. Yes; I would say that we may very well, and I hope we do, get together on the basin.

Senator KUCHEL. Wouldn't that be better?

Wouldn't that be the way to pass constructive legislation in this Congress?

Mr. UDALL. Well, my position, Senator, would be this:

We need the water. We need that badly. I am willing to get it by ourselves. I am willing to get it with two States or three States or—

Senator KUCHEL. Well, you don't want to damage your neighbor, do you?

Mr. UDALL. No, indeed; and I appreciate the very constructive attitude that the Senator from California has taken in these hearings. He could very well come in here and be an obstructionist and he hasn't.

He has said, and I commend him for it, that he wants to help Arizona and I say to him that I want to help California.

We are neighbors. We are all in this same boat in that area.

And if California will come forward and come out of the old trenches and Arizona, too, and we put our arms around each other and help each solve its water problems I think we will stand a good chance of doing it.

And I assure the Senator that I am not going to turn my back on 17 million people in his State.

I will help them with their water problems either in a regional plan or I will help them singly if it should occur or if that is the case.

But I want to say that I appreciate very much the attitude that the Senator has taken.

Senator KUCHEL. Well, I thank my colleague for that statement.

The point is that nobody officially has commented on the bill that we have before us in this committee at the present time but the basin plan has been recommended by the Department of the Interior and has now been submitted in accordance with law to the States.

Would my colleague say that that might be a better approach for his State and mine and the people of Nevada to come together and use that as a starting point for the development of legislation?

Mr. UDALL. I would say that it has many advantages and from a practical standpoint it is pretty apparent that the House, from what the Chairman on the House side has said, that there isn't going to be action on legislation this year—

Senator KUCHEL. Of which kind?

Of this bill?

Mr. UDALL. Of the separate central Arizona project bill. He indicated that out in Phoenix. There simply isn't time and a lot of these questions are going to be answered by November.

If California comes in and says, "Fine, we will go on the basin account" and Arizona says "Fine", and Utah and Nevada, I would hope that we could put it together very quickly.

Senator KUCHEL. I thank you, my colleague, very much.

Senator MOSS. Senator Goldwater, any questions?

Senator GOLDWATER. I have none.

Senator MOSS. Senator Mechem?

Senator MECHEM. No questions.

Senator MOSS. Thank you very much, Congressman Udall.

Senator HAYDEN. Congressman Rhodes, please.

Senator MOSS. Congressman John Rhodes.

Mr. Rhodes, we are happy to have you.

STATEMENT OF HON. JOHN J. RHODES, A U.S. REPRESENTATIVE IN CONGRESS FROM THE FIRST CONGRESSIONAL DISTRICT OF ARIZONA

Mr. RHODES. Mr. Chairman and members of this great subcommittee:

It is a real pleasure to have the opportunity to appear here today to speak in behalf of this very important legislation to my State.

I have a statement here which I think sets forth my own views as well as I could in a few pages and I would like to ask permission that it be submitted for the record as read.

Senator MOSS. It will be inserted in the record in full at this point.

(The complete prepared statement of Hon. John J. Rhodes follows:)

PREPARED STATEMENT OF HON. JOHN J. RHODES, A U.S. REPRESENTATIVE FROM
THE STATE OF ARIZONA

Mr. Chairman, you and the members of this subcommittee are interested in facts. There are many people in this room who can provide detailed facts better than I can. Therefore, my testimony will be brief. The brevity of my statement is certainly not an indication of the depth of my interest in the subject or of the sincerity of my conviction that S. 1658 should be reported favorably by this subcommittee.

The Congress deals with problems. When the attention of Members of the House and Senate is directed toward a legislative area, we usually ask several questions: (1) Is the problem real or fancied? (2) Is it a problem which should be dealt with by the Federal Government? (3) Should the problem be solved now, or could it be deferred until later? (4) Is the suggested solution the best one available? (5) Is it practical, feasible, and desirable to proceed with the solution now?

Not only the economy of Arizona, but the lives of her citizens, are dependent upon the development and utilization of water resources. We are blessed with a pleasant, dry climate in most parts of our State; with this blessing goes a limitation—a scant supply of annual rainfall to fill our reservoirs and recharge our underground aquifers. As a result, not only is all surface water being utilized, but we are “mining” water from the underground. I employ the word “mining” advisedly, since we are using water from the underground far in excess of the annual recharge. No one knows how much water is available in our underground supply. However, commonsense leads one to believe that when the level of water in a barrel continues to fall, sooner or later the bottom will be reached, and no more water will be available. This analogy applies to the actual situation in central Arizona, where the water table continues to fall year after year. Therefore, it is obvious that the problem is real and not fancied.

Since the reclamation laws were first adopted in 1902, the Federal Government has been in the business of aiding people to develop water supplies for use on land, and for domestic water in cities. I need not remind the members of this subcommittee that almost all the money supplied by the Federal Government for reclamation projects is repayable, much of it with interest. The present need of Arizona for additional water can best be met by a project which is almost a classic example of the type of project which the reclamation laws have always contemplated. Therefore, I think we can safely say that this is a problem in which the Federal Government should be interested.

I think it is also obvious that central Arizona may be close to the bottom of the water barrel, and that therefore this is a problem which cannot wait for solution. The project contemplated by S. 1658 has been approved by the U.S. Senate twice. It is not a new project. Planning work, and procedural matters which must be accomplished prior to the authorization of a reclamation project have been concluded. The opinions of the States involved have been given. A report has been submitted by the Department of the Interior. If ever a project was ready, and needed now, it is the one which would be authorized by S. 1658.

I have already mentioned that the U.S. Senate has twice authorized this project. This was done once 12 years ago and once 14 years ago. At that time the population of the State of Arizona was under 700,000, and the main areas to be served contained fewer than 500,000 people. The population of the State of Arizona is now over 1.5 million, and the area to be served directly contains about 1.1 million people. Through water exchanges, undoubtedly additional people will be served.

The fact that the economic growth of Arizona in many categories leads the Nation bears evidence to the importance of this area to the overall economy of the United States. The project contemplated by S. 1658 is not intended to expand this economy, but to save it. It will allow the cities of Phoenix and Tucson to continue an orderly growth, and will allow the agricultural industry in Arizona to remain in existence.

However, the amount of water which would be developed by this bill will be oversubscribed the day the project is completed. The economic feasibility of the project is assured—in fact, it is a much better project, economically speaking, than it was 12 and 14 years ago.

Therefore, I respectfully submit to you, Mr. Chairman, and to the members of your subcommittee that this problem of Arizona is a real one, one in which the Federal Government should be interested, and that a reasonable solution is available and should be applied now. There is no intention on the part of Arizona or Arizonians to foreclose further and more complete development of the water resources of the Pacific Southwest. However, we would like to impress upon you, Mr. Chairman, and the members of this subcommittee that we do feel a sense of urgency toward our own water needs. Since our project is now far ahead of the stage of development enjoyed by many other features of a more comprehensive plan, we feel strongly that S. 1658 should be enacted now, either on its own, or as a necessary first step in the implementation of a larger plan for the benefit of the entire Southwest. We pledge ourselves not to forget the needs of our sister States, but to continue to cooperate, as we always have, in providing the best solutions to all the water problems of the United States.

MR. RHODES. Mr. Chairman, I have tried, and it wasn't easy, to put myself in the position of one who might be considering this legislation without prejudice. I say it wasn't easy because of course I am prejudiced.

This is a very important piece of legislation to the whole State of Arizona and to my district but when you look at a piece of legislation, as a Member of the House or Senate, I think you have to answer several questions.

First, when you look at the problem, you want to know if it is a real problem. Is it a real problem or is it fancied?

Second, is it a problem which should be dealt with by the Federal Government and third, should the problem be solved now or could it be deferred until later, and fourth, is the suggested solution the best one available, and five, is it practical, feasible, and desirable to proceed with the solution now?

There has been testimony concerning the need, the fact that the water table in Arizona is falling, the facts of the economic growth of the State and also the fact that this is a feasible project.

I think the feasibility will turn out to be—the benefit-to-cost ratio is somewhere in the neighborhood of 3 to 1 and I don't need to tell you, sir, and the other members of this committee that we like to have projects and reclamation which have benefit-to-cost ratios that high.

In fact, very seldom do we find them any more.

It seems to me that certainly the need is established that we have a plan which is feasible.

It is a plan which is needed now. It has been commented on by the States and by the Government.

This body has passed the bill twice and it seems to me that the prudent and the opportune time to move is just as soon as we possibly can.

So with that, Mr. Chairman, I appreciate again your holding these hearings and I appreciate the fact that the great Senate of the United States is going along with this problem which is so important to my State and my district.

Senator MOSS. Thank you, Congressman Rhodes. We appreciate your statement.

Are there any comment or questions?

Senator KUCHEL, do you have any questions?

Senator KUCHEL. John, do you believe that this committee has complied with the provisions of the Flood Control Act in holding these hearings?

Mr. RHODES. Senator Kuchel, I feel that if these hearings were to be adjourned without the 90 days provided for in the Flood Control Act of 1944 having elapsed, without statements from the Governors of the various States involved concerning this project, that then there might be some doubt as to that compliance.

However, it is my position, and it sticks in my mind, that nobody has been foreclosed of any rights by the conduct of these hearings.

The State of Arizona has waited a long time for any water. As you know, the State finally got around to agreeing to the Colorado River compact about 1940 and it has been some 23 years since that time.

Your State, on the other hand, ratified the compact earlier and has had the benefit of the provisions of the compact to Hoover Dam and the other works on the lower Colorado. And our State has been dry.

So I think if we appear to be in a hurry it is because we are in a hurry and it is because we have to be in a hurry and I know my friend from California will understand that.

Senator KUCHEL. I do understand it and I repeat, as a U.S. Senator, I want to see the people of Arizona benefit to the maximum extent from the waters of the Colorado River which are allocable under the law to it.

But I repeat my question to you:

Does this hearing comply, in your judgment, with the provisions of the Flood Control Act of 1944?

Mr. RHODES. In my opinion this hearing does not violate the provisions of the Flood Control Act of 1944.

Senator KUCHEL. Well, that act intends that in advance of any hearings the Secretary of the Interior shall issue his own official views on the legislation.

Is that not correct?

Mr. RHODES. Well, I think it is correct, but I think the statement requires some implementation. "In advance of hearings" could very well mean in advance of the closing of hearings. I don't think it necessarily means in the advance of the beginning of hearings.

Senator KUCHEL. Well, it also says that the affected States shall be notified and have an opportunity to comment.

Mr. RHODES. In advance of the close of hearings.

Senator KUCHEL. You see, it would help every member of this committee, whether he comes from an affected State or not, if at the beginning of the hearings each member of the committee did know the official position of the States involved and the official position of the Department of the Interior.

It would help him in examining witnesses.

If they came in at the close of the hearings I think the intention of the Congress would be violated for then they would serve no useful purpose.

However, I appreciate the urgency which motivates all of my friends in Arizona. It is an urgency that I sense for my people.

You are acquainted with the fact that the people of California have bonded themselves in the amount of \$1.750 billion to bring intrastate waters from the north to the south?

Mr. RHODES. I am, and that is an action to be commended.

Senator KUCHEL. No further questions.

Senator Moss. Thank you.

Any questions?

Thank you, Congressman Rhodes. We appreciate your testimony very much.

Mr. RHODES. Thank you very much.

Senator Moss. Congressman Senner, please.

STATEMENT OF HON. GEORGE F. SENNER, JR., A U.S. REPRESENTATIVE IN CONGRESS FROM THE THIRD CONGRESSIONAL DISTRICT OF ARIZONA

Mr. SENNER. Mr. Chairman and members of the subcommittee, I want to thank you for the privilege of appearing before this important committee.

Arizona is now at the crossroads, one path marked with slow death, by desiccation, and the other, continued survival with precious water. Arizona needs help and assistance from this Congress and our Federal Government. We need that assistance now.

Assuming that S. 1658 was signed into law today, it would still be 7 to 10 years before water would flow into our thirsty cities and upon our dry and parched land.

Gentlemen, in short, we have a critical water problem. Over 200,000 acres of rich and fertile lands have been taken out of cultivation because of water shortages and the high cost of pumping. Arizona is now and has been overmining its water resources to the tune of 2½ to 3 million acre-feet per annum. We have been doing this in a desperate attempt to maintain our economy and sustain the needs of our people.

Many cities and towns in Arizona have insufficient water supplies. Some of our communities are forced to haul water by railroad tank cars, in some instances a distance of more than 50 miles at an expense of over \$800 per acre-foot—just to provide the minimum needs of our citizens in their daily lives.

We have other cities and citizens spending thousands of dollars drilling for this precious life-giving liquid only to find dust and dryness. We know this problem is not Arizona's alone but that it also exists to one degree or another in the great States of New Mexico, Colorado, Utah, Nevada, and California.

We also know that the benefit-to-cost ratio of the central Arizona project is over 3 to 1, and that it could be put to work to assist other States in meeting their challenges as well. But whether or not the central Arizona project shall be made part and parcel of other important reclamation projects under the banner of the Southwest regional plan, we, in Arizona, know that our survival depends on the central Arizona project becoming a reality now.

The new supplemental Colorado River water, that will flow into our valleys in the central and southern portions of our State by virtue of the central Arizona project, will give new hopes and continued life to this area. However, we also recognize that the water is for all of Arizona and that exchanges will be made with the thirsty and dry cities in the upper plateaus of our State.

A method of equitable and just exchanges will also give hope of survival to the Third Congressional District, which encompasses approximately two-thirds of the land mass of Arizona. Many of these cities and towns which have streams and rivers running by their front door and through their city limits are prohibited by the law of "prior appropriation" from utilizing this water under the laws of the State of Arizona.

Since the Secretary of the Interior has already been given the authority to distribute, within the lower basin States, the waters of the Colorado River, I am sure that under this legislation the Secretary of the Interior will negotiate fair and equitable mandatory exchanges for all of our people on a just formula of needs, population, shortages, quantity, and quality, et cetera.

We in Arizona are proud people. We do not come before you to seek charity or a gift or a handout from our Federal Government. What we seek is the hand of friendship. The money so authorized by this bill will be in the form of a loan and will be repaid, with interest, to our Government by our people, as has been the case with other Arizona reclamation projects.

We in Arizona seek this chance to continue to survive and prosper, and to contribute to the welfare of America. The passage of S. 1658 will add much in the form of material wealth and strength to this great Nation of ours.

Thank you.

Senator Moss. Thank you, Congressman Senner. We appreciate your testimony.

Are there any questions of the Congressman?

Senator Kuchel?

Senator KUCHEL. Yes. I want to ask my colleague this: on page 2 of his statement he goes on to say—

Many of these cities and towns which have streams and rivers running by their front door and through their city streets are prohibited by the law of "prior appropriation" from utilizing this water under the laws of Arizona.

I suppose a corollary statement would be that those cities in Arizona which have a prior appropriation and which have contracts with the Department of the Interior are protected. Is that correct?

Mr. SENNER. Yes, Senator; but most of those communities, with the exception of one, would be in the Second Congressional District—Yuma and Parker and a few of the other areas.

But most of my communities in the north two-thirds of the State of Arizona do not have contracts with the Secretary of the Interior and are receiving their water either by prior appropriation with regard to the law in the State of Arizona or are receiving water by wells which comes from the source of percolating water which they are able, under the present law, to drill if they can find a source of water and utilize it.

Senator KUCHEL. Well, now, where you say that you were sure that under this legislation, referring to the legislation before us, that—the Secretary of the Interior will negotiate fair and equitable mandatory exchanges for all of our people on a just formula of needs, population, shortages, quantity and quality, et cetera—

You were not implying that that mandatory exchange would take away water from one of your Arizona cities which has a contract and which is a prior appropriator, were you?

Mr. SENNER. No, Senator; I would not.

I believe the best reference to the intention of the Secretary of the Interior would be found in his Pacific Southwest water plan, roman numeral 83:

Exchanges and replacement of water—

And he has pointed out this is the philosophy of the Pacific Southwest water plan—

One of the features of the Pacific Southwest water plan is the substitution of water through exchange or replacement to compensate for the taking of water from present sources of supply of existing projects so as to provide supplemental water supplies for water-deficient areas.

It is intended that such exchanges of water will be accomplished pursuant to an appropriate legislative requirement as part of the contracts which provide for the supply of supplemental Colorado River waters.

No exchange or replacement of water would be permitted to injure a present user.

Senator KUCHEL. Are you applying the Secretary's comments in his basin proposal to the central Arizona bill that is before us now?

Mr. SENNER. Yes, Senator; in the sense that he, by the provisions of the Boulder Canyon Project Act, has the authority to distribute within the State the new supplemental Colorado River water and if this is his intention, as he so stated, then I am assured that he will provide for compulsory, mandatory, fair, and equitable exchanges so that all of the State of Arizona can benefit from those exchanges and utilization of water.

Senator KUCHEL. But when you use that phrase, "compulsory, mandatory, and fair," do you mean to imply that the Secretary of the Interior would deny water to a city which, in your State, presently has a contract to receive it and give that water to some other city in your State which does not have a present contract to receive it?

Mr. SENNER. No, Senator. I believe that my understanding of the California-Arizona Supreme Court case is that the vested rights or protective rights are not to be disturbed.

So he would not have that authority even if he intended.

Senator KUCHEL. And as a policy matter, I will ask my colleague, would you favor protecting valid existing rights to the use of the Colorado River water?

Mr. SENNER. I am certainly going to be bound by the Supreme Court decision and I think they have so indicated—

Senator KUCHEL. But apart from the Court's decision, if you have a valid existing right in the State of Arizona to the use of Colorado River water would it be your desire to see legislation pass which would uphold that right and recognize it and protect it?

Mr. SENNER. I would have no objection to that.

Senator KUCHEL. OK. Thank you.

Senator MOSS. Are there any further questions of the Congressman? Thank you very much.

Senator HAYDEN. I would like Senator Goldwater to make a statement, please.

Senator MOSS. Senator Goldwater, of Arizona, will make a statement.

STATEMENT OF HON. BARRY GOLDWATER, A U.S. SENATOR FROM
THE STATE OF ARIZONA

Senator GOLDWATER. Mr. Chairman, first I would like to thank you for the opportunity to appear before your committee in support of S. 1658, a bill to authorize the central Arizona project, which I cosponsor with my colleague, Mr. Hayden.

I am particularly grateful to the chairman who has allowed me to sit in on these hearings as a sort of ex officio member although I am no longer a member of the Interior Committee. I want to voice my appreciation for this courtesy because of the vital importance of this legislation to my State.

In recent hearings, this committee has heard the need and feasibility of the central Arizona project established by Bureau of Reclamation witnesses. Reclamation Commissioner Floyd Dominy has made the record quite clear on the feasibility of the central Arizona project, confirmed by Bureau of Reclamation studies, and I will not repeat his testimony except to say that the favorable benefit-to-cost ratio of 3.03 to 1 is one of the best that I have ever seen for such a project during my years in the Senate and better than many projects which Congress has authorized.

I believe that this project could stand on this feasibility report alone, but there is a far better reason for authorization of the central Arizona project than that of economics. That reason is people.

Since the beginning of recorded time the six civilizations which my part of the Southwest has known have either flourished or died through the availability or the lack of water. The present population of Arizona is no different. The future of Arizona depends to a great extent on the completion of the central Arizona project and without this source of water, it is entirely possible that Arizonians may some day find themselves in the same predicament as civilizations before them which were forced from the land through lack of water.

Since 1947, when the project was first proposed, Arizona's population has more than doubled. If the project was necessary then, it stands to reason that it is doubly vital to Arizona today. The areas which the project will principally serve have experienced a population explosion second to none in the Nation. Between 1950 and 1960 Maricopa County's population doubled while the city of Phoenix tripled its population to 439,170. The Maricopa County population figure stood at 663,510 as of the 1960 census and it is now well beyond that. Tucson's population during the same 10-year period had an increase of 368 percent and Pima County is now well on its way to 300,000 people. The population of the State is now over one and a third million and from 1950—when, I repeat the central Arizona project was deemed necessary—until 1960, the State population increased 73 percent.

I cite these figures to show that a project that was feasible and necessary 15 years ago is even more of a necessity today.

The one and a half million Arizonians I mentioned are not just a statistic, but are one and a half million citizens who are dependent on the central Arizona project to meet their water needs. We speak of the "central" Arizona project, but in essence it is a project which will benefit the entire State, either directly or indirectly.

Mr. Chairman, in testimony which your committee will hear, my Governor, my colleagues in Congress, and my fellow citizens will elaborate far better than I on the details of this project. Beginning back when I was a member of the original Interstate Stream Commission the reasons supporting the project have been recited over and over again and these are precisely the same arguments we are using today.

Mr. Dominy in his testimony has shown that the central Arizona project is an integral part of any extended project which the Bureau may have in mind. If this is true, there is no need to delay hearings or legislative work on this project which could and should be started within the next 12 months.

Evidence is so clear that the central Arizona project can stand on its own two feet and the need has been so clearly demonstrated, that we must not wait to authorize it, appropriate for it, and start construction of it.

All of our discussions on the subject can be traced back to the proven need of water for the people of Arizona, and I strongly urge this committee and this Congress not to delay fulfilling this need.

Senator Moss. Thank you, Senator, for your statement.

Are there any questions of Senator Goldwater?

Senator KUCHEL. Senator, when you say on page 3 of your statement that Mr. Dominy in his testimony has shown that the central Arizona project is an integral part of any extended project which the Bureau may have in mind, that phrase of yours, "extended project," means, I take it, the regional development plan which has recently been submitted to the Colorado River Basin States by the Department of the Interior?

Senator GOLDWATER. Oh, it could mean any plan.

Senator KUCHEL. Well, are there any other plans now of which the central Arizona project would be an integral part?

Senator GOLDWATER. Well, there could be combinations of projects proposed in New Mexico and in Nevada and Utah and even projects in southern California.

Senator KUCHEL. What I mean is this:

Is it not true that in your bill you provide for the construction of Bridge Canyon Dam and then specifically provide that the power revenues from Bridge Canyon Dam would be used exclusively for the use of your central Arizona project?

Senator GOLDWATER. That is correct.

Senator KUCHEL. Whereas, in the recently announced Pacific Southwest water plan, which is the only plan I know which includes a development in Arizona similar to the central Arizona project, the Department of the Interior and the Secretary of the Interior would commit revenues in from Bridge Canyon Dam to the development of the entire regional project.

Is that not correct?

Senator GOLDWATER. That is correct, and if I am not mistaken the project, as it was originally outlined by the Secretary, would also require that the State of California allow the transportation of waters from their northern rivers to the desert areas to the south and eventually across the State line into Arizona.

This, I might say, would be a very commendable act on the part of the Legislature of California and I think would be the most important act to make the entire suggested southwest project feasible.

But I am afraid that if we in Arizona wait for that action by the California Legislature, we will be a pretty dry hole.

Senator KUCHEL. Well, God knows you are not waiting because again I say I never heard of any such rapidity on any project on this committee similar to this bill.

But the fact remains, does it not, that under the Secretary's recommendation the power revenues from Bridge Canyon Dam would be used in the development of a basinwide project, whereas your bill commits those revenues exclusively—

Senator GOLDWATER. That is correct.

Senator KUCHEL. To your own project?

Senator GOLDWATER. Yes. You see, our problem, Senator, is one of urgency.

If we had water resources in our State that could allow us to leisurely await 1967 or 1970 to have this project authorized, I don't think you would find us in this state of urgency.

But we haven't any other source of water than the Colorado River.

And I am afraid if we wait for the commencement of any project, no matter what it might be, we are talking about 4 or 5 years from now.

So we are talking about 12 to 15 years from now before we receive water and, frankly, as a lifelong resident of that area, I don't think we can wait 10 years for this water.

That is why Senator Hayden and I in this body and our Congressmen in the House are urgently pushing this legislation.

And again, we don't feel that it is being pushed in an illegal way.

Senator KUCHEL. Well, you are not going to say that there is not an equally urgent problem in my State, are you?

You are not going to take that position?

Senator GOLDWATER. I don't think that California has any urgency that can compare with the water urgency in central Arizona today.

I think the time might come but I also see California drinking the Pacific Ocean long before they reach that time.

Senator KUCHEL. Well, I disagree with you, Senator.

That is your opinion. My opinion is that we face in California an exceedingly urgent problem.

We have tried to put our own house in order, as I have suggested earlier, in bonding ourselves in an unheard-of amount of money.

And my point is that there is an urgency in my State and there is an urgency in yours. And I think it would be far better for us to walk down the line together rather than to consider simply the problems of one State when they are concerned to the problems of their neighbor.

Senator GOLDWATER. Might I point out to my colleague that the only part of this project, the Southwest project, that bears immediately upon California is not to provide more water for people but it is to provide water for plants in the form of link canals.

Now, if there was some area in California that would be receiving urgently needed water through this project immediately, I think you would find a different reaction immediately from those of us who are concerned.

I am not certain, and I haven't seen these figures lately, but a number of years ago southern California had not used her full allotment from the Colorado for domestic water purposes of metropolitan water district.

Senator KUCHEL. Senator, the facts are that we have been able to use the surplus waters that have come down from the Colorado River, but the hazard to southern California involved in such legislation as this, is that in periods of drought or following excessive demands on the river, where there was less water available to Arizona and to California than what is allocated to them, is that you would take away from long historic existing uses in southern California the use of Colorado River water by people, not by agriculture, but by people and if that unhappy day ever came then there would be consternation and chaos in southern California.

My only point is that I think it would be far better for the future of both of our States if we tried to work together rather than to work separately.

Senator GOLDWATER. Well, I couldn't agree more and I am in complete agreement with former Governor Warren, who is now Chief Justice, that when this matter was settled in the courts that California would march down the aisle with Arizona to get something done.

Senator KUCHEL. Well then, why don't we use the basinwide development as a basis for these hearings rather than this bill, one on which nobody has made any comment?

Senator GOLDWATER. We have been making comments on this bill for almost half of my life and that is a long time.

Senator MOSS. Thank you, Senator.

Any other questions from members of the committee?

Thank you, Senator Goldwater.

Senator HAYDEN. Mr. Wayne M. Akin, the chairman of the Arizona Interstate Stream Commission.

Senator MOSS. Mr. Akin, please come forward.

STATEMENT OF WAYNE M. AKIN, CHAIRMAN, ARIZONA INTER-STATE STREAM COMMISSION

Mr. AKIN. Mr. Chairman and gentlemen, my name is Wayne M. Akin, and I reside in Phoenix, Ariz.

I appear in my capacity as chairman of the Arizona Interstate Stream Commission, which is an instrumentality of the State of Arizona. Its duties include the formulation of plans for the practical and economical development, control, and use of the water of interstate streams and the means of carrying such plans into effect.

For over 40 years the State of Arizona has been working toward the objective of bringing Colorado River main-stream water into central Arizona. The State's water problem began to come into focus with the formation of the League of the Southwest which first met at Salt Lake City in January 1919. Three years later in 1922 the Colorado River compact was signed in Santa Fe, N. Mex.

It is not my intention to belabor the struggles of the next 20 years which took place because of the activity of our neighbor to the west, which had the advantage of low-lying land that could be served with Colorado River water in unlimited amounts with comparative ease.

She was big and ready to move. We were small and our problem of diversion and transportation was great. We had to have time.

As a result, California was able to proceed with her development program while Arizona stood by frustrated. However, by 1940, Arizona had developed a tentative plan and in October of that year the Bureau of Reclamation began investigations preparatory to the formulation of an Arizona water plan. Then the war intervened and work was greatly slowed down until 1944 when Arizona entered into a contract with the Bureau of Reclamation to contribute half of the cost of a joint investigation which led to the development of the central Arizona project plan, which was formalized in the 1947 report of the Bureau of Reclamation and with minor changes is the plan today for such project.

In 1946 during the 78th Congress, Senator Ernest McFarland introduced S. 2346 to authorize the central Arizona project, and in 1947, during the 80th Congress, he again introduced the bill designated S. 1175. Hearings on that bill began in June of 1947, before the Subcommittee on Irrigation and Reclamation of the Senate Committee on Public Lands. The proceedings at those hearings were printed and comprise more than 500 pages.

When the 81st Congress convened in 1949, S. 75, a bill to authorize the central Arizona project, was introduced by Senators Hayden and McFarland, and Senators Downey and McCarran introduced Senate Joint Resolution 4 to grant the consent of Congress to the joinder of the United States in a suit in the Supreme Court for the adjudication of claims to waters of the Colorado River system.

The printed hearings on these two proposed measures, which were considered jointly, cover more than 900 pages. Southern California interests opposed authorization of the central Arizona project on the ground that the Supreme Court should first determine the extent of Arizona's right to mainstream water of the Colorado River. S. 75 was nevertheless reported out by the Senate Committee on Interior and Insular Affairs in August of 1949, and it was passed by the Senate in February of 1950. It did not, however, pass the House.

In the 82d Congress, Senators Hayden and McFarland again introduced the bill—also numbered S. 75—to authorize the central Arizona project. This bill was reported out by the Senate Committee on Interior and Insular Affairs in January of 1951, without additional hearings, and was passed by the Senate in June of 1951, by a vote of 50 to 28.

On April 18, 1951, the House Committee on Interior and Insular Affairs terminated hearings on a bill to authorize the central Arizona project by adopting the following motion made by Mr. Saylor of Pennsylvania:

I move that H.R. 1500 and 1501 be postponed until such time as use of the water in the Lower Colorado River Basin is either adjudicated or binding or mutual agreement as to the use of the water is reached by the States of the Lower Colorado River Basin.

Therefore, 15 members of that committee signed a statement to the effect that—

the adjudication of the water rights should come before authorization of the project, and not following [it] * * *.

In January of 1953, Arizona's motion for leave to file a bill of complaint to quiet title to its share in the waters of the Colorado River was granted by the Supreme Court. The United States and Nevada intervened. In July of 1954, California moved to join Colorado, New Mexico, Utah, and Wyoming. That motion was denied but New Mexico and Utah were impleaded in their capacity as Lower Basin States.

Trial of the case began in San Francisco on June 14, 1956, and was concluded on August 28, 1958. The special master filed his final report and recommended decree on December 5, 1960.

Oral argument was had before the court on January 8, 9, 10, and 11, 1962, and again on November 13, 1962. The case was decided by the U.S. Supreme Court on the 3d day of June 1963.

In the course of the trial innumerable pleadings, interrogatories, motions, arguments, depositions, memorandums, and briefs were filed, and some 30,000 pages of testimony was taken. Thousands of exhibits were filed.

Millions of dollars and years of time have been invested by Arizona in its effort to secure the benefits of its share of the main stream waters of the Colorado River. I call your attention to only a few of the major items such as the investigations which led to the original report on the proposed central Arizona project and the hearings on it before committees of three Congresses. There was the trial to quiet title to the water right requiring more than 12 years of effort. There was the updating of the original report on the project. The road to authorization has been long and arduous. Be that as it may, we have been to the Supreme Court. Our legal title to water of the main stream has been established. The project report has been updated by the Bureau of Reclamation. The merit of our project has been considered three times by this Senate committee. Twice your committee has recommended passage and twice the Senate has passed the authorizing legislation.

I have said that this is the same project. I should have added that, with the passage of time, it has become a project of much greater financial strength than it had in 1947. This arises from the fact that population influx and industrial growth have greatly increased the amount of water required for municipal uses and such water carries a higher rate.

Furthermore, advancing prices and improved farming practices make it possible to charge a higher rate for water. With improved revenues from irrigation and municipal water uses and with engineering advances heretofore presented, we have a repayment period much shorter than was anticipated when this project was being considered by this committee in 1949.

But the financial improvement is only part of the story. Perhaps of greater import is the impact of the declining underground water supply that has now reached the point of disaster. During the 80th Congress the late Senator Eugene D. Millikin, of Colorado, presided over the subcommittee before which we appeared.

Senator Millikin then characterized the central Arizona project as a project for the preservation of a civilization. So, indeed, it is today. Without it, we cannot long continue the present economic base of central Arizona.

We do not seek water for agricultural expansion. We want it only to provide water for our expanding cities and to preserve such of our agriculture as can be served with a supplemental water supply—to rescue it from doom. What Senator Millikin said 15 years ago was a prediction of a condition with which are today face to face.

Since we last appeared before you, reclamation development in the Colorado River Basin has progressed at a fast pace but Arizona has not shared in that development. You have authorized the Colorado River storage project, the Big Thompson project, the San Juan-Chama project and the Fryingpan-Arkansas project. Arizona has given to these projects her wholehearted support. We are confident that the central Arizona project will now also receive your sympathetic consideration and favorable action.

Thank you very much.

Senator MOSS. Thank you, Mr. Akin, for that fine statement.

Are there any questions of Mr. Akin, Senator Hayden?

Senator HAYDEN. No.

Senator MOSS. Do you have any questions, Senator Kuchel?

Senator KUCHEL. Yes, sir.

Mr. Akin, what is the status of that Supreme Court decision involving your State and mine?

Mr. AKIN. I think that would better be stated by lawyers but I think we are thoroughly familiar with the fact that the Supreme Court has rendered an opinion and that California has filed a motion for rehearing.

I think that is what you are driving at; is that correct?

Senator KUCHEL. Yes, sir; in other words, is it not correct to say that the Supreme Court has not rendered a final judgment in the matter as of today?

Mr. AKIN. I am not prepared to make that kind of a statement, Senator.

I am sure that before these hearings can possibly be brought to any conclusion that the decision of the Court case will be final.

Senator KUCHEL. I would hope so. California has raised substantial issues concerning the Court's opinion. If you agree with me that the Supreme Court decision is not final, don't you think that it could not hurt you very much to wait for action on the petition for rehearing and the actual entry of a decree?

Mr. AKIN. No; I don't think so, either.

Senator KUCHEL. You say in your statement that you do not seek water for agricultural expansion.

Since there is nothing in the legislation which says just that, would you object to an amendment to this legislation prohibiting central Arizona project water from being utilized by new agricultural ventures in your State?

Mr. AKIN. Oh, Senator, I think what you are really saying is that you would put into the law something that would put it in a strait-jacket, that might be damaging—

Senator KUCHEL. You oppose that?

Mr. AKIN. The economic necessities of the case would control. We just haven't any water for new expansion.

Senator KUCHEL. You see, there, it is not new or novel. The Congress wrote in that kind of a restriction in the Colorado River storage project.

It wrote that kind of a restriction in San Juan-Chama legislation.

I simply asked you if you would approve a similar amendment to this legislation which would prohibit bringing in new areas for agricultural production.

Mr. AKIN. Well, I would like to see the words of the amendment, and have advice of counsel before I accepted any such thing but it is our intention, which I see no objection to implementing in any manner, that we will not use this water for agricultural expansion; that it simply shouldn't be used for that purpose.

Senator KUCHEL. And under those circumstances, if an amendment were offered which accurately reflected that statement, you would approve it as an amendment to this legislation?

Mr. AKIN. Well, as I say, these are words that are susceptible of various types of interpretation and I would want to see the words and have the advice of counsel before I made a commitment on the part of the State of Arizona.

Senator KUCHEL. All right.

No further questions. Thank you.

Senator Moss. Senator Goldwater has a question.

Senator GOLDWATER. Mr. Akin, on page 4 you state that in January of 1951, "without additional hearings."

Now, just to keep the record straight because there has been some objection raised about having hearings, the record shows that S. 75, introduced by Senators McFarland and Hayden, on January 8, 1951, was referred to the Interior Department on the 11th of January, referred to the Bureau of the Budget on the same day and on January 30, 1951, without any hearings it was ordered reported favorably upon receipt of reports from the Interior Department and the Bureau of the Budget.

Then on March 2, a report was received from the Bureau of the Budget.

On March 5 the report was received from the Interior Department. On March 12, it was reported to the Senate by Mr. McFarland.

On April 11 it was objected to on the call of the calendar by Mr. Knowland.

On May 4 it was objected to on the call of the calendar by Mr. Hendrickson.

On May 17 it was objected to on the call of the calendar by Mr. Schoeppel and on June 5 it passed the Senate, amended.

Now unless there is some record of hearings, I think your statement is correct, that S. 75 passed from this committee without additional hearings.

Mr. AKIN. Well, that was my recollection and I asked the staff to check it so I am quite sure it is accurate.

Senator GOLDWATER. Well, I have asked the staff to check it and that is their conclusion and also that it was reported from the committee favorably upon the provision that it would not be on the calendar until reports had been received from the Bureau of the Budget and the Department of the Interior.

So again I say to my good friend from California, I don't think that we are upsetting procedure or precedent at all.

Senator KUCHEL. Well, I have been on the committee for 11 years, Mr. Akin, and we never had one piece of reclamation project legisla-

tion come out of this committee until the report of the Department of the Interior had been referred to the States affected for 90 days.

And that is the only point I make. I think it would have been not only orderly procedure, but I think it would have been in the interest of fairplay if these hearings had not been held until after the reports of your State and mine had been made known after the report of the Secretary had been referred to them.

Senator Moss. Any further questions of Mr. Akin?

Senator BURDICK. Mr. Chairman, I think the record should show at this point the date the petition for rehearing in the Supreme Court was filed.

Do you know when it was?

Mr. AKIN. Well, I have a date in mind but I wouldn't want to trust my memory.

I think there are persons here in this room who could answer that question.

I understand it is September 16.

Senator BURDICK. This year?

Mr. AKIN. Yes, sir; that is my recollection but I don't trust my memory.

Senator Moss. All right, sir.

Thank you, Mr. Akin.

Mr. AKIN. Thank you.

Senator HAYDEN. I would like to hear from Mr. Walter Bimson, the chairman of the board of the Valley National Bank of Phoenix.

Senator Moss. Mr. Bimson, we are glad to have you here sir.

**STATEMENT OF WALTER R. BIMSON, CHAIRMAN OF THE BOARD,
VALLEY NATIONAL BANK, PHOENIX, ARIZ.**

Mr. BIMSON. My name is Walter R. Bimson. I am chairman of the board of the Valley National Bank of Arizona with its home office in Phoenix. The Valley Bank, as it is popularly known, has 80 branches and serves every county in Arizona. We have over 350,000 deposit customers, all of whom have a vital concern in the economic welfare of the State.

The unusual growth of Arizona, most of which has taken place during the postwar years, and its continuing has been made possible only through the careful husbanding and efficient use of our quite limited water resources.

In 1950, the census counted less than 750,000 people in Arizona. Today, only 13 years later, even the most conservative estimates show more than double that number. To support the new population has required a steady supply of new jobs. Most of these have been created in manufacturing, construction, and services.

It has been obvious for many years that our total acreage farmed must ultimately decline unless an additional source of water is made available. As proof we can show that our pumps are depleting our natural underground reservoirs at the rate of more than 2 million acre-feet of water per year. Wherever such depletion is occurring, we face taking the land out of production and having it return to the desert. It is this already developed acreage that we are anxious to preserve to the extent practicable, by bringing in Colorado River water.

It is simply good business to protect the original investment. The Supreme Court decision, in clearing Arizona's right to use 2,800,000 acre-feet of mainstream Colorado River water, did not make available all the water that Arizona needs. After present existing needs, both domestic and agricultural, are met, there will be no water for expansion. Every drop will be used to supplement the supply for lands now being farmed and a continuing frugality in water use will be necessary.

The economic returns from the use of irrigation water are spectacular. Of even more importance, however, is the use of water for domestic purposes. I am gratified that a substantial portion of Arizona's share of the Colorado River water is to be allocated to this use. At present some 300,000 acre-feet of water is being delivered for municipal and industrial use each year.

Numerous population growth forecasts have been made for the project area by economists, engineers, and urban planners. The more conservative of these projections indicate a population of 4 million by the year 2000. As this figure is approached municipal and industrial requirements will increase to over 1 million acre-feet per year.

Some of this demand will be met by transferring water used for irrigation to municipal and industrial uses. However, since some of this growth will occur in desert areas now undeveloped and without a water supply, it is planned ultimately to apply annually 312,000 acre-feet of imported Colorado River water to the satisfaction of these requirements.

Meanwhile, the quantity and quality of existing water in many of our communities leaves much to be desired. A survey by Western Business Consultants indicates that at least half of the existing central Arizona urban water supply will be unsatisfactory by 1980. Just recently one of our smaller central Arizona towns, Buckeye, became the first in the United States to finance and build a water desalinization plant and the experiment is working nicely. The residents are paying an additional sum each month for the sake of better water.

It is difficult, if not impossible, to assign a dollar value to pure domestic water when the alternative is salty water or worse, no water at all. Health considerations, plumbing maintenance, and cost of water treatment must all enter in.

The Colorado River water not used for domestic purposes will go to agriculture to help stabilize the existing acreage. We anticipate that about 800,000 acre-feet will be available for this purpose. Based on today's yields and today's prices, 800,000 acre-feet of additional water will produce crops equivalent to \$60 million per year. It will actually firm up production on land producing several times that amount, but \$60 million is a fair annual income to assign to the additional water. The gradual rise in general price levels is sufficient guarantee that this income will continue to increase during the life of the project.

An income of \$60 million per year would require an investment of about \$1½ billion at the current rate of yield on long-term Government securities. Hence, we can see that agriculture alone will amply justify the cost of the project even before assigning any dollar value to domestic use, recreation and fish and wildlife, flood control, and so forth.

It should be emphasized that a large portion of the crops produced in central Arizona are fresh vegetables and melons maturing early in the year and hence, not competitive with the produce of other areas.

Other benefits will be obtained from cattle raising and feeding with locally grown crops. Pen-feeding of cattle is in an important activity in Arizona but operations will be curtailed by insufficient supplies of feed unless Colorado River water is brought in.

Another important consideration is the contemplated addition to recreation facilities. These will consume little water but will add greatly to the attractiveness of the State for new residents and visitors. For an arid State, Arizona has an unusually high per capita boat ownership and business connected with water sports form an important part of our economy.

The city of Phoenix is the only sizable community in Arizona which obtains a substantial portion of its water supply from streams. Most central Arizona towns depend on wells which are becoming increasingly unreliable. Actually, even Phoenix obtains about 40 percent of its supply from deep wells and the balance from the Salt and the Verde Rivers.

Both pumped and gravity flow waters are consumed in competition with other users as the Salt and the Verde Rivers and the local ground water basins are the source of our irrigation water.

During 1961, Phoenix water requirements were about one-fourth of the year's flow of water in these two streams. Disaster to local farms was prevented only by water stored from previous years and by heavy pumping.

As the population expands and an even higher percentage of water is diverted to domestic use, an erosion of the underlying agricultural base of the economy will take place which will ultimately create hardship and unemployment. Only a timely supply of Colorado River water will prevent such a tragedy.

In closing I want to point out the critical importance of new water to another basic industry—mining.

A study by the U.S. Bureau of Mines (1963)—Information Circular 8162—indicates that 1960 mineral production in Arizona required about 28 billion gallons of new water.

That is about 8,600 acre-feet.

On page 89 of that report the following appears:

* * * total 1980 intake (new, recirculated, and transferred water) by the copper industry will be 50-percent greater than in 1960, and the demand for new water will increase by 20 percent.

Arizona produces more than half of the Nation's copper, 65 percent of that from plants in central Arizona. About 85 percent of the industry's water is supplied by pumping from disappearing ground water. Since copper is of such great importance to the Nation's economic life and to its weapons of defense, the importance of Colorado River water to keep the copper industry in a vital operating condition is of grave national concern.

Thank you very much, gentlemen.

Senator Moss. Thank you.

Senator HAYDEN. Mr. Chairman, I have now about 14 other residents of Arizona who have come a long way to testify as to the need of this project.

Their testimony will also show our pressing need for this project and the present situation.

Under those circumstances, I would like to suggest that we come back at 2 o'clock this afternoon and give them an opportunity to be heard and I think with that, and tomorrow, why, we will finish it up and then go home.

Is that agreeable?

Senator Moss. Well, it is agreeable, of course.

The Senate will be in session and I understand that there will be an objection to our sitting as an official hearing.

I think we might hold a conference of this committee for the purpose of taking testimony that could be put in the record when we could officially sit and I would suggest that we do that since so many of these people have come and they have come a long way and certainly they shouldn't be asked to wait over because of this problem on the rule.

Would there be any objection to that, Senator Kuchel?

Senator KUCHEL. I am not going to make any objection to hearings this afternoon.

Senator HAYDEN. If that is the case, we might as well adjourn now.

Senator KUCHEL. Let me ask you a question, Mr. Bimson.

Senator Moss. All right. We will finish with Mr. Bimson and then we will adjourn.

Senator KUCHEL. Maybe I shouldn't say this but I have had one of my favorite relatives in the banking business in Phoenix for a long time.

So I have a great respect for you and your institution.

Mr. Bimson, you paint a rather dire picture of the future of your people, and you say in part that an erosion of the underlying agricultural base of the economy will take place which ultimately will create hardship in employment as your population increases.

You have a publication in Arizona which I guess is issued by your State government. I see it occasionally because it is an excellent magazine with wonderful colored pictures in it.

In the "Arizona Highways" issue for February and March of 1962 there is an article on the question of water in Arizona.

This was written before the Supreme Court had rendered its opinion in the lawsuit between our two States.

And in "Arizona Highways" the article goes on to say that Arizona's location in one of the most arid sections of the United States often gives rise to questions as to whether its water supply is sufficient to permit of substantial population growth. The article says:

This question can be answered quite specifically and simply and the answer is definitely yes.

I have already submitted the entire article for the record and I would be glad to read it all right now, but it says also in part:

When, as, and if Arizona's population reaches 10 million and assuming no substantial change in Arizona's water resources it appears likely that one-third to one-half of the agricultural acreage in the State would, by that time, be forced out of production. This would not be an economic calamity, because generally speaking, water is much more valuable when used to support population and industry than when it is used to raise agricultural produce.

Whenever a cow pasture or citrus grove is converted into a residential subdivision there is both a saving in water and a tremendous property increase.

It also says:

In all seriousness Arizona's water supply for normal domestic and industrial usage is one of the best in the country.

Do you disagree with that?

Mr. BIMSON. No; I don't disagree with that.

I think that would be true if you wanted to substitute the ordinary urban use of water for the agricultural use of water.

I would disagree with their figures. I think if you had a population of 10 million we would have no more agriculture on our present water supply.

Senator KUCHEL. But, sir, is not this bill designed, in the opinion of those people who testified previously here, to help agriculture?

Mr. BIMSON. Well, we weren't talking about that. We were talking about this article.

Senator KUCHEL. Yes; we were.

Mr. BIMSON. Well, I think it is possible to create—to use our present water now used in agriculture for domestic purposes, for urban purposes, to support a much greater urban population.

Also you must remember that we put our best foot forward for tourists when we write in our tourist magazines.

Senator KUCHEL. OK. It is a good magazine.

Senator MOSS. Thank you, Mr. Bimson.

And I concur with the Senator from California.

That is a very excellent magazine and one which I look forward to receiving each month.

We are now going to recess until 2 o'clock. We have scheduled some very outstanding witnesses. I have looked through the list and I am sure that the testimony that will be given this afternoon will make for a very fine record here in presenting the viewpoint of the people of Arizona on this proposed project.

This afternoon it may not be possible for me to return and if I cannot be here at 2 o'clock I will ask Senator Carl Hayden to take the chair and preside and go right forward.

So until 2 o'clock, then, we are in recess.

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

AFTERNOON SESSION

Senator HAYDEN (presiding). The hour of 2 having arrived, I will call the meeting to order.

The first witness to testify is John M. Jacobs, chairman of the board of Arizona Public Service Co., and farmer. Mr. Jacobs.

STATEMENT OF JOHN M. JACOBS, CHAIRMAN OF THE BOARD, ARIZONA PUBLIC SERVICE CO., AND FARMER

Mr. JACOBS. I am John M. Jacobs of Phoenix, Ariz. My family and I own and operate the John Jacobs farms. This brief statement will deal primarily with our production, which is fruit and vegetables, as well as cattle feeding, on our farm near Phoenix and cattle ranches operated in northern Arizona and central western New Mexico. I have grown fruits and vegetables for 42 years and in this area since 1932. I have a good general knowledge of irrigated agriculture at large over the State and particularly the central Arizona area.

In 1947, I presented testimony on the central Arizona project before this committee and hence, when I found that I was to appear before this committee on this hearing, I reviewed the statements I had made at that time as well as those I made before the committees of the House of Representatives in 1949 and 1951. I then made statements regarding production of various agricultural commodities and predictions of what might be expected in the future. I reviewed not only my own statements but those of other Arizonians who testified on various phases of our economy. Then I checked the 1962 figures on the main items to see what had actually happened in this 12- to 15-year period. My sources of information were mainly from the agricultural experiment station at the University of Arizona, the Arizona Crop and Livestock Reporting Service and the Valley National Bank. The thing that particularly impressed me was that our predictions made in those earlier hearings were uniformly too conservative. Our population increases have far surpassed our expectations. Our economy has expanded beyond our forecasts and our groundwater tables have dropped much more rapidly than we then thought possible.

My production is mainly broccoli, lettuce, carrots, brussels sprouts, romaine, endive, green onions, rapini, and so forth; also citrus and table grapes. There have been around 100,000 acres in fruits and vegetables produced annually continuously since 1947 in Arizona. Last year Arizona shipped over 58,000 carloads, mostly to the major Eastern and midwestern cities and to the west coast. The bulk of this tonnage was through the winter months when agriculture in all of the North and most of the Eastern and Midwestern States were dormant. None of these crops are supported.

In fact, Arizona's income from Government subsidies in agriculture is very light. While fruit and vegetable acreage has not changed materially, production has increased substantially due to better technology and more scientific methods of farming. Costs of production, of course, have risen materially. Increased production has fairly well stood off this extra cost of production. The general water table in the area in which I farm has dropped an average of approximately 10 feet per year for the past 10 years. My farming is all done by pump irrigation from deep wells, developed mainly from 1940 to 1945. We have very good records from 1951 to 1962 which show a cost per acre-foot of \$6.85 in 1952 increasing to \$9.76 in 1962, a 42-percent increase. Our average use of water per crop of vegetables ranges from 3 to 4 acre-feet, depending on the length of time of maturity of any given commodity and seasonal temperature. We have sumps at low points in various locations on our farm for the purpose of gathering the so-called waste water, which is repumped back up to higher points where it is added with the virgin pump water and we use this water over and over, until it almost becomes dusty, in order to cut down waste and hold irrigation costs as economical as possible.

Many acres of pump-irrigated land have gone out of production. In my general area some entire farms have gone out of production due to the drop in the water table, others are rotating, leaving part out each year—most have cut down to one crop per year.

There are other areas that are affected to a greater or lesser degree. The lowering water table exists throughout most of the central Arizona project area and will get progressively worse until we can get Colorado River water to supplement our dwindling supply. Total

agricultural production and yields per acre have increased, due to modernization of equipment, improved seed varieties, better farming methods and all around know-how. Agriculture has become far more scientific than it was even 10 years ago. The agricultural production has gone up; likewise costs of labor, farm equipment, supplies, fertilizer, insecticides, et cetera; volume has substantially increased.

We have employed Navajo Indians very successfully since 1942 in a lot of our farmwork, mainly in our harvesting. We provide them transportation from the reservation starting in our November harvest and returning them in the spring as we finish. This covers our peak need and is very satisfactory to them as most of them have homes on the reservation and some have small farms and herds which require their work on the reservation during summer months. Also, the Indians like to winter in this milder climate and can earn sufficient to carry themselves and families, and many have taken back substantial savings each season. We have had from 150 to 250 on our ranch from November to spring, with a few working the year round. They have taken hold well and are doing a creditable job in the work assigned them.

Arizona's cattle production has increased primarily due to heavy influx of cattle from other States, as the desert areas of Arizona have proved to be very desirable as feeding grounds for finishing out cattle for market. These cattle go mainly to the west coast with some being marketed in the Midwest. Cash income from cattle finished for market, has more than trebled since 1951 and this cattle concentration for fattening for market has created a local market for much of our irrigated feeds. We produce a well-rounded supply of feed for proper rations for cattle feeding, which are barley, maize, alfalfa, ensilage, and cotton seed. We are now an importer of considerable cereals from other States for cattle feeding—from adjoining States and as far away as Kansas, Oklahoma, and Texas.

Arizona continues to produce sugarbeet seed for approximately 60 percent of our national beet sugar production.

The drop in our water table has continued at an alarming rate, which points up the real urgency for an authorization and speed forward with the development of the central Arizona project. We said in the previous hearings that this was a feasible project and with the vast growth that has come to Arizona and the population that must be taken care of in our metropolitan areas, along with the industrial developments in this area, a more solid and more highly diversified economy has been built that leave no question about the feasibility of this project, and certainly there can be no question about the need, as we have already started a reversion of good land to the desert and I am confident there is no choice except for a continuation of more of this land going out. Remember most of these are highly developed lands that have produced well but simply need supplemental water.

While I have spoken mainly of my own production with which I am most familiar, still I have a general knowledge and close acquaint-

tance with much of the irrigated areas in Arizona, as chairman of the board of Arizona Public Service, which is the largest utility in Arizona serving electricity or gas or both to 10 of our 14 counties. In our total area, on a survey that we made in 1962, we serve power for pumping on a gross of 563,210 acres. To give this service we generate all of the power that is used by independent pumpers in unorganized districts. However, in organized irrigation districts and in the power districts which have hydropower contracts we supplement with steam-generated energy and perform a service on the whole power supply.

I might explain that formerly we had considerable hydropower but not being a preference customer and under the recapturable regulation, we were asked to relinquish, and did release, this power to various districts in 1962, prior to the expiration of a contract which ran until 1964, and have only 50 kilowatts of hydropower remaining under contract; however, we have steam generation for approximately 1 million kilowatts of power, from which we supplement the shortages to a number of the districts that we serve in our franchised area. We also serve some areas with gas for pumping.

The territory that Arizona Public Service serves is well representative of the State agricultural commodity production. Due to favorable climate, Arizona produces approximately half of the U.S. production of long staple cotton, which is not in surplus, and only slightly over 2 percent of the short staple acreage.

Feed grains and hay, cattle ranching and feeding for market, dairying, poultry raising, and practically all varieties of fruits and vegetables are grown in the State. Timber is also an important item of harvest for lumber and pulp. Arizona has a well-balanced economy that adds greater stability to the central Arizona project development. Manufacturing now produces Arizona's largest gross income, with livestock and our highly diversified agricultural crop production second, closely followed by mining; and, of course, Arizona has a substantial tourist business that adds to our metropolitan population and its required service.

At \$10 per acre-foot, the total water available to Arizona will be oversubscribed, the municipal need is already substantial, and by the time this project is a reality the municipal need will have increased materially. We are not bringing in new land under this project, we will be rehabilitating some farms already out of production and saving many more that will go each year. Having a well-developed farm without water is like having a good piece of equipment without fuel to operate it. I'm sure authentic figures will be in the record to support the need and economic feasibility of this and it is an area well worth your support.

Senator HAYDEN. I want to compliment you, sir, upon a statement which clearly demonstrates the loss to the Nation as a whole if we do not obtain the water required from the Colorado River to carry on this project. Thank you, sir.

The next witness is Dean Harold E. Myers, School of Agriculture of the University of Arizona.

STATEMENT OF DEAN HAROLD E. MYERS, COLLEGE OF AGRICULTURE, UNIVERSITY OF ARIZONA; ACCOMPANIED BY DR. J. S. HILLMAN, PROFESSOR OF AGRICULTURAL ECONOMICS AND HEAD OF THE DEPARTMENT OF AGRICULTURAL ECONOMICS, UNIVERSITY OF ARIZONA

Mr. MYERS. Senator Hayden, I am Harold E. Myers, dean of the College of Agriculture, the University of Arizona. With me is Dr. J. S. Hillman, professor of agricultural economics and head of the Department of Agricultural Economics, the University of Arizona.

Agriculture is a major factor in Arizona's economy. About one-fourth of all people employed in Arizona are engaged in agriculture directly or in industries and services dependent upon agriculture.

Arizona agriculture is predominantly based on the irrigation of desert valleys. At the beginning of the century less than 200,000 acres were irrigated, most of which were irrigated by diverting surface water from streams. Beginning about 1920, the groundwater used for irrigation purposes became an important factor and, except for Yuma County and the San Carlos irrigation project, additional irrigation water since that era has come from pumping. The greatest acreage ever irrigated in the State was in 1953 when 1,300,000 acres were irrigated. Acreage has declined since that time. The approximate reduction of 150,000 acres has been largely concentrated in Pinal and Maricopa Counties.

Historically, the economy of Arizona has been heavily dependent on income and raw materials produced in the agricultural sector. Arizona farms produced crops valued at over \$325 million in 1962. Another \$226 million of livestock and livestock products were produced. Gross value of agricultural production in Arizona compares favorably with income produced in other sectors of Arizona's economy as indicated by chart 1 over here to the side.

The second chart shows that agriculture since World War II has varied between 25 and 41 percent of total income from agriculture, manufacturing, mining, and tourists, averaging about 30 percent (data in table 1). In spite of recent rapid increases in manufacturing, agriculture has managed to hold its own since 1955. If water supplies had been available in recent years in the same magnitude of early postwar years, agricultural income might have been even greater.

In addition to the value of crops produced, worth noting is the wide variety of crops grown on Arizona farms, including citrus, grapes, lettuce, melons, a wide variety of other vegetables and specialty crops, including commercial rose production. The national supply of some horticultural products such as lettuce and melons is heavily dependent on Arizona production during certain seasons.

NEED FOR ADDITIONAL WATER

An increased pumping lift, coupled with other factors, is resulting in a continued reduction of land irrigated in Arizona. Pinal County, an area largely dependent on pumping, decreased from 315,000 irrigated acres in 1952 to 258,000 irrigated acres in 1962, and a more dramatic drop is in prospect unless a supplemental water supply is found. A severe economic loss results when land, prepared for crop production through irrigation, goes out of production. The high level of investment in land preparation, wells, equipment, and other resources required for development may be of little value.

The importance of agriculture and the resultant loss, should agriculture decline decidedly, can be adduced from facts published recently by a California growers' organization.¹

Using their information and recognizing the similarity between the two agricultures, it appears that for every 100 employed in agriculture another 250 or more are employed in closely related industries such as processing, packaging, transporting, storing, and selling. Farming in itself accounts directly for about 30,000 jobs in Arizona. This becomes of much greater importance, something close to 100,000 jobs, when such multiplier effects are taken into consideration. This was about one-fourth of all people employed in Arizona in 1960.

LOSSES DUE TO UNCERTAINTY

A good example of losses which plague agriculture because of water uncertainty in the San Carlos irrigation project located in eastern Pinal County. Less than half of the developed area of this project, which comprises 100,000 acres, can be planted to crops in any given year due to the shortage of water.

Compounding the San Carlos problem is the fact that the flow from the Gila and San Pedro is so erratic that farmers cannot make efficient use of the water which is available. Farmers don't know at planting time how much water will be available. Hence, not only is water inefficiently used but so are other resources due to economic uncertainty. Supplemental water from the Colorado River could contribute considerably to farm income by providing a certain amount of stability. But, the need for this stability should not be interpreted as a request for water to develop new land for irrigation, since there is to be no new irrigated land under the proposed project.

Stability alone is an important fact to be desired in agriculture. A recent study by the Department of Agricultural Economics, the University of Arizona points out the effects of this unstable water situation on the farmer decisionmaking process in the San Carlos project area. This study shows that the low probability of having sufficient

¹ Council of Agricultural Growers, "Agricultural Briefs on California."

water during the latter part of the growing season has restricted farmers from planting the crops which would yield the highest returns. A supplemental stable water supply would not only stabilize the agriculture of the San Carlos area but also would assist in stabilizing the community and State.

VALUE TO ARIZONA OF GROUND WATER USED IN AGRICULTURE

Arizona produces crops on about 800,000 acres of land by using irrigation water pumped from underground. In 1962 the value of crops produced on this acreage was \$220 million. The \$220 million received currently for the crops produced on these 800,000 acres will continue annually so long as groundwater is available to be pumped at economical costs, assuming no changes in price relations, technology, and irrigation practices. We estimate that on the average over the pump water areas in the State, the water table is falling about $6\frac{1}{2}$ feet per year and will reach the limit of economic pumping in about 24 years assuming no change in technology or price structure.

If these \$220 million per year could be received indefinitely because the water table could be prevented from receding, these dollars would continue to flow indefinitely through the Arizona economy continuing to generate incomes to the State's economy. However, if the agriculture dependent on groundwater for its irrigation disappears after 24 years, then, beyond that time, these \$220 million will no longer be available to perform their service of generating income in the State's economy.

How much will this damage the State economically? Let's put it this way—

\$220 million annually in perpetuity at 5 percent discount is worth \$4,400 million today.

\$220 million annually for only 24 years, again at 5 percent discount, is worth \$3,036 million today.

The difference between \$4,400 million and \$3,036 million is \$1,364 million. This means that, as of today, the economy of the State of Arizona stands to take a loss of \$1,364 million if some means is not found to prevent the ultimate and inevitable disappearance of that part of its agriculture now dependent on pumped water. This estimated loss of \$1,364 million is far in excess of the estimated construction cost of the central Arizona project.

This is the minimum loss to the State if the decline in the water table is not arrested. This loss takes only partial cognizance of the loss of other incomes generated in the State through the multiple respond-

ing of this agricultural income. Data do not reveal how big this multiplier effect may be; but if it is, as is often suggested, as much as four times the net value added to cultivated crop agriculture, then the present value of the total loss to the Arizona economy brought about by the continued decline in the ground-water level may be as much as \$2,828 million (app. I).

The total estimated loss of the crop producing capacity plus the assumed multiplier effect of the loss crop income becomes a calculated \$4,192,000, more than four times the estimated cost of the central Arizona project.

The Department of Agricultural Economics, the University of Arizona, estimates that there are about 43,000 jobs dependent on agriculture (app. II). These are jobs supplying inputs for Arizona agriculture. These are the "pull" effects. The "push" effects of agriculture on jobs in the State, or those in transportation, processing, and other sectors, are probably equally as important which approximates the 100,000 jobs figure mentioned earlier.

The above analysis does not take into consideration the tremendous direct loss of investment in land and improvements which occurs when land goes out of production completely. The salvage value of water in terms of investments saved adds to the economic necessity for supplementing pump water in central Arizona with other supplies.

(The attachments referred to follow:)

TABLE 1.—Major sources of Arizona income, 1947-61

[Dollar amounts in millions]

Year	Agriculture		Manufacturing		Mining		Tourist		Total amount ¹
	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	
1947.....	\$182.8	32.59	\$117.0	20.86	\$186.1	33.18	\$75.0	13.37	\$560.9
1948.....	223.0	34.34	136.0	20.94	200.4	30.86	90.0	13.86	649.4
1949.....	240.0	36.86	130.0	19.97	181.1	27.81	100.0	15.36	651.1
1950.....	278.0	38.06	145.0	19.85	207.4	28.40	100.0	13.69	730.4
1951.....	388.0	41.19	190.0	20.17	243.9	25.89	120.0	12.75	941.9
1952.....	433.4	41.08	255.0	24.17	231.7	21.96	135.0	12.79	1,055.1
1953.....	379.0	34.28	320.0	28.94	256.6	23.21	150.0	13.57	1,105.6
1954.....	393.0	35.48	300.0	27.09	254.5	22.98	160.0	14.45	1,107.5
1955.....	347.0	27.32	365.0	28.73	378.3	29.78	180.0	14.17	1,270.3
1956.....	392.0	25.67	450.0	29.47	485.0	31.76	200.0	13.10	1,527.0
1957.....	411.5	27.09	510.0	33.57	372.6	24.53	225.0	14.81	1,519.1
1958.....	433.5	28.00	550.0	35.53	314.5	20.32	250.0	16.15	1,548.0
1959.....	426.9	25.35	650.0	38.60	326.9	19.42	280.0	16.63	1,683.8
1960.....	485.2	25.66	700.0	37.02	415.8	21.99	290.0	15.33	1,891.0
1961.....	503.5	25.09	750.0	37.37	433.4	21.60	320.0	15.94	2,006.9
Annual average..	367.8	30.23	371.2	30.51	299.2	24.60	178.3	14.66	1,216.5

¹ Sum of income from the 4 major sources. This is not to imply that this is the total gross income of the State.

CHART 1

Major Sources of Arizona Income

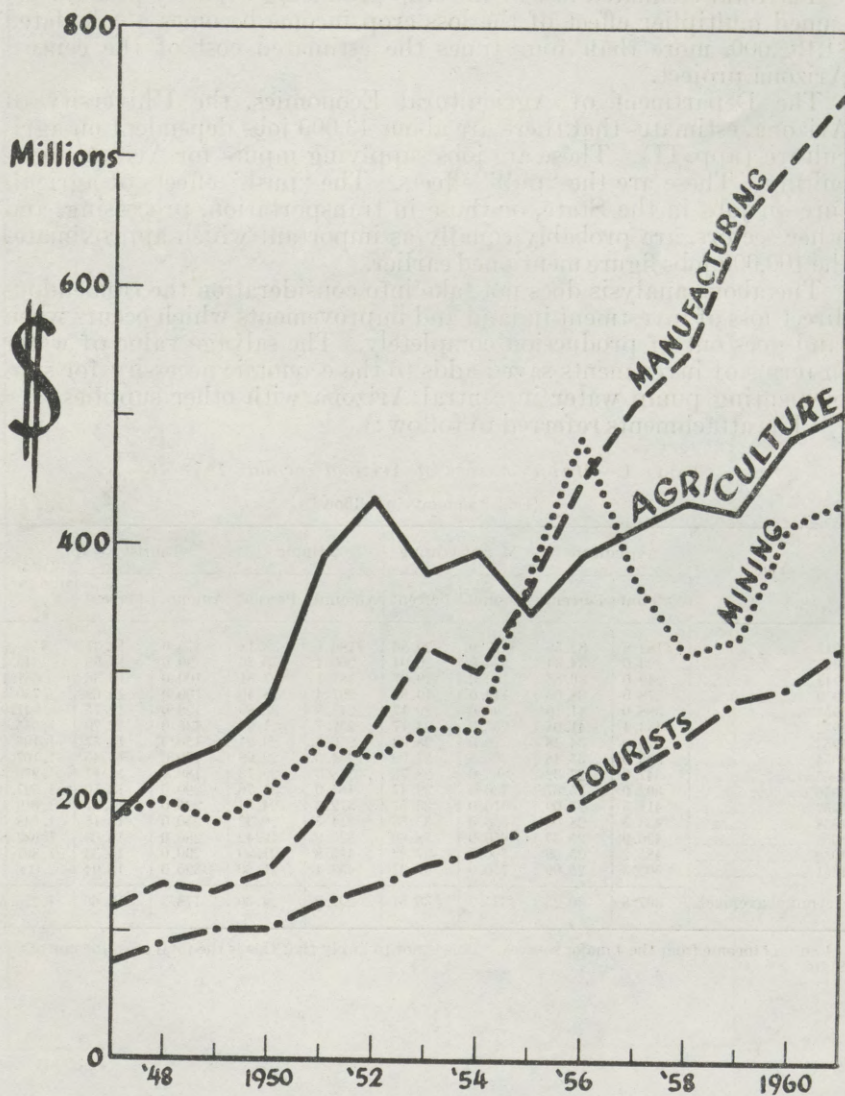
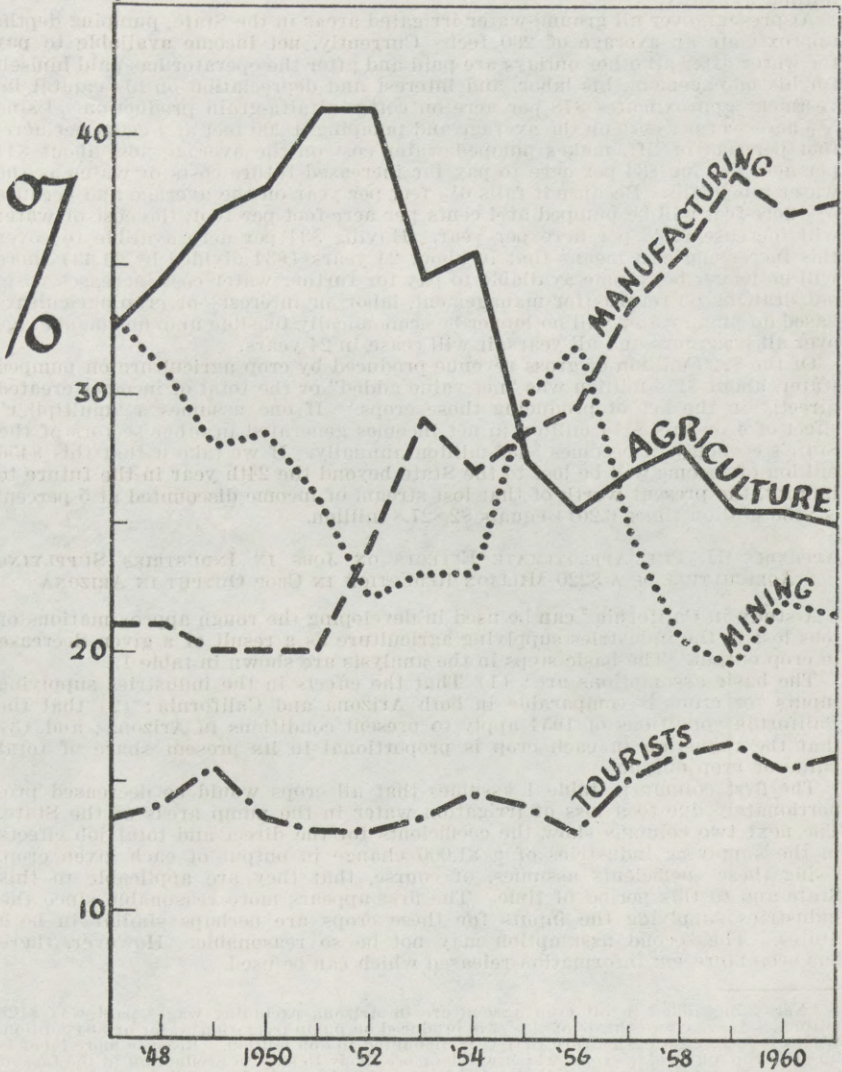


CHART 2

Percentage Comparison of Arizona Income Sources

Percentage



APPENDIX I

Total output from crop agriculture in Arizona in 1962 approximated \$330 million, virtually all produced under irrigation. About two-thirds of Arizona's annual water use is drawn from ground-water supplies. Thus, if we assume that two-thirds of our annual irrigation water is pumped and that two-thirds of our crop production depends on pumped water, then the annual value of crops depending on ground-water withdrawals is two-thirds of \$330 million, or \$220 million annually.

At present, over all ground-water irrigated areas in the State, pumping depths approximate an average of 200 feet. Currently, net income available to pay for water after all other outlays are paid and after the operator has paid himself for his management, his labor, and interest and depreciation on his capital investment approximates \$78 per acre on cotton-alfalfa-grain production. Using $5\frac{1}{2}$ acre-feet per acre on the average and pumping it 200 feet at 4 cents per acre-foot per foot of lift, makes pumped water cost on the average now about \$44 per acre leaving \$34 per acre to pay for increased future costs of water as the water table falls. Because it falls $6\frac{1}{2}$ feet per year on the average and because $5\frac{1}{2}$ acre-feet will be pumped at 4 cents per acre-foot per foot, the cost of water will increase \$1.43 per acre per year. Having \$34 per acre available to cover this increasing cost means that in about 24 years (\$34 divided by \$1.43) there will no longer be income available to pay for further water cost increases without drawing on returns for management, labor, or interest—or crop agriculture based on pump water will no longer be economically feasible and, on the average over all irrigators and all years, it will cease in 24 years.

Of the \$220 million of gross revenue produced by crop agriculture on pumped water, about \$114 million was "net value added" or the total of incomes created directly in the act of producing those crops.¹ If one assumes a "multiplier" effect of 4 on this \$114 million in net incomes generated in other sectors of the State's economy, it becomes \$456 million annually. If we take it that this \$456 million of income will be lost to the State beyond the 24th year in the future to infinity, the present worth of that lost stream of income discounted at 5 percent is \$456 million times 6.2014 equals \$2,827.8 million.

APPENDIX II. THE APPROXIMATE EFFECTS ON JOBS IN INDUSTRIES SUPPLYING AGRICULTURE OF A \$220 MILLION REDUCTION IN CROP OUTPUT IN ARIZONA

A study in California² can be used in developing the rough approximations of jobs lost in the industries supplying agriculture as a result of a given decrease in crop output. The basic steps in the analysis are shown in table 1.

The basic assumptions are: (1) That the effects in the industries supplying inputs for crops is comparable in both Arizona and California; (2) that the California conditions of 1954 apply to present conditions in Arizona; and (3) that the reduction in each crop is proportional to its present share of total value of crop output.

The first column in table 1 assumes that all crops would be decreased proportionately due to a loss of irrigation water in the pump areas of the State. The next two columns show the coefficients for the direct and total job effects in the supplying industries of a \$1,000 change in output of each given crop. Using these coefficients assumes, of course, that they are applicable to this State and to this period of time. The first appears more reasonable since the industries supplying the inputs for these crops are perhaps similar in both States. The second assumption may not be so reasonable. However, there has been no recent information released which can be used.

¹ Net value added in all crop agriculture in Arizona excluding wages paid was \$126 million. Assume two-thirds of this was produced on pump irrigation water or \$84 million. Wages paid in crop agriculture that year amounted to \$59 million. Because more labor is hired in the high value crops, which will be more likely to stay in production in the face of water shortage, we assume one-half of this wage bill instead of two-thirds of it would be lost if crop agriculture on pump-water lands ceases. So, \$84 million plus \$30 million gives the \$114 million of "net value added" in pump irrigated crop agriculture that will be "lost" when pump irrigation no longer is economical. Data from 1958 were used because later data were not available, and because the examination of later data indicates there was not a great difference in magnitude in "net value added" between 1958 and 1962.

² William E. Martin, "A California Interindustry Analysis Emphasizing Agriculture," Ph. D. thesis, University of California, Berkeley, September 1961.

If we make the assumptions outlined above, then the total reduction in jobs in the industries supplying inputs into agriculture is estimated at something like 34,000. It must be remembered that this estimate covers only the job effects in the supplying industries; that is, the "pull" effects. The "push" effects; that is, those effects in the transportation and processing industries, are not covered in this estimate. Neither are the income effects accounted for. Although we have no good estimates of these push effects and income effects on jobs, they probably would exceed the effects in the input industries.

TABLE 1.—*An estimate of the decrease in jobs in the supplying industries resulting from a \$220,000,000 reduction in crop output*

Arizona crops	Percent of total income	Volume of output reduced by loss of pump water, ¹ in millions of dollars	Jobs per \$1,000 of agriculture output ²		Approximate decrease in jobs due to loss of pump water ³	
			Direct	Total	Direct jobs	Total jobs
Grains.....	10.1	22.2	0.09762	0.14007	2,167	3,110
Cotton.....	49.5	108.9	.14807	.18462	16,124	20,105
Vegetables.....	21.8	48.0	.19600	.22396	9,408	10,750
Citrus.....	2.7	5.9	.20855	.23777	1,230	1,403
Forage.....	10.7	23.6	.18578	.22199	4,384	5,239
Miscellaneous.....	5.2	11.4	.17513	.21029	1,996	2,397
Total.....	100.0	220.0	-----	-----	35,309	43,004

¹ Total crops output equals \$306,400,000 in 1960. Estimated loss in value due to loss of pump areas equals \$220,000,000. The proportionate value for each crop is assumed to be equal to the value it assumed in 1960.

² Taken directly from W. E. Martin, "A California Interindustry Analysis Emphasizing Agriculture," (table 16). He gives these coefficients as coefficients of final demand. We assume that total supply equals total demand for the State, therefore we assume that these coefficients can be used in determining jobs lost due to the reduction in agricultural output (supply).

³ This estimates only the effects in industries supplying inputs into the agricultural sector. The input-output model cannot estimate the "push" effects; that is, in this case, the effects in the processing industries and the income effects.

Senator HAYDEN. Thank you for your statement. I would like to remind my good friend from California that I attended the hearings when the Congress justified the construction of the central California project in the San Joaquin Valley.

Senator KUCHEL. We wouldn't have that project without friends like you, Senator.

Senator HAYDEN. The points were then made just as this witness has done, about the great economic loss to the Nation if the water was not supplied, and I was happy at that time to be helpful and I am sure in due time you will be here too.

Thank you.

Senator GOLDWATER. Mr. Chairman, might I ask that a letter appearing in the record on this project in the 81st Congress, 1st session, House Document No. 136, a letter appearing on page 15 to the Honorable J. A. Krug, signed by Earl Warren, the Governor of California, in which he makes this statement among others, referring to the suit.

Whenever it is finally determined what water belongs legally to Arizona, it should be permitted to use that water in any manner or by any method considered best by Arizona so long as that use does not conflict with the right of California to the use of its water from the Colorado River system.

I ask that that letter be made a part of the record.

Senator HAYDEN. Without objection the letter will be included in the hearing record.

(The letter referred to follows:)

STATE OF CALIFORNIA,
GOVERNOR'S OFFICE,
Sacramento, December 29, 1948.

HON. J. A. KRUG,
Secretary of the Interior,
Washington, D.C.

MY DEAR MR. SECRETARY: There is transmitted herewith a report of the California State Division of Water Resources commenting on your proposed report, dated February 5, 1948, on the central Arizona project, which was received on February 9, 1948. The appendixes volume of substantiating material of your report was received on February 17, 1948. The report of the division of water resources was prepared in collaboration with and approved by the Colorado River Board of California and approved by the State director of public works.

In transmitting this report, I wish to call attention specifically to the following statement in the letter, dated January 26, 1948, of the Commissioner of Reclamation, which was approved by you on February 5, 1949:

"Assurance of a water supply is an extremely important element of the plan yet to be resolved. The showing in the report of the availability of a substantial quantity of Colorado River water for diversion to central Arizona for irrigation and other purposes is based upon the assumption that claims of the State of Arizona to this water are valid. It should be noted, however, as the regional director points out, that the State of California challenges the validity of Arizona's claims. If the contentions of California are correct, there will be no dependable water supply available from the Colorado River for this diversion. While water is physically available in the Colorado River at the present time, and is wasting to the sea, the importance of the questions raised by the divergent views and claims of the States is apparent. The Bureau of Reclamation of the Department of the Interior cannot authoritatively resolve this conflict. It can be resolved only by agreement among the States, court action, or by an agency having proper jurisdiction. It is assumed that the Congress, in considering this proposed project will give this conflict the full consideration it deserves.

"The submission of this report is not intended in any way to prejudice full consideration of this controversial matter, nor should this report be construed as affecting the water rights of Indians or Indian reservations."

With respect to the foregoing matter, a controversy has existed between California and Arizona for many years as to their respective claims to Colorado River water. Conferences held on this subject throughout the years have not brought about a solution, and as the present and future needs become more critical the situation will probably become more acute. It is unfortunate that such is the case and I had hoped that a way could be found to settle the differences in a prompt and friendly manner. To that end I made the written suggestion to the Governor of Arizona on March 3, 1947, that we endeavor to resolve our differences by one of three methods. These methods are, in order of preference, (1) by written agreement between the States; (2) by arbitration; or (3) by suit in the Supreme Court of the United States which, in my opinion, could be submitted on an agreed statement of facts. No agreement resulted from this proposal of mine, but I am of the firm belief that such action is still highly desirable and in the best interests of both Arizona and California. I renew that offer at this time and would welcome the assistance of the Secretary of the Interior or of the Congress to bring about that result.

Until there is a final settlement of the water rights by some method, the aggregate of Arizona and California claims to Colorado River water will exceed the amount of water available to the lower basin States under the Colorado River compact and relevant statutes and decisions. It is only because a determination of the respective rights of the lower basin States to the waters of the Colorado River system has not been made, that California submits any criticism of your proposed report. Whenever it is finally determined what water belongs legally to Arizona, it should be permitted to use that water in any manner or by any method considered best by Arizona, so long as that use does not conflict with the right of California to the use of its water from the Colorado River system. However, as long as the present unsettled situation exists, it is my opinion that each State in the lower basin must of necessity interest itself in the others' projects which would overlap its claims. For this reason the State of California cannot concur in the proposal of the Secretary of the Interior for the authorization and construction of the central Arizona project. Accord-

ingly, the attached report of the division of water resources deals with matters of water supply, water requirements and utilization, and feasibility of the central Arizona project.

In conclusion, I respectfully request that this letter and the concluding comments and recommendations set forth in the report of the division of water resources, as approved by the director of public works, be considered as expressing the views and recommendations of the State of California on your proposed report on the central Arizona project, and further request that both the report and this letter be transmitted to the President and the Congress.

Sincerely,

EARL WARREN, *Governor.*

Senator KUCHEL. I think that is a good letter and I think the sentence that my friend, Barry Goldwater, has just read is precisely the philosophy that would guide any representative of California here today.

Senator HAYDEN. The next witness is Mr. Samuel F. Turner, a consulting engineer, subject: dendrochronology as an aid in the ascertainment of wet and dry cycles. That is tree rings.

STATEMENT OF SAMUEL F. TURNER, CONSULTING GEOLOGIST AND ENGINEER, PHOENIX, ARIZ.

MR. TURNER. Mr. Chairman and members of the committee, my name is Samuel F. Turner. I am a consulting engineer and geologist specializing in hydrology. I was raised on an irrigated farm in New Mexico. I attended the Colorado Agricultural and Mechanical College, at Fort Collins, Colo., and graduated with a degree of bachelor of science in civil and irrigation engineering in 1926. I received a master's degree in geology from the George Washington University in 1929. From September of 1929 to June of 1952, I was with the U.S. Geological Survey. I have been a consulting engineer with offices in Phoenix, Ariz., since June of 1952.

I have done extensive work in hydrology where long-term flow records were of greatest importance. Our streamflow and weather records both are of comparatively short duration, with the earliest weather records going back to about 1855 and the earliest streamflow records to just before 1900. Thus, the existing data in Arizona records just one long wet spell followed by a long drought.

To increase this period of record so that we may better determine what we can expect in the future we have dendrochronology, the science of tree rings. The science of dendrochronology proves that there is a direct correlation between the annual growth of rings of trees and the amount of soil moisture available in any given year. Thus we are able to deduce the relative amounts of soil moisture available from year to year historically for the life of specific tree specimens, and from that establish relative precipitation in the life-span of the specimen trees measured. By various scientific means the period in which a tree specimen was a growing tree can be determined. That applies to archeological specimens.

Dr. A. E. Douglass of the McDonald Observatory at the University of Arizona was the originator of the study of tree rings. He discovered their value in a search for the relationship between sunspot cycles and weather cycles on the earth. His work was continued by his assistant Dr. Edmund Schulman. Among the publications I have used in my studies are those entitled "Tree-Ring Hydrology of the

Colorado River Basin" by Edmund Schulman, "University of Arizona, Laboratory of Tree-Ring Research," Bulletin No. 2, October 1, 1945, and "Dendro-Climatic Changes in Semiarid America" also written by Dr. Schulman in 1950. Plate 3 of the Colorado River Basin report gave the tree-ring indices in the Colorado River Basin as a whole and for its principal divisions. The record for the Colorado River Basin above Lee's Ferry began in the year 1250 and continued through 1944. This was brought up through 1950 by using the Colorado River in Lees Ferry from figure 8 on page 50 of the report on semiarid America. On this graph Dr. Schulman compares the variation in tree-ring growth with the runoff of the Colorado at Lees Ferry.

For many years I have maintained a graph showing the accumulated departure from average of the precipitation for the State of Arizona. This has proven to be such an effective method of showing what was happening that I have adapted it to tree-ring growth. I have prepared a graph comparing the average Arizona precipitation with the available tree-ring records in Arizona. These correlated very well but the Arizona tree-ring records went back only to the year 1600. The longest record in the Colorado River Basin area was that for the Colorado Basin above Lee's Ferry which dates back to 1250. This was graphed in the search for long-term cycles. This illustration is given in the back of the report which you have.

Dr. Schulman's tree-ring graphs indicated the variation from the average growth rate for the period of record. I converted the material to my cumulative graph by measuring the variation from average with a metric scale and plotting these changes on my graph using a scale which gave variations approximately equal to the weather variations. A copy of this graph is attached to this statement.

On the right hand side of the graph there appears the cumulative departure from the average flow of the Colorado River at Lee's Ferry as set forth in the *Arizona v. California* exhibit No. 201A and as derived from Arizona exhibits 197 and 77-B. The figures graphed varied from those in the exhibits named due to the fact I brought the runoff data through 1961 and used a new average of 15,002,000 acre-feet per year and the deviations were recomputed.

The graphic record of the cumulative variation from average flow at Lee's Ferry bears a remarkable resemblance to the tree-ring record for the area above Lee's Ferry. This close comparison of the two curves justifies the conclusion that the runoff of the Colorado River in previous years, back through the year 1250, would have been similar to the tree-ring records as shown on the graph.

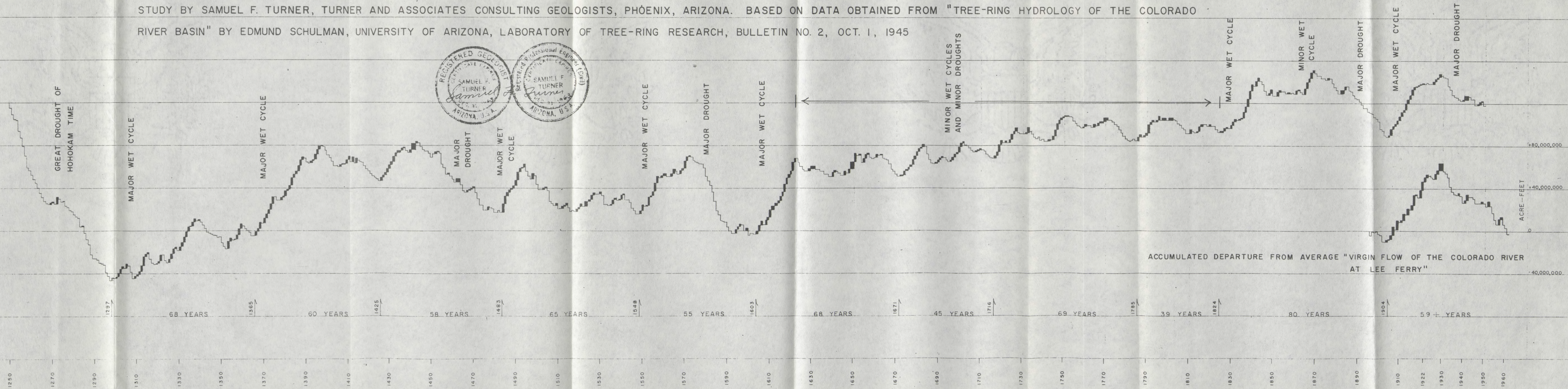
The tree-ring record starts with the record of the great drought which drove the Hohokam Indians from this area. This was the greatest drought shown by the record. The present drought will be equal to that if it continues for another 20 years.

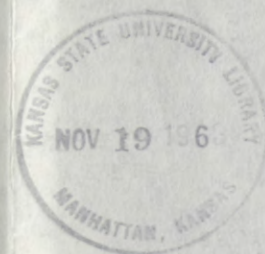
I have indicated the major wet cycles and major droughts on the graph. My study accented the wet cycles and I have darkened in the years in which the growth was above normal. One thing that stands out is that every major drought was followed by a major wet cycle, and minor droughts seem to be followed by minor wet cycles.

The period from 1622 to 1824 was characterized by minor wet cycles and minor droughts, but on the whole during this 200-year period

ACCUMULATED DEPARTURE FROM AVERAGE RATE OF GROWTH AS INDICATED BY TREE RINGS IN COLORADO RIVER BASIN ABOVE LEE'S FERRY

STUDY BY SAMUEL F. TURNER, TURNER AND ASSOCIATES CONSULTING GEOLOGISTS, PHOENIX, ARIZONA. BASED ON DATA OBTAINED FROM "TREE-RING HYDROLOGY OF THE COLORADO RIVER BASIN" BY EDMUND SCHULMAN, UNIVERSITY OF ARIZONA, LABORATORY OF TREE-RING RESEARCH, BULLETIN NO. 2, OCT. 1, 1945





there was a gradual increase in the accumulated departure from normal. A major wet cycle began in 1825 and was followed by a minor drought and a minor wet cycle and then by a major drought which started in 1869 and ended in 1904, with only one very minor wet cycle to relieve the distress. The wet cycle which started in 1905 and continued through 1929 was contemporaneous with most of the Colorado River flow record that was available when the Santa Fe compact was signed in 1922. The drought which started in 1930 and has continued to 1963 has countered the effect of the wet cycle and we have had below normal runoff during this period.

In my study the start of each major wet cycle was marked on the graph. The average number of years separating these periods was 57 with the minimum being 41 and the maximum being 77 years. Thus, we note that according to the averages, 1963 would well mark the beginning of another major wet cycle. If we go to the maximum time, it could be another 20 years and would give us another drought equal to the one which drove the Hohokam from their homes.

I believe that my graph shows that we will have wet cycles occurring which will give flows in the Colorado River at Lee's Ferry which will approximately equal those which occurred during the wet cycles 1905-29, inclusive. Although our streamflow record covers only one wet cycle and one dry cycle it is believed that the average flow from these two cycles of 15 million acre-feet per year is a reasonable average for the Colorado River in the future not considering upstream storage dams and other manmade factors which influence this flow. The tree-rings indicate that two of the previous weather cycles were greater than the wet cycle of record, 1905-29. These were the wet cycles starting in 1365 and ending in 1396 and the one starting in 1603 and ending in 1627. This would indicate that the average might actually be somewhat higher than 15 million acre-feet.

If the year 1963 turns out to be the start of another wet cycle, we should have about 20 years of somewhat above average precipitation and runoff. This will give time to pursue other means of increasing the runoff to the Colorado River and saving more of this water for beneficial use.

Senator HAYDEN. Any questions?

Senator KUCHEL. That is a most interesting paper, Mr. Turner. I listened to you with great interest.

You said in part, quoting from your statement on page 4:

The figures vary from those in the exhibits named due to the fact that I brought the runoff data through 1961 and used a new average of 15,002,000 acre-feet per year, and the deviations were recomputed.

That would be the average in the Colorado River over what period of time?

Mr. TURNER. The average in the Colorado River from the start of the flow record, which was 1896.

Senator KUCHEL. And you forthrightly suggested that the storage dams now under construction and those authorized in the upper basin would, of course, affect that amount?

Mr. TURNER. Yes.

Senator KUCHEL. As they are built.

Mr. TURNER. I did not attempt to estimate any effect.

Senator KUCHEL. I think, Mr. Chairman, we should have in this record the capacity of the storage projects in the Upper Colorado River Basin from the Department of Interior.

Senator HAYDEN. I can't see that that is of much concern to us, although we can have it readily put in the record, inasmuch as the Colorado River compact divides the water between the two basins, and they cannot take more out of the river than they are allowed in the compact.

(The material referred to is as follows:)

Capacities of reservoirs on main stem, Colorado River and tributaries

Reservoir	Storage, acre-feet	
	Active	Total (exclusive of surcharge)
Lake Havasu (Parker)	619,400	648,000
Lake Mohave (Davis)	1,809,800	1,818,330
Lake Mead (Hoover)	28,427,000	31,047,000
Lake Powell (Glen Canyon)	20,876,000	27,000,000
Flaming Gorge	3,515,700	3,788,900
Fontenelle ¹	150,000	345,000
Navajo	1,036,100	1,708,600
Crystal ²	16,430	38,190
Morrow Point ^{1 2}	42,120	117,190
Blue Mesa ^{1 2}	748,500	940,800

¹ Data from construction specifications.

² H. Doc. No. 77, 88th Cong., 1st sess.

Senator HAYDEN. Any questions, Senator Goldwater?

Senator GOLDWATER. Just one.

What would be, in your estimation, the lowest runoff at the bottom of the major dry cycle?

Mr. TURNER. I am sorry, I couldn't say. I have no way. It would be probably less than we have had in this dry cycle, because the first great dry cycle was of longer duration than the one we are having now; but how much less I couldn't say, sir.

Senator GOLDWATER. On your vertical column on the right, you have a zero line. Then you run minus 40 million and up to plus 80 million.

What is the minus 40 for?

Mr. TURNER. We started, first computed the average, and then the first year of streamflow record was below average, so it was minus. We came down.

Then the next year was above, and we went back up to the average.

Then the several ensuing years were less than average, and we had accumulated deficiency below the average flow.

Then, for a long while, we had above average and went above average.

This is just a plotted amount of the change from average.

Senator GOLDWATER. Yes.

Mr. TURNER. And we accumulate to see whether we are gaining or losing.

Senator GOLDWATER. Now referring to the two graphs at the right side of the paper, the accumulated departure from average virgin flow of the Colorado River at Lee Ferry is the bottom one, and the top one containing a major wet cycle and a major drought.

Is it just happenstance that those two graphs follow pretty much the same configuration?

Mr. TURNER. No, sir; it definitely is not happenstance in my belief.

Senator GOLDWATER. They seem to be almost exact copies.

Mr. TURNER. They are almost exact. And it indicates that the flow of the Colorado River follows the cycles of the wet and dry precipitation, and, of course, the tree rings follow those same cycles.

That is the reason that it is not happenstance.

Senator GOLDWATER. Just to complete getting me out of my ignorant stage, what do the shadings mean on each graph?

I notice at the top of each one of these graphs that we are talking about you have a rather extensive shaded area. This is over on the right-hand side.

And then to the right you go down in lines that are not shaded.

Mr. TURNER. We shaded in each year where the runoff and the precipitation is indicated by tree rings was above average, so that as I said in my report, I was accentuating the study of wet periods, and therefore I shaded those in to show up the wet periods.

Senator GOLDWATER. Thank you.

Senator HAYDEN. Thank you for your appearance, sir.

The next witness will be Mr. O. M. Lassen, State land commissioner of Arizona.

Mr. TURNER. Copies of the two papers I referred to here are available if anyone would like to have them.

STATEMENT OF O. M. LASSEN, ARIZONA STATE LAND AND WATER COMMISSIONER

Mr. LASSEN. Mr. Chairman and members of the committee, my name is O. M. Lassen. I am the State land and water commissioner and in charge of the State Land and Water Department of the State of Arizona. I would like to discuss the critical ground water situation which exists in Arizona.

One of the responsibilities of my office is the conduct of cooperative investigation programs with the U.S. Department of the Interior, Geological Survey. A portion of this work is carried forward under cooperative agreements between the State land department and the Water Resources Division of the Ground Water Branch of the Geological Survey. My office publishes an annual report on ground water in Arizona which summarizes the results of these investigations and presents summaries of the basic data which have been gathered. The most recently published report covers the period from the spring of 1961 to the spring of 1962. A report covering the period, spring 1962 to spring 1963, is in the course of preparation, but has not yet been printed.

The water supply problems in Arizona are Statewide and are extremely complex. Time does not permit an extensive discussion of all of the multitudinous problems, but I believe it is relevant to briefly point out some of the results of the studies of ground water in Maricopa and Pinal Counties where Arizona is facing the most serious water crisis.

To understand Arizona's ground water problems it is essential to realize that underlying the State are numerous ground water basins

which are not interconnected, or are imperfectly interconnected. These underground basins are in many respects analogous to a basin filled with sand, into which water flows each year and which under natural conditions would discharge to the atmosphere through evaporation or transpiration or contribute to the flow of surface streams.

In the interest of brevity, I would like to limit my discussion today to seven of these basins which in the aggregate underly the major portion of the agricultural acreage in the central Arizona project service area. Three of these basins are located in Pinal County. The exterior boundaries of the lands within which the basins occur are delineated on map No. 1, a reduced copy of which is attached to this statement. The three basins to which I refer are the Stanfield-Maricopa area, the Casa Grande-Florence area and the Eloy area. The Geological Survey in cooperation with the State of Arizona has been making measurements of the ground water levels in these three basins since 1940. From these data they have been able to depict the average ground water table in the three basins year-by-year since 1940, and the graph attached to this statement and entitled, "Cumulative Net Changes in Water Levels by Areas and Total Annual Pumpage in the Lower Santa Cruz Basin Within Pinal County," enlarged and redrafted for display purposes, shows what has happened to our ground water tables during the 1940-62 period. In the case of each basin, the ground water level as of 1940 has been assigned an arbitrary value of 0 and the year-by-year cumulative change has been plotted.

You will note that in each of the three basins there has been a steady decline in ground water levels at varying rates and in each case, this decline has been virtually without interruption.

Referring now to the map of the Salt River Valley area, designated as map No. 2, a reduced copy of which is attached to this statement, you see depicted thereon eight ground basins. I would like to discuss four of these. They are the Queen Creek-Higley-Gilbert-Magma area, the Tempe-Mesa-Chandler area, the Litchfield Park-Beardsley-Marinette area and the Phoenix-Glendale-Tolleson-Deer Valley area.

The graph attached to this statement and titled, "Cumulative Net Changes in Water Levels in the Queen Creek-Higley-Gilbert and Tempe-Mesa-Chandler Areas of the Salt River Valley," enlarged and redrafted for display purposes, shows the drastic decline in water levels which has occurred in those areas from 1930 through 1963. Similarly, the graph attached to this statement and entitled, "Cumulative Net Changes in Water Levels in the Litchfield-Beardsley-Marinette and Phoenix-Glendale-Tolleson Areas of the Salt River Valley," enlarged and redrafted for display purposes, shows what has happened to the water levels in these areas since 1930. You will note, in each case that a drastic and dramatic decline in underground water levels has occurred. In the Litchfield-Beardsley-Marinette area, for example, the decline since 1930 has been over 1,960 feet

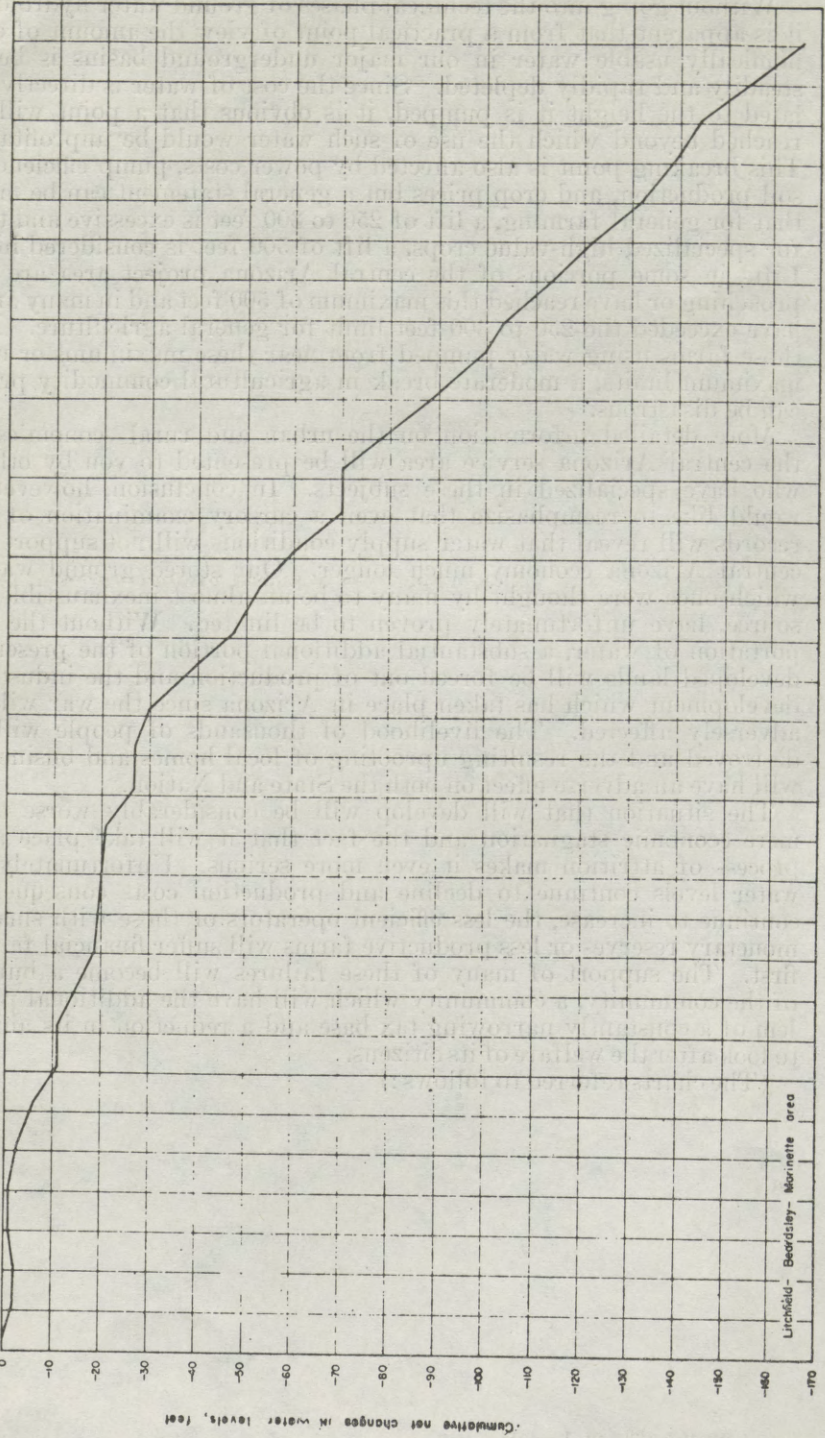
Without going into the technical phases of ground water hydrology, it is apparent that from a practical point of view the amount of economically usable water in our major underground basins is being steadily and rapidly depleted. Since the cost of water is directly related to the height it is pumped, it is obvious that a point will be reached beyond which the use of such water would be unprofitable. This breaking point is also affected by power costs, pump efficiencies, soil production, and crop prices but a general statement can be made that for general farming, a lift of 250 to 300 feet is excessive and that for specialized high-value crops, a lift of 500 feet is considered high. Lifts in some portions of the central Arizona project area are approaching or have reached this maximum of 500 feet and in many areas have exceeded the 250 to 300-foot limit for general agriculture. For those farms using water pumped from near these maximums or near maximum limits, a moderate break in agricultural commodity prices can be disastrous.

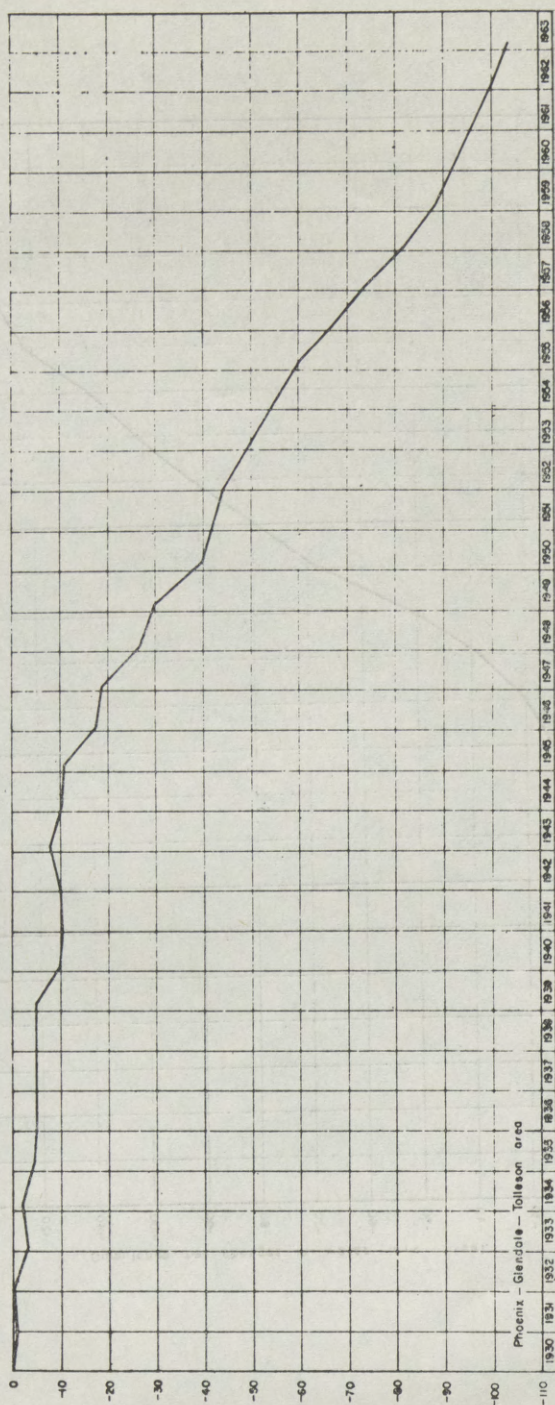
More detailed information on the urban and rural economics of the central Arizona service area will be presented to you by others who have specialized in these subjects. In conclusion, however, I would like to reemphasize that even a cursory examination of the records will reveal that water supply conditions will not support the central Arizona economy much longer. Our stored ground waters which once were thought by many to be an almost inexhaustible resource, have unfortunately proven to be limited. Without the importation of water, a substantial additional portion of the presently developed lands will be forced out of production and the industrial development which has taken place in Arizona since the war will be adversely affected. The livelihood of thousands of people will be destroyed and the resulting uprooting of local homes and businesses will have an adverse effect on both the State and Nation.

The situation that will develop will be considerably worse than mere economic stagnation and the fact that it will take place as a process of attrition makes it even more serious. Unfortunately, as water levels continue to decline and production costs consequently continue to increase, the less efficient operators or those with smaller monetary reserves or less productive farms will suffer financial failure first. The support of many of these failures will become a burden of the community, a community which will have the additional problem of a constantly narrowing tax base and a reduction in its ability to look after the welfare of its citizens.

(The charts referred to follows:)

FIGURE 37.—CUMULATIVE NET CHANGES IN WATER LEVELS IN THE LITCHFIELD-BEARDSLEY-MARINETTE AND PHOENIX-GLENDALE-TOILESON AREAS OF THE SALT RIVER VALLEY





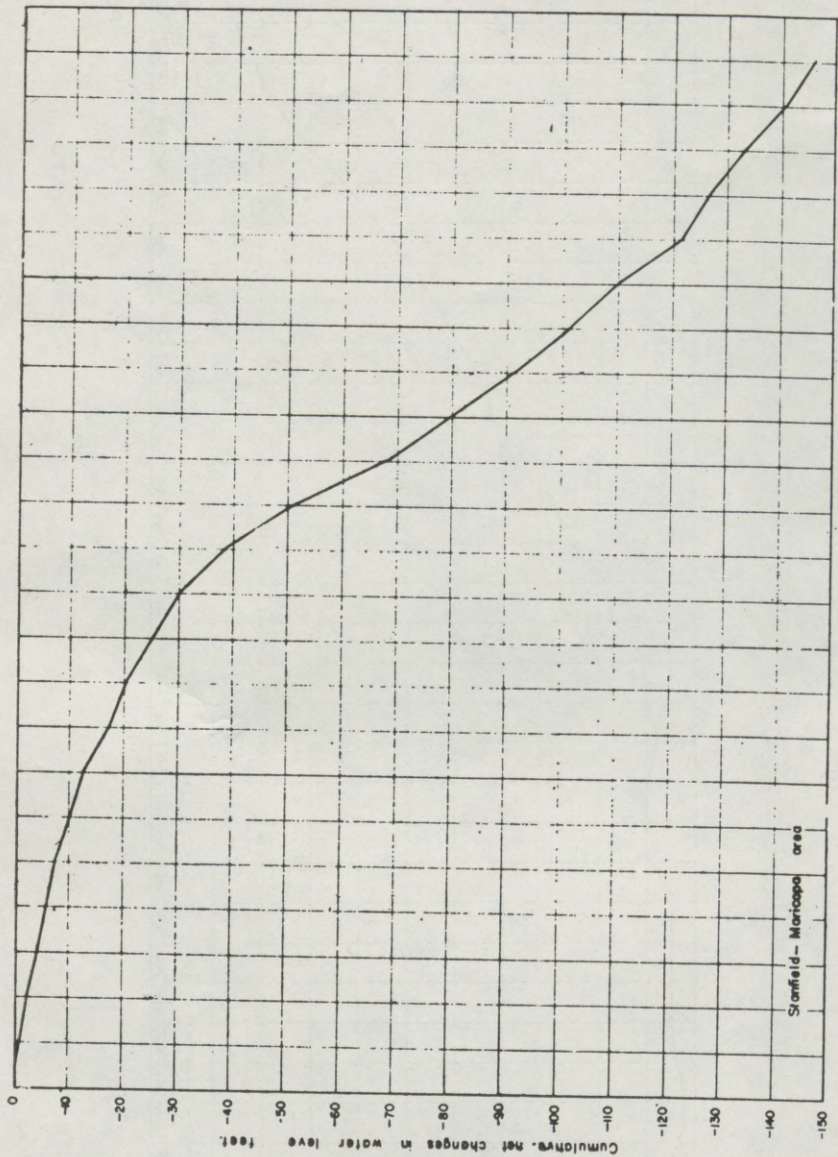
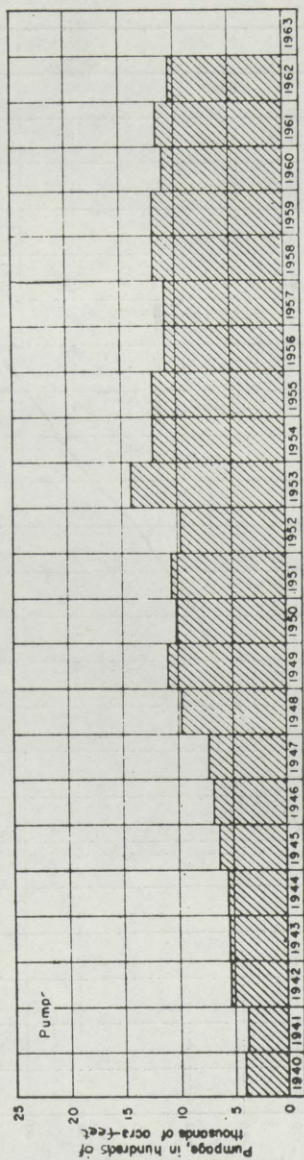
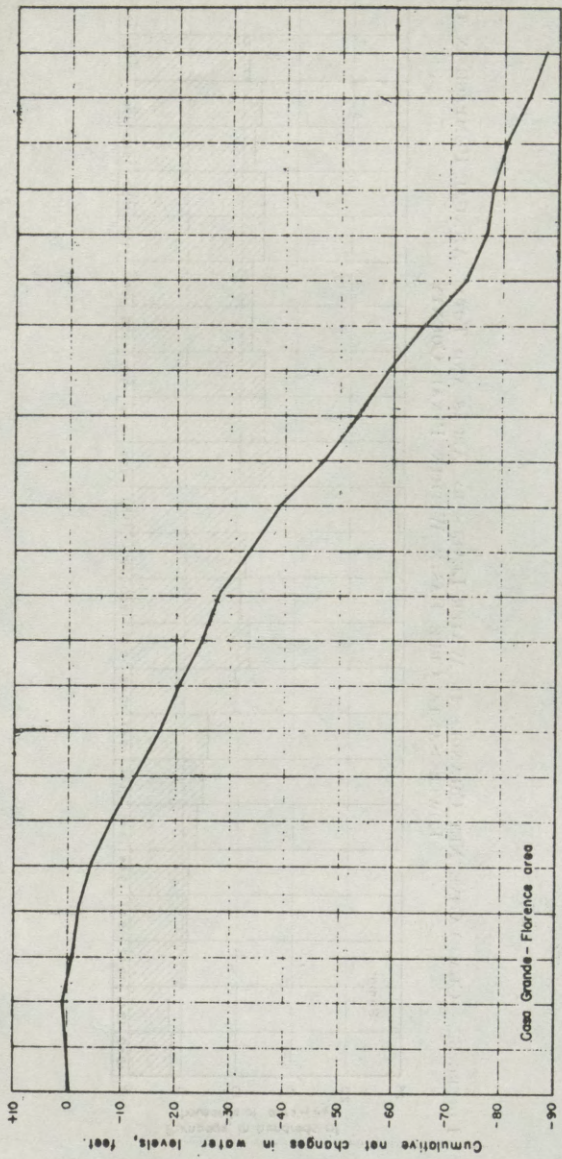


FIGURE 32.—CUMULATIVE NET CHANGES IN WATER LEVELS BY AREAS AND TOTAL ANNUAL PUMPAGE IN THE LOWER SANTA CRUZ BASIN WITHIN PINAL COUNTY





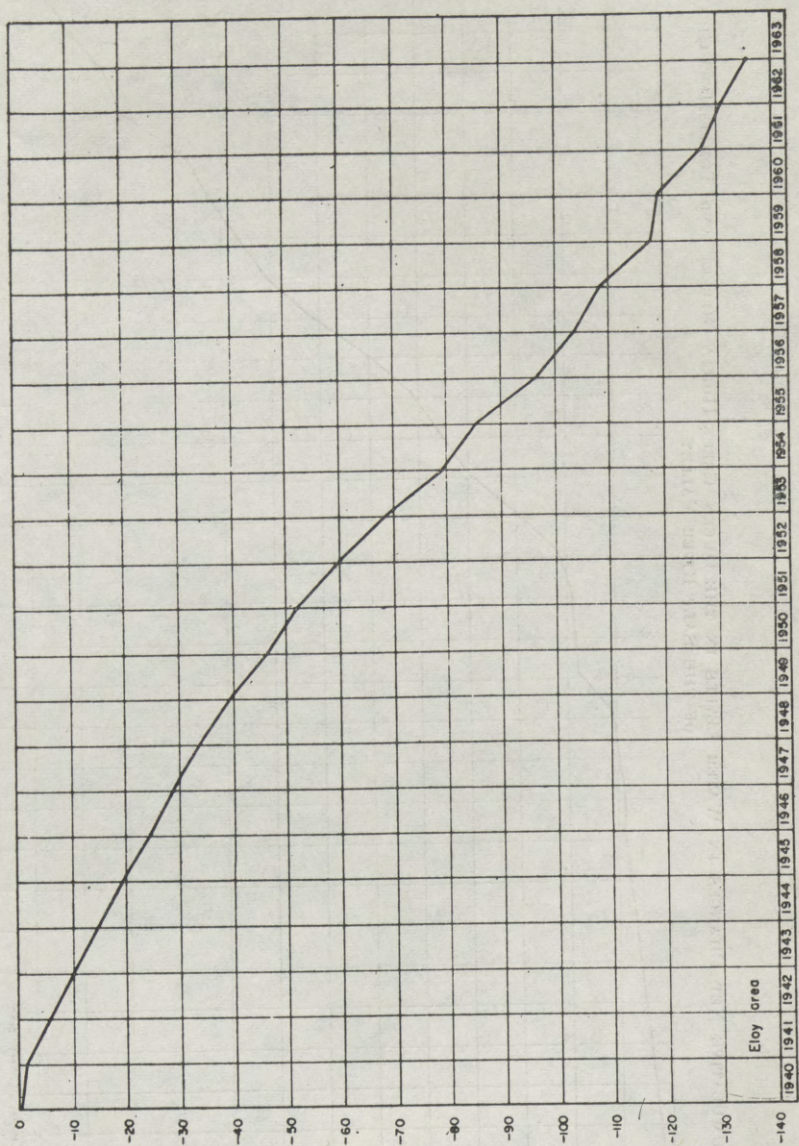
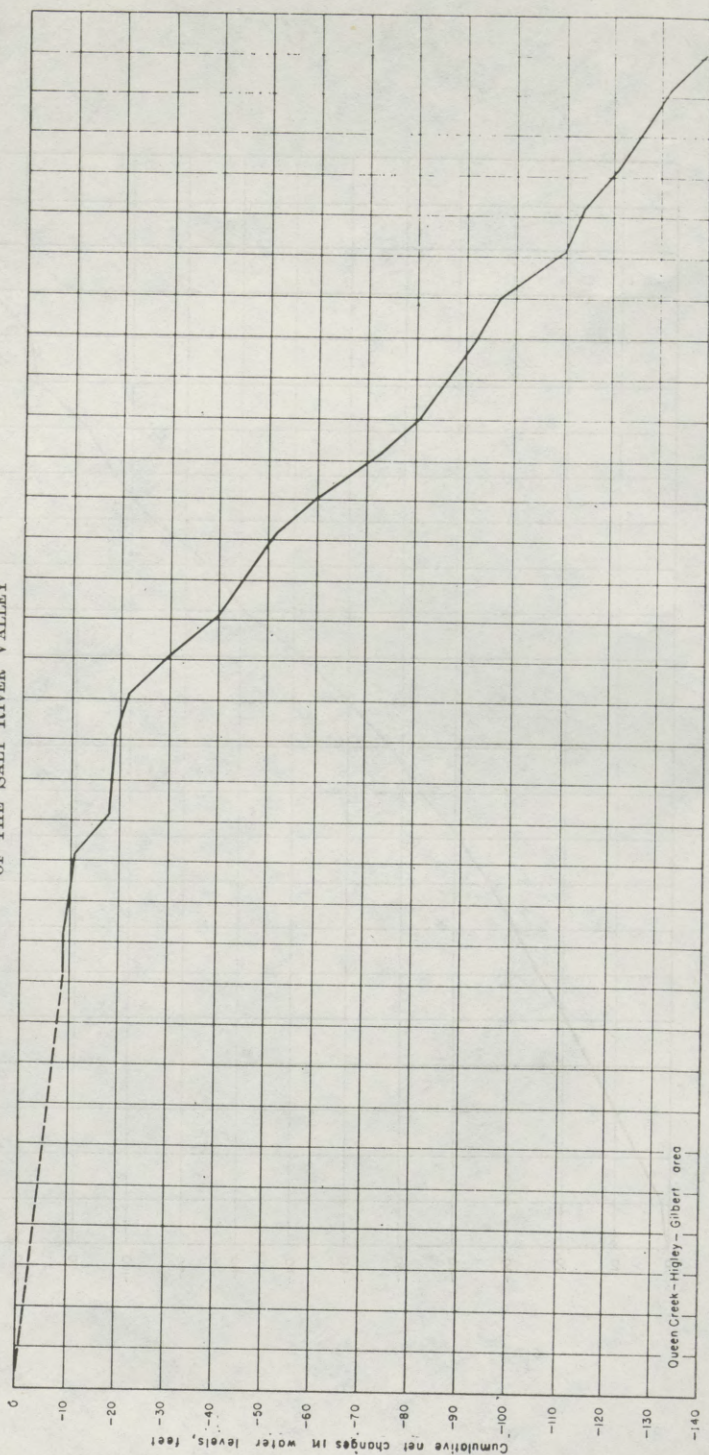
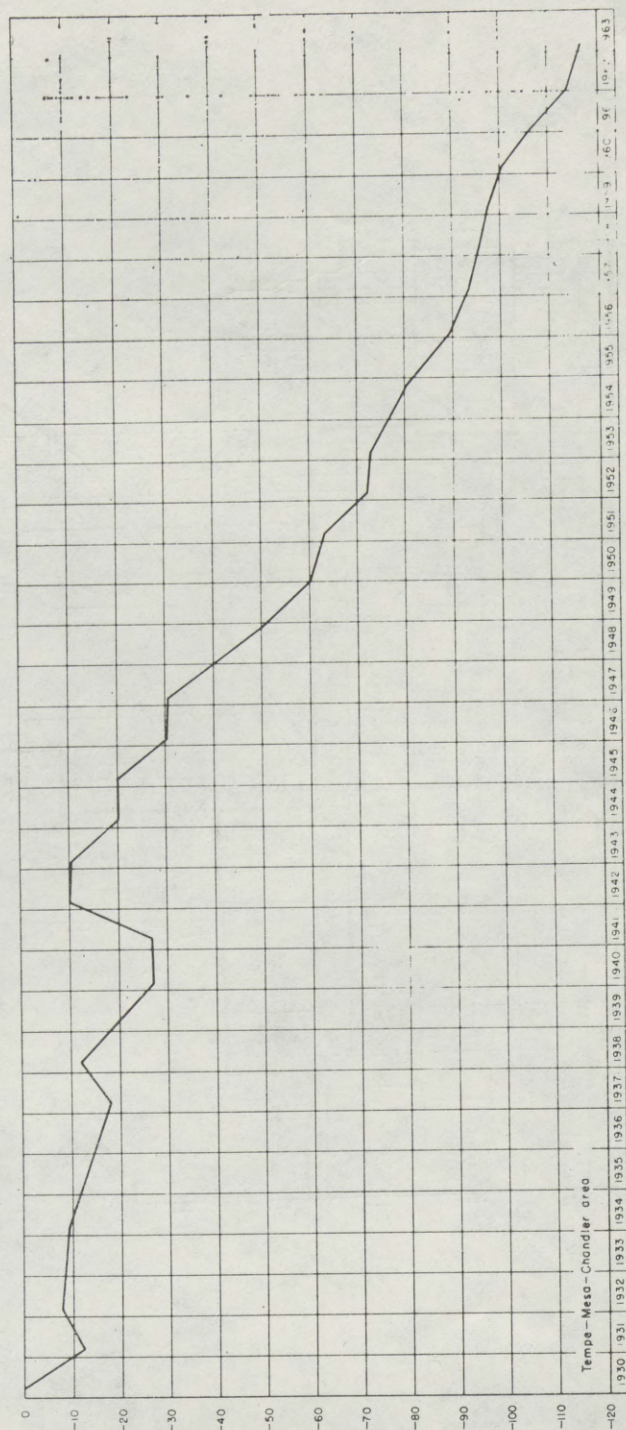
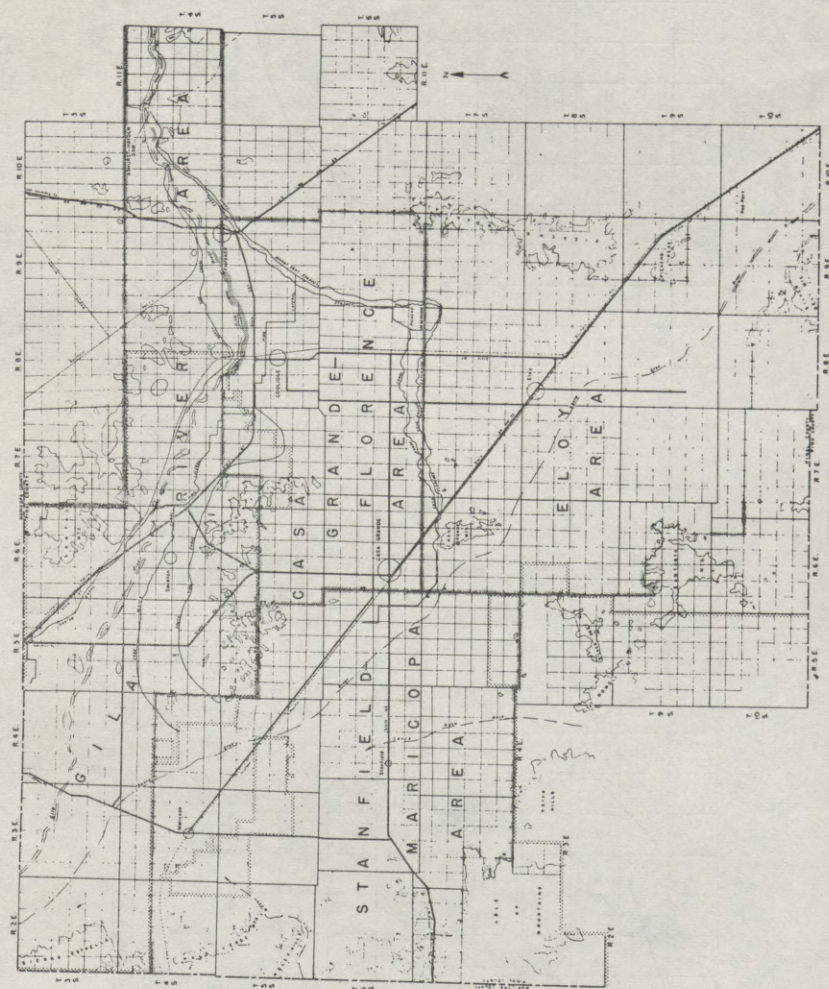


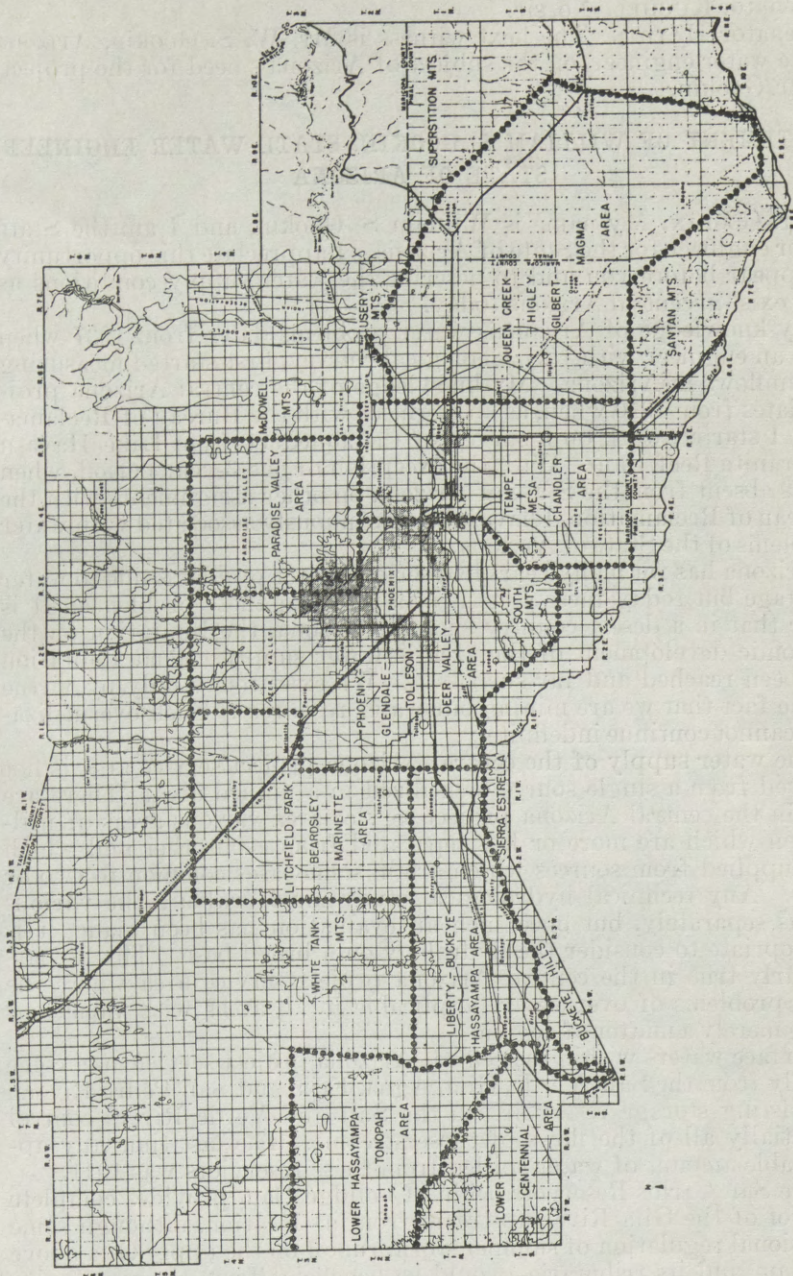
FIGURE 36.—CUMULATIVE NET CHANGES IN WATER LEVELS IN THE QUEEN CREEK-HIGLEY-GILBERT AND TEMPE-MESA-CHANDLER AREAS OF THE SALT RIVER VALLEY







MAP NO. 1
SANTA CRUZ BASIN



MAP 2.—SALT RIVER VALLEY AREA

Senator HAYDEN. We thank you for your statement.

Any questions, Senator Kuchel?

Senator KUCHEL. No, sir.

Senator HAYDEN. The next witness is Mr. W. S. Gookin, Arizona State water engineer, on the subject of Arizona's need for the project. Mr. Gookin.

**STATEMENT OF WILLIAM S. GOOKIN, STATE WATER ENGINEER,
STATE OF ARIZONA**

Mr. GOOKIN. My name is William S. Gookin, and I am the State water engineer for the State of Arizona. I appreciate this opportunity to appear before you and to describe the water supply conditions as they exist in central Arizona today.

My knowledge of Arizona's water problems dates from 1937 when I, as an engineer with U.S. Geological Survey, first started measuring streamflows in Arizona. My knowledge of the central Arizona project dates from 1940 when, as an engineer with the Bureau of Reclamation, I started work on a survey of the aqueduct from Lake Havasu to Granite Reef Dam. With the exception of one 3-year period, when I was absent from the State of Arizona on other assignments with the Bureau of Reclamation, I have been continuously associated with water problems of the State of Arizona.

Arizona has for many years had serious water problems due to water shortage but today faces a crisis as a result of these problems. It is basic that in a desert country such as Arizona, the limitation on the economic development of the area is water supply. That limitation has been reached and far surpassed. We exist today only by virtue of the fact that we are mining our water resources. Such overutilization cannot continue indefinitely.

The water supply of the central Arizona project service area is not derived from a single source or utilized in a unified area. There are within the central Arizona project service area various areas of utilization which are more or less separated from each other and which are supplied from sources which are in some cases common to two or more. Any technical hydrological study must evaluate the various basins separately, but once such an evaluation has been made, it is appropriate to consider the hydrology on a broad base. This is particularly true in the central Arizona project service area where the same problems of overuse are applicable in all areas with variations being merely a matter of degree.

Surface waters within the central Arizona project service area come chiefly from the Salt, Verde, Gila, Agua, Fria, and San Pedro Rivers.

Existing storage reservoirs on the Salt and Verde Rivers control essentially all of the flows of those streams. The last time any appreciable amount of water spilled from these reservoirs was 1941.

The San Carlos Reservoir behind Coolidge Dam provides complete control of the Gila River upstream from its location, although some additional regulation of summer storm runoff on the upper Gila above the dam and its tributaries would be beneficial from the standpoint of flood control and water salvage.

No regulating reservoirs exist on the Gila River downstream from Coolidge Dam or the San Pedro and some water from high intensity thunderstorms on this unregulated watershed above the Buttes Dam site escapes the project area and is largely lost to evaporation and vegetation.

The flow of the Agua Fria is controlled by the Carl Pleasant Dam.

The existing storage reservoirs of which I speak, combined with the diversion dams operated in conjunction therewith, serve to permit virtually complete utilization of the surface water supply, of the central Arizona project service area. Even so, this surface water supplies less than one-quarter of the total amount of water used each year in the service area.

The major portion of the central Arizona project service area is characterized by comparatively small mountain ranges separated by basins filled with various alluvial materials. These basins form underground reservoirs in which water has accumulated for geological ages. To obtain the remainder of the water supply needed to even support the existing economy of the area, the people of the State of Arizona have tapped these underground reservoirs and are pumping approximately $2\frac{1}{2}$ times as much water as annually enters those basins. The result of this overdraft is obvious. The static water level in our underground reservoirs is progressively lowering at a precipitous rate and the pumping levels are declining at an even greater rate.

Mr. Lassen, our State land commissioner, has demonstrated how the water levels in these ground water reservoirs is declining. Where ground water levels are declining at rates such as Mr. Lassen has demonstrated one of three results is inevitable. Either the ground water reservoir is pumped dry, the quality of the water deteriorates until it is no longer usable or the pumping lift becomes so great that the cost of pumping renders continued utilization impractical and uneconomic. In either event, continuing declining water tables eventually put the water user out of business.

In Arizona this crisis is not 50 or 100 years in the future, it is upon us today.

Approximately 1,162,000 acres of land in the project service area have been fully developed for irrigated farming. During the 1955-60 period an average of 880,000 acres were irrigated. The 282,000 acres made ready for irrigation, but not irrigated during this period are for the most part acres which were idle because of insufficient water supplies or because water costs increased to a point where further farming was uneconomic. Thus even though we are now mining our ground water reservoirs at a rate which can only lead to catastrophe, we still are not meeting the full requirements of our developed acreage. More than one-quarter million acres of good, developed farmland stands idle each year for lack of water. This idle acreage is increasing every year. To the individuals who own this acreage this idleness often represents economic ruin.

In any hydrologic discussion involving quantities of water it is important to clearly define the point and period of measurement. In the discussion which follows, unless specifically designated otherwise, all figures are annual averages for the 1955-60 period, at the farmer's

headgate and the intakes to the systems used to supply municipal and industrial requirements.

To supply 880,000 acres it is necessary to deliver 4,190,000 acre-feet of water annually. In addition, 300,000 acre-feet was needed to supply the municipal and industrial requirements.

Thus, even with 250,000 acres out of production, the water requirements during the 1955-60 period totaled 4,490,000 acre-feet. Since the mean long-term surface supply available to the central Arizona project service area is only 1,020,000 acre-feet annually, it is evident that the ground water basins must make up an annual deficit amounting to 3,470,000 acre-feet to sustain agricultural, municipal, and industrial development at the 1955-60 level. The gross amount of ground water which can be withdrawn year after year on a sustained yield basis is estimated to be 1,280,000 acre-feet. Thus, with sustained agricultural and static urban area such as existed during the 1955-60 period, the overdraft on the ground water basins in the central Arizona project service area amounts to 2,190,000 acre-feet annually.

Were present conditions to continue, ultimately deliveries would have to be decreased by 2,190,000 acre-feet annually.

To illustrate the relationship of these figures, chart No. 1, a copy of which is attached to this statement and entitled "Present Water Requirements—Deficiency and Supply" has been prepared. The total annual water deliveries have been depicted as a circle and the relative portion which may be considered as dependable supply shown as a blue segment. The red segment of the circle entitled "Average Annual Deficiency" illustrates the proportion of present water supplies which are obtained through ground water mining and which cannot be considered to be available on a long-term sustained basis unless additional sources such as waters under the central Arizona project are made available.

I would interject that because of the difficulties of reproducing a chart in color, the chart which I have attached has been stippled and carries the same proportions.

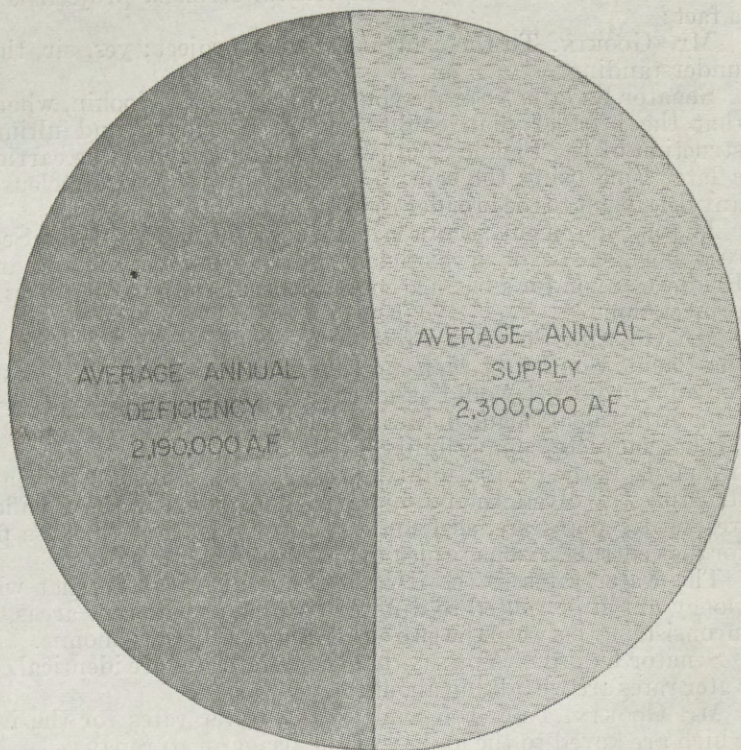
The diversion of 1,200,000 acre-feet of water from the Colorado River, under the central Arizona project would result, after deducting conveyance losses, in the delivery of 1,020,000 acre-feet to the project direct service area. This supplemental supply would directly reduce the draft on the ground water basins and, in addition would, through deep percolation, augment the recharge to those basins increasing the safe annual yield. Effluent flows resulting from additional municipal and industrial uses could also be recaptured, thereby adding further to the total usable water.

It is anticipated that operation of Colorado River diversion facilities would be coordinated with the operation of existing irrigation works and with other conservation facilities to be developed within the project service area. It is estimated that these latter facilities, which would furnish additional storage on the Gila River and tributaries, would make an additional 50,000 acre-feet of water available for project use. Such facilities would also make possible the exchange of Colorado River water for local stream water at downstream locations, making possible the supplementing of supplies at upstream locations not susceptible of benefits by direct diversions from the main-stream of the Colorado River.

Even so, it cannot be anticipated that a central Arizona project would make available enough water to fully meet the needs of the project service area under present conditions and certainly no water would thereby be made available for the increasing needs which will inevitably develop as municipal and industrial requirements grow. The Pacific Southwest water plan as set forth in the August 1963 report of the Secretary of the Interior includes in it every feature contained in the central Arizona project as conceived in 1947 and subsequently updated by the Bureau of Reclamation.

Were the central Arizona project to be authorized it could be constructed immediately to provide a measure of relief from our existing water crisis. The details of the broader plan could then be developed and ultimate construction of the Pacific Southwest water plan could be carried out at a later time using the central Arizona project as a nucleus without any detriment to the broader plan. Completion of the central Arizona project at an early date is not only desirable but imperative. We must have our water today if we are to continue in our role as a healthy, integral part of the national economy.

(The chart referred to follows:)



PRESENT WATER REQUIREMENTS, DEFICIENCY
AND SUPPLY—CENTRAL ARIZONA PROJECT

Senator HAYDEN. Thank you for your statement.

Senator KUCHEL?

Senator KUCHEL. Mr. Gookin, the Hayden-Goldwater bill authorizes the construction as an integral part of this central Arizona project of Bridge Canyon Dam Reservoir and powerplant.

Mr. GOOKIN. Yes, sir.

Senator KUCHEL. And the income to be derived from the sale of energy at Bridge Canyon Dam would be used to provide a basis for the economic feasibility of the project overall, would it not?

Mr. GOOKIN. Senator, if I may state a minor technical difference of opinion with you there, I think of economic feasibility and financial feasibility as two different things.

Senator KUCHEL. All right.

Mr. GOOKIN. Now, insofar as financial feasibility is concerned, certainly the large bulk of the revenue would be devoted to Arizona.

Some of them most certainly would be diverted into New Mexico, speaking again of the direct revenues from the sale of power as opposed to the benefits from sale of that power.

Senator KUCHEL. The fact is that the revenues from Bridge Canyon are dedicated exclusively to the central Arizona project, is that not a fact?

Mr. GOOKIN. To the central Arizona project; yes, sir, that is my understanding.

Senator KUCHEL. So, are you quite right, Mr. Gookin, when you say that the broader plan could then be developed and ultimate construction of the Pacific Southwest water plan could be carried out at a later time using the central Arizona project as a nucleus without any detriment to the broader plan?

Is your statement accurate in view of the fact that the Secretary's recommended basin development would sequester the revenues from Bridge Canyon for a basin account rather than for this central Arizona project alone?

Mr. GOOKIN. Senator, referring to the subsequent authorization of the Pacific Southwest plan and the incorporation into it of a central Arizona project, I would assume, sir, that there would necessarily be some adjustments made in the financial structure.

The complete compatibility of the two plans to which I referred primarily is the compatibility insofar as the physical makeup of the structures involved, the power rates as proposed in the Pacific Southwest water plans are, as I understand it, identical to those proposed for the central Arizona project plan.

The water rates to the irrigators are identical, so that where the money might be routed to different people or different areas, I see no inconsistency between the two either financially or economic.

Senator KUCHEL. You say that the water rates are identical. Which water rates are we talking about?

Mr. GOOKIN. I am referring to the water rates for the irrigators which are keyed to the ability of the irrigator to repay.

Senator KUCHEL. Under the central Arizona bill?

Mr. GOOKIN. It is my understanding, Senator, that this policy applies under both bills.

Senator KUCHEL. You say that, but have you got any authority for that statement? I don't think that is correct.

Mr. GOOKIN. Senator, if the principle of charging the irrigator to the extent of his ability to pay be valid, you couldn't increase it under any other plan.

Senator KUCHEL. Well, then you are dealing with the amount of subsidy that the Congress is going to write into one reclamation project as against another, aren't you?

Doesn't that present a political problem to Members of Congress?

Mr. GOOKIN. I don't understand that it does; no, Senator. I see the same power rates, the same water rates. I don't understand the problem.

Senator KUCHEL. I think just in the last few weeks the Department has revised its estimate of the cost at which the water will be sold in central Arizona, so I think they are still studying this. They revised upward.

Mr. GOOKIN. I would imagine, Senator, that the cost would be subject to revision up to the time of the signing of the contract.

Senator KUCHEL. Yes, sir.

Mr. GOOKIN. That, in my understanding, is the general history of the reclamation projects.

Senator KUCHEL. But what I mean is that if the revenues from Bridge Canyon Dam were taken out of this bill and made available to a basin account in connection with a lower basin development, which is what would be done, how can we then say as you do that this bill could become enacted into law without detriment to any broader plan?

Mr. GOOKIN. Senator, as I understand the revenues under the central Arizona project they are designed as they are under the Pacific Southwest plan to repay the reimbursable costs in accordance with the policies set forth in the plan.

If the revenues from Bridge Canyon Dam were taken and applied to some other area, presumably then revenues from some other structure would have to be brought into the central Arizona project area to provide the necessary reimbursement. I visualize the larger plan as operating as a pool into which a number of facets are draining in the form of revenues, and you are dipping out of this pool as needed to provide the repayment requirements, and it is rather difficult to identify which facet that the water you dipped out came from.

Senator KUCHEL. Surely isn't it a fact that repayment schedules and costs of water, under this legislation, would be affected, if you took away from this legislation the exclusive benefits of the revenues derived from Bridge Canyon?

Mr. GOOKIN. I think not, Senator, if you replace those revenues from some other source.

Senator KUCHEL. Where would you replace them from? You would replace them from the general fund of the U.S. Government, wouldn't you?

Mr. GOOKIN. That is not my understanding, Senator.

Senator KUCHEL. Where would you get them?

Mr. GOOKIN. From the other power developments on the river, Hoover, and so forth, which as I understand it is part of the plan.

Senator KUCHEL. So that your testimony is that it would not affect central Arizona by denying central Arizona the exclusive benefits of the revenues derived from Bridge Canyon. Is that your statement?

Mr. GOOKIN. Clearly that is my statement, Senator, if an equivalent amount of money is made available from some other source, which is as I understand it again the basic principle.

Senator KUCHEL. Let's talk about that a little bit, Mr. Gookin. You can educate me. What source would you use? You mentioned Hoover Dam. What would you do with Hoover Dam's revenues?

Mr. GOOKIN. I understand—and believe me I have not studied the Pacific Southwest water plan in detail—I understand that it employs the general principle of basin accounting, whereby all revenues from all sources go into a common fund, and all expenses to all components of the project are repaid from the common fund, and among the expenses that are repaid from the common fund are the expenses of amortization and repayment as required.

So that again if I may use an analogy, sir, you have a tub, if you will, or a pool into which you are pouring water from many different sources, and out of which you are dipping water for many different uses. It is difficult, nay, impossible to identify what water came out of what faucet.

Senator KUCHEL. You lose me a little bit.

Mr. GOOKIN. I am sorry, sir.

Senator KUCHEL. Have you studied the basin development proposal of the Secretary of Interior?

Mr. GOOKIN. No, sir, Senator, I have not. I am in a very general way familiar with it. I think I am familiar with the principle, but I am not familiar with the details of it.

Senator KUCHEL. In your statement to this committee, you say that this legislation should be passed into law, and it would pose no detriment to a subsequent basin development.

Mr. GOOKIN. That is my opinion, sir, financially or physically.

Senator KUCHEL. Do you think maybe if this legislation was adopted into law and these revenues were committed to one project, that it would be easy for the Congress later on to say these revenues are now going to be uncommitted to this project, and be committed to another project?

Mr. GOOKIN. That, sir, goes into the field of——

Senator KUCHEL. Votes.

Mr. GOOKIN. Law, and it goes into the field of congressional actions in which I have no expertise at all.

Senator HAYDEN. It would seem to me perfectly feasible, Senator Kuchel, to have the Secretary provide an alternative situation that in the event the absin project was developed, revenues from all sources would go into one pot and be sent out again.

We can provide for that in this legislation just as well as anything else on the recommendation he has given us.

Senator KUCHEL. We don't even know what the Department of the Interior thinks about your bill yet.

But we do know that they have a basin development recommendation.

Senator HAYDEN. We do know that we are just in a hell of a fix for water in Arizona. That is what we are telling you.

Any further questions.

Senator KUCHEL. No, sir.

Senator ANDERSON. Can I ask him one question?

Senator HAYDEN. Yes.

Senator ANDERSON. I regret I really haven't been able to be here very much because of the discussion of the debt reduction in the Finance Committee today, and we are probably going to have more talk on that later on.

But you mentioned Hooker Dam and Reservoir and its construction. Where would the water go from Hooker Dam? Where would it be utilized?

Mr. GOOKIN. Hooker Dam, sir, is proposed as a multiple-purpose development which would regulate the flows available to the downstream irrigated areas as far downstream as the Duncan and Virdon Valleys at least and, of course, to some extent into Safford and which would in addition provide rather extensive recreational benefits.

Senator ANDERSON. But no water for New Mexico.

Mr. GOOKIN. Well, sir, the irrigated lands downstream from New Mexico above the Duncan-Virdon Valley are in large part—the irrigated lands below Hooker Dam are in large part in New Mexico.

Senator ANDERSON. They are?

Mr. GOOKIN. Yes, sir. The only irrigated lands that are in Arizona downstream in Hooker Dam until you get to the Safford Valley are those in the Duncan Valley.

Now the Virdon, the Redrock Valley, the Cliff-Gila area are all areas in New Mexico.

Senator ANDERSON. Have you had any discussion recently with New Mexico officials trying to get just a small, tiny portion of the Gila River water from New Mexico?

Mr. GOOKIN. Not recently; no, sir.

Senator ANDERSON. Who does the negotiating for Arizona then?

Mr. GOOKIN. The negotiators are appointed by the Arizona Interstate Stream Commission.

I was on the previous negotiations.

Senator ANDERSON. Aren't you water engineer?

Mr. GOOKIN. State water engineer; yes, sir.

Senator ANDERSON. Doesn't the water engineer have anything to do with water?

Mr. GOOKIN. Yes, sir.

Senator ANDERSON. Then you have been, haven't you, in the discussions?

Mr. GOOKIN. Recently, sir?

Senator ANDERSON. Yes.

Mr. GOOKIN. During the Supreme Court litigation; yes, sir. I am sorry, I thought you meant since.

Senator ANDERSON. Even since it.

Mr. GOOKIN. No, sir; I have not.

Senator ANDERSON. Has there been any attempt on the part of New Mexico to discuss this with Arizona?

Mr. GOOKIN. Not to my knowledge. Your legal staff, sir, has discussed the decree with our attorneys, but no other attempt at negotiation of which I am aware, and I think I would be aware of any.

Senator ANDERSON. They have all been in here talking to me by the hour trying to explain what the difficulties are with Arizona, and hoping that they might be able to get just a little cupful of water out of Hooker Dam.

It doesn't look possible we are going to get very much but they would like a little tiny bit.

Don't you really think it would be useful to settle that question before you got too far into this one?

Mr. GOOKIN. Of course, sir, we had extensive negotiations and agreement by the New Mexico officials during the Supreme Court litigation, but subsequent to that, there has been no attempt so far as I know to reopen any negotiations or to reopen the stipulation which was agreed to by both parties some 2 years ago.

Senator ANDERSON. Did that stipulation give New Mexico any water?

Mr. GOOKIN. Yes, sir; clearly.

Senator ANDERSON. 25,000 feet maybe?

Mr. GOOKIN. I would have to check the figure, sir.

Senator ANDERSON. 20,000 feet possibly?

Mr. GOOKIN. It gave them adequate water for the acreages which are now irrigated.

Senator ANDERSON. Now, would Arizona be happy under the California and Arizona suit to take water for just the areas now being irrigated?

Mr. GOOKIN. Oh, yes. We propose no new acreage whatsoever, nor do I anticipate that there will be any.

You see, sir, under the most optimistic of interpretations there is no possibility that we can get enough water out of the central Arizona project to provide any new acreage in Arizona, to provide enough for the acreage which is already cultivated and under irrigation.

Senator ANDERSON. You are including now all the pumping acreage?

Mr. GOOKIN. Yes, sir; the pump acreage. The most we can hope to do is to retard somewhat, we hope rather appreciably, the decline in our ground water tables, but we certainly cannot even sustain the existing irrigated acreage in the central Arizona project area, and this is one of the predicates for the Bureau of Reclamation report of 1947 reiterated in the report of 1962, reiterated again in the report of 1963, so we have no ambitions for additional acreage.

Senator HAYDEN. Senator Anderson, I think I have a record made by the representatives of New Mexico and Arizona at the time of the Supreme Court decision by which they arrived at an agreement as to what water would go to New Mexico. I would be glad to supply the agreement.

Senator ANDERSON. I think they finally ended up by deciding those areas being usefully cultivated in New Mexico might get some water, but that wouldn't take care of the area that needed cultivation at all, and with Arizona getting all the water it gets out of the river, there was some hope that out of all the water going back behind Hoover Dam that a tiny portion of it, not very much of it, just a little bucketful now and then, might come to our State.

But so far as we know we have not been able to get any agreement nor have we been able to have any negotiations.

Senator GOLDWATER. The chairman of the Streams Commission is here. Maybe he has an answer.

Senator HAYDEN. He may know.

Senator ANDERSON. This man doesn't.

Senator HAYDEN. I will try and get you that information.
(Discussion off the record.)

Senator HAYDEN. Are they any further questions?

Senator KUCHEL. May I ask one question?

In the area sought to be served by this legislation, are there lands that are not now in agricultural production?

Mr. GOOKIN. Yes, sir; about 200-and-some-odd-thousand acres which have been irrigated but which are at present out of irrigation, primarily because of lack of water.

Senator KUCHEL. Would it be your testimony that this bill would provide a source of supplemental water to that 200,000 acres?

Mr. GOOKIN. No, sir; unfortunately there is not enough water to do that.

Senator KUCHEL. Your testimony is that this is not designed to bring any new acreage into agricultural production?

Mr. GOOKIN. That is correct, sir.

Senator KUCHEL. Would you oppose an amendment that would spell that out in this bill?

Mr. GOOKIN. Well, sir; to oppose or support an amendment is not my prerogative. This is clearly a policy matter and I could only be guided by the Stream Commission.

Senator KUCHEL. At least your policy is that this legislation would be so interpreted?

Mr. GOOKIN. That is the basic principle; yes, sir.

Senator KUCHEL. The next Stream Commission might change the policy and say, "We want this to bring new land into agricultural production."

Mr. GOOKIN. Well, sir; if they were to bring new land into agricultural production, you would find yourself faced with the actual situation of telling this farmer, "You have been irrigating for lo these many years, true, but now you must go out of irrigation because we want to give it to our friend who is over here who has a piece of raw desert and wants to develop it."

Senator KUCHEL. And you do not propose to do that?

Mr. GOOKIN. No, sir.

Senator KUCHEL. Do you propose to recognize all existing use in Arizona and to protect them?

Mr. GOOKIN. To the extent that the State law embraces them we, of course, expect to abide by the State law.

Senator KUCHEL. So that an existing use in Arizona of Colorado River waters is protected by State law, and the individual entity which is using the Colorado River water at present and in the past will be protected in its rights?

Mr. GOOKIN. I am sorry, sir, but did you say if an existing use is protected by State law? There are uses that may not be protected by State law.

Senator KUCHEL. Give me an example of one of them.

Mr. GOOKIN. There may be a diverter from a stream who has no right to divert from a stream.

Senator KUCHEL. Oh, sure, but I mean anyone who is legally an entity, a district or a city, and is legally and properly using Colorado River water today and has been doing so, will that entity be protected? Will it continue to be protected in its use to the amount of water which it has been using legally and properly?

Mr. GOOKIN. To the extent that it has legal rights, it will be protected; yes, sir. That would be my understanding.

Senator GOLDWATER. Wasn't that the conclusion that the master reached at page 113, paragraph 2 and 3 of the conclusion that he was convinced that:

California's apprehension of chaotic disaster resulting from the recommended decree is unfounded.

Mr. GOOKIN. Yes, sir; I recall that quite clearly. That I think was predicated in part on the fact that California is seeking to enlarge its irrigated acreage, and to bring under cultivation certain land which has never heretofore been irrigated, as a part of its existing rights.

Senator KUCHEL. The truth is we have a limitations statute in California, don't we?

Mr. GOOKIN. That is my understanding, sir.

Senator KUCHEL. Why sure we do.

Mr. GOOKIN. But according to the engineering data which has been submitted to me, your use and proposals envisages the enlargement of the irrigated acreage.

Senator KUCHEL. The fact of the matter is the master never did arrive at any conclusion as to supply of water in the future, did he? Didn't he throw up his hands and say, "I can't do that."

Mr. GOOKIN. That is my understanding, sir.

Senator KUCHEL. Sure he did.

Mr. GOOKIN. Of course, he did indicate that as it became less than there is now there would be conservation measures needed and necessary.

Senator KUCHEL. And he was overruled, in his recommendation with respect to a shortage formula based on proration, by a majority of the court, wasn't he?

Mr. GOOKIN. That is a legal question I could not answer.

Senator KUCHEL. Well, in time of drought or water shortages how do you understand the waters to be allocated to your State and to mine?

Mr. GOOKIN. I think we are talking about two different things, sir.

I was referring to the wastage which is now in progress, such as that into the Salton Sea, and I think you are talking about the possibility of shortage, which, of course, we don't anticipate will ever arise.

Senator KUCHEL. But if you were wrong, Mr. Gookin, how do you understand that that problem would be solved between the States in the lower basin?

Mr. GOOKIN. Again, sir, it is an engineer giving a legal opinion which, of course, the engineers are accused of doing. I understand that the Secretary would decide how that shortage would be shared.

Senator KUCHEL. That is all.

Mr. GOOKIN. Thank you, sir.

Senator GOLDWATER. Might I ask the Senator from California just one question:

Are you talking about the limitations self-imposed by California or the limitation of the compact?

Senator KUCHEL. I am talking about the limitation imposed by the Legislature of California, which if I understand it correctly, was an action taken as a condition precedent to implementation of the Boulder Canyon Project Act of Congress.

Senator ANDERSON. It wouldn't build the Hoover Dam unless California limited itself to 740,000 acres.

Senator KUCHEL. It was a prerequisite limitation to 4.4 million acre-feet plus one-half the surplus above 7.5 out of the Colorado River system, we thought.

Senator GOLDWATER. Aren't there two different limitations we are talking about in California? One is in the compact, the other I believe is higher than the compact figure.

Senator KUCHEL. We ought to get into this, but basically part of the problem before the Supreme Court was what you do with the water, if I understand it correctly, which flows past Lee Ferry, and in a divided opinion as you know, the Court indicated that the problem would not arise if there were sufficient waters, but the problem when it did arise, because of a period of drought or after excessive withdrawals from the river, then would have to be controlled by the decision of the Secretary of the Interior in the absence of any guidelines enacted by Congress.

But all through this it just seems to me somehow or other one place where we all ought to agree is that existing use—I don't care whether they are in Arizona, in the city of Yuma or elsewhere, or any place in my State—existing use ought to receive some equitable recognition by the Congress when we are talking about a new use. This is what I am trying to urge.

Senator ANDERSON. May I urge that we have a chance now to go over and vote on the civil rights bill, which is perfectly harmless.

Senator HAYDEN. I am perfectly willing to remain here and allow the witnesses to testify. They have traveled from long distances and I will be willing to take the testimony now of Mr. Victor I. Corbell.

STATEMENT OF VICTOR I. CORBELL, VICE CHAIRMAN, ARIZONA INTERSTATE STREAM COMMISSION, AND PRESIDENT, SALT RIVER VALLEY WATER USERS' ASSOCIATION

Mr. CORBELL. Mr. Chairman and members of this committee, my name is Victor I. Corbell and I appear before you as president of the Salt River Federal reclamation project located in central Arizona's Salt River Valley. I have resided in the Salt River Valley, in the vicinity of Tempe, Ariz., all of my life.

I have been continuously engaged in farming for the past 43 years. At the present time my family and I own and operate 314 acres of land. The land we farm is in an advanced state of cultivation and receives its water supply through the Salt River Valley Water Users' Association from the Salt River project.

While some of you gentlemen are undoubtedly acquainted with the Salt River project, I would like to briefly review the background and progress of this important chapter in man's conquest of the Arizona desert.

Due to the low annual rainfall—an average of 7 to 8 inches in the Phoenix area—agriculture in the plains and valleys of south-central Arizona is almost wholly dependent on irrigation.

In 1867, with less than 100 families on the present site of Phoenix, construction was started on crude canals and ditches. Later, many corporations were formed for the same purpose, but disputes and litigation arose over priority of appropriations and claimed inequi-

table distribution of water. During this period of time it became apparent that the only solution to the problem of a stable water supply for the valley lay in the building of a high storage dam in the mountains. At the same time it was equally clear that private capital could not be induced to take on the risks involved on a scale necessary to build the needed dam and related irrigation facilities.

The passing of the National Reclamation Act formed the vehicle for a coordinated approach to the irrigation problem, and a means for eliminating the disputes and conflicts of the previous era. It was at this point that the residents of the valley took the steps to form the Salt River Valley Water Users' Association and pledged their lands to guarantee repayment of a loan from the Federal Government to build Theodore Roosevelt Dam and the related facilities of the Salt River project. This project was organized in February 1903, and construction was authorized by the Secretary of the Interior in March 1903.

The lands of the project area have rights to the waters of the Salt and Verde Rivers, rights finally adjudicated by the Kent Decree of 1910. Surface water rights in Arizona are legally recognized as being inseparable from the land, and no barter or sale of either can be effected without the other. The association, initially for its own account, and now as agent of the Salt River Project Agricultural Improvement & Power District, is the agency by which these waters are delivered to the landowners.

Following construction of Roosevelt Dam, five more dams were built which impounded the entire flow of both the Salt and Verde Rivers. Horse Mesa, Mormon Flat, and Stewart Mountain Dams were built on the Salt River and Bartlett and Horseshoe Dams on the Verde River, increasing the project water storage capacity to a total of 2,076,720 acre-feet. Water supplies of the project have subsequently been augmented by the installation of 250 wells on project lands. Throughout the period of construction of the dams on the rivers, the economy of central Arizona remained predominantly agricultural. However, following World War II a rapid trend toward urbanization started. Agricultural lands have begun to give way to residential development and the cities and towns in the project are in need of additional sources of water to sustain their exceptional growth.

The per acre use of water in the Salt River Valley project has held constant over the past 25 years. This trend will, undoubtedly increase in the future because our latest review of water use shows that urbanization now requires more water per acre than the acre formerly used when under agricultural production. Some 66,000 acres of the 250,000 acres of the Salt River project have already been urbanized.

A study of the project's history shows an enviable record in regard to a firm and consistent supply of water. In the 47 years—1917–63 inclusive—there have been fluctuations from year to year as the precipitation pattern in their arid southwest has varied, but all in all, by drawing on underground water storage, the record of an essentially firm water supply has been maintained.

Yet unfortunately, 30 percent of the water delivered to project lands in the last 20 years has been developed by overpumping underground water supplies. While this situation is undesirable as to the Salt River project, it ranges from serious to critical for those areas

in the central part of the State which depend entirely on underground pumping for their water supply.

Furthermore, in all these years there has been a constant requirement for more water by the farmer. He could do a better job of growing crops if he knew he could plan on 1 additional acre-foot per acre every year. Without putting new acres under cultivation, with supplementary water, he could add to the area's economy through full development of the crop production potential of the land. Yet the amount of water necessary to give the lands of the project this additional water supply would require approximately one-third more than the present average availability.

Of even greater importance than the requirements for additional water for increased crop production is the vital necessity to reduce underground pumping. As others will point out in detail, users of water in central Arizona have been pumping far in excess of underground recharge.

The water resources of the Salt River project, consisting of the surface water runoff from our watershed plus deep-well pumping from the underground, have been developed to their maximum potential.

Water for increased crop production and decreased irrigation pumping must come from outside sources such as the Colorado River.

The project, for years, has measured water at the source and at the delivery points. We have found that the amount delivered to the landowners is approximately two-thirds of the source amount. The rest is represented by evaporation, canal, and lateral losses.

The Salt River project, following the reclamation principle of using power revenues to underwrite the major costs of developing, storing, and delivering water in an arid area, has been actively engaged in minimizing water losses due to evaporation and canal and lateral seepage by lining and tiling canals and laterals. These construction programs are moving along at an optimum pace, taking into consideration that some sections of the canals and laterals can only be out of service a short time each year. Nevertheless, we are making every effort to increase our water availability through loss savings.

In the 1963-73 period the project will spend an estimated total of \$116 million for developing, storing, and delivering agricultural, industrial, and residential water. These costs include the expenditures for water resources development, water saving research, and construction. Again, following the reclamation principle, we expect that \$94 million of this total cost will be defrayed by power revenues. The central Arizona project as proposed by the Bureau of Reclamation will operate under the same principle that has been proven by the experiences of the Salt River project during the last 60 years.

History has proven, as it did in the case of our project, that the only feasible way of creating or maintaining the economy of arid portions of the West is through the construction and operation and maintenance of reclamation projects in the manner provided by existing laws. Yet there are those who believe that investments in reclamation projects represent a useless and foolish expenditure of the taxpayers money.

We who really know from experience what reclamation has done and can do, know that reclamation is not pork barrel philosophy or a

dole—it is an investment which is being repaid by the users of the products of reclamation projects—benefiting not only the local economy but also the entire Nation. Reclamation law repayment requirements as a two-way street, are in sharp contrast to the one-way aspects of many Government expenditures.

As Mr. Kirwan, of Ohio, so well expressed in the Congressional Record on August 14, 1963:

Reclamation puts to work the renewable—and precious—resource of water, water that is the key to life and prosperity, particularly in the entire western half of our country.

The argument that no more reclamation projects should be built because these projects will only contribute to an evermounting surplus is entirely erroneous. An examination of the attached crop report for the Salt River project shows that wheat, a surplus crop, represented less than 1 percent of the value of crops grown on the Salt River project during 1962. Feed grains of all kinds, including wheat, represented only 8.5 percent of the total value—none of which went into surplus. This small amount of these crops is necessary for balanced crop rotation and livestock feeding.

On the other hand, seed, hay and forage, vegetables, fruits and nuts, and flowers represented 45 percent of the total value of 1962 crops. Cotton lint and cottonseed made up approximately the same percentage. This distribution of cropping is generally typical throughout the entire irrigated area of central Arizona.

The central Arizona project, as envisioned by the Bureau of Reclamation, is simply an expansion upon the concepts and the experiences of the Salt River project. Its cost will be repaid to the Government in the same manner that the cost of the Salt River project has been repaid. There is no other feasible way of sustaining an economy that exists in one of the fastest growing areas of the United States.

I offer the following facts to support my contention that investment in reclamation projects is good business for the local area and for the country as a whole.

The original Federal investment in the Salt River project was repaid in full in 1955.

The assessed valuation in Maricopa County in 1900, when the project was under consideration was \$10 million; and in 1962 it had risen to \$770 million.

A recent study revealed the following analysis of employment in Maricopa County:

	Jobs	Projections:	Jobs
1940.....	54, 500	1965-70.....	357, 000
1950.....	111, 700	1975-80.....	491, 000
1958.....	203, 000		
1962.....	267, 200		

Employment is one of the Nation's most pressing economic and social problems. The history of the Salt River project proves that where reclamation has provided a water and power supply in an area where none previously existed, an economy has grown and employment has skyrocketed.

According to Western Management Consultants, Inc., the value of manufacturing in Arizona increased from zero in 1903 to \$86 million in 1946 and to \$850 million in 1962.

In 1903 when the project was started, the city of Phoenix occupied less than 2,000 acres of project land. In 1962 the Salt River project supplied 65.4 percent of the water used by the city of Phoenix domestic water system and the city occupied about 44,000 acres of the project land.

Lands of the Salt River project represent only 4 percent of the land area in Maricopa County, yet contain approximately 80 percent of the county's assessed valuation.

The foregoing statistics emphasize the fact that the Salt River project made possible a stable agricultural economy in Arizona, which in turn encouraged population, trade, and industrial growth important to the Nation. It is not hard then to shift from the experiences of the Salt River project to a projection of the effects of the central Arizona project. Conservative estimates of benefits resulting from the central Arizona project, prepared by the Bureau of Reclamation indicate total annual benefits of \$125,468,800 which is more than three times the annual cost of the central Arizona project, including amortization of construction costs.

The cost of the central Arizona project is too great for any group of men or the State of Arizona to undertake. That was true of the Salt River project when they commenced building it almost 60 years ago. But, if you will take the long-range view for the years that the Salt River project has been in existence, there are many more reasons, as of today, why the central Arizona project should be built than there were reasons in 1903 for commencing to build the Salt River project. A few of these reasons are:

There are 13 times more people who will be affected by the central Arizona project.

Assessed valuation has increased over the same period 77 times.

Crop valuation in 1962 in the Salt River project area was nearly 11 times the valuation in 1912 at the time of the construction of Theodore Roosevelt Dam. Similarly, livestock has grown to a \$20 million per year business on the Salt River project area alone.

Mining now accounts for about \$450 million as a source of Arizona's income, and tourism has grown from a negligible figure in 1903 to the stature of a \$350 million industry.

Arizona needs the water that will be provided by central Arizona project. Without this additional water the present economy cannot be sustained. More land will have to go out of cultivation; farmers will face the stark reality of failure and the future growth of cities and towns will be jeopardized.

The central Arizona project is feasible. The Federal investment will be repaid and the water is needed now.

For these reasons on behalf of the Salt River project and its land-owners, I urge favorable consideration and approval of S. 1658.

(The material referred to follows:)

CENTRAL ARIZONA PROJECT

Crop report, Salt River project, year 1962

Kind, item No., and crop	Acreage	Unit	Yield		Value of crops		
			Per acre	Total	Per unit	Per acre	Total
Cereals:							
1. Barley.....	22,956	Bushel.....	70.000	1,606,920	\$1.2000	\$84.00	\$1,928,304
2. Oats.....	2,421	do.....	70.000	28,470	.9800	68.60	28,881
3. Wheat.....	3,584	do.....	50.000	173,200	2.1000	105.00	376,320
4. Grain sorghum.....	22,622	do.....	70.000	1,583,540	1.1500	80.50	1,821,071
Subtotal.....	49,583					83.79	4,154,376
Seed:							
5. Alfalfa.....	922	Hundredweight.....	5.000	4,610	27.0000	135.00	124,470
7. Safflower.....	4,456	Hundredweight.....	30.000	133,680	5.0000	150.00	668,400
8. Sugarbeets.....	2,495	do.....	35.000	87,325	13.0000	525.00	1,309,875
9.....							
Subtotal.....	7,873					207.08	2,102,745
Hay and forage:							
10. Alfalfa.....	37,660	Ton.....	4.800	180,768	25.0000	120.00	4,519,200
11. Alfalfa and grain.....	3,762	do.....	2.400	9,029	25.0000	60.00	225,720
12. Alfalfa (after grain).....	3,762	do.....	3.400	12,791	25.0000	85.00	319,770
13. Pasture, grain, alfalfa.....	68,383	Animal unit month.....	6.000	410,298	6.0000	36.00	2,461,788
14. Pasture, Bermuda, Sudan.....	10,923	do.....	13.000	109,230	6.0000	60.00	655,380
15. Corn fodder, ensilage.....	2,274	Ton.....	25.000	56,850	4.0000	100.00	227,400
Subtotal.....	126,764					66.34	8,409,258
Vegetables and truck:							
16. Cantaloups.....	193	Crate.....	150.000	28,950	3.0500	457.50	88,298
17. Garden.....	4,636	Acre.....			500.0000	500.00	2,318,000
18. Lettuce, fall.....	2,693	Carton.....	350.000	942,550	1.5500	542.50	1,460,953
19. Lettuce, spring.....	703	do.....	500.000	351,500	2.8800	1,440.00	1,012,320

20. Onions, dry.....	1, 026	Hundredweight.....	300, 000	307, 800	3, 9000	1, 170. 00	1, 200, 420
21. Potatoes, white.....	134	Bushel.....	400, 000	77, 000	2, 0000	800. 00	155, 200
22. Potatoes, sweet.....	386	do.....	175, 000	67, 500	2, 0000	330. 00	133, 100
23. Truck, miscellaneous 1.....	2, 951	Hundredweight.....	243, 270	717, 900	3, 0233	733. 50	2, 170, 460
Subtotal.....	12, 782					668. 19	8, 540, 751
Fruit and nuts:							
24. Citrus.....	4, 779	Hundredweight.....	130, 000	621, 270	3, 22	418. 60	2, 000, 489
25.							
26.							
27. Peaches.....	13	Hundredweight.....	17, 000	221	8, 0000	136. 00	1, 768
28.							
29. Fruit, small 2.....	182	Hundredweight.....	44, 038	8, 015	13, 6080	687. 36	124, 100
30. Pecans.....	260	do.....	30, 000	7, 800	35, 0000	1, 050. 00	273, 000
Subtotal.....	5, 234					458. 61	2, 400, 357
Miscellaneous:							
31. Cotton lint (upland).....	51, 499	Bale.....	2, 350	121, 023	160, 0000	376. 00	19, 363, 624
32. Cottonseed (upland).....	51, 499	Ton.....	960	49, 439	49, 0000	47. 04	2, 422, 513
33. Cotton lint (American Egypt).....	3, 673	Bale.....	1, 250	4, 591	270, 0000	337. 50	1, 239, 038
34. Cottonseed (American Egypt).....	3, 673	Ton.....	530	1, 947	49, 0000	25. 97	95, 388
35. Flowers.....	160	Acre.....			750, 0000	750. 00	120, 000
36.							
Subtotal.....	110, 504					210. 32	23, 241, 163
Soil building:							
37. Soil-building crop.....							
38. Fallowed land.....	19, 289						
Subtotal.....	19, 289						
Total value.....							48, 848, 850
Additional revenue.....							118, 044
Total and average gross value per acre.....						295. 74	48, 966, 894

² See table headed "Small fruits."

¹ See table headed "Itemized list of truck miscellaneous."

Total acreage reported	332, 029
Less duplicate areas	166, 454
Net area in cultivation	165, 575
Less idle or fallowed	19, 289
Total area irrigated	146, 286
Farmsteads, ditches, and roads	10, 575
Fallowed or idle	19, 289
Subdivided, residential	46, 000
Subdivided, commercial and industrial	16, 000
Grand total, irrigable or project	238, 150

Summary of additional revenue received: Purpose: Conservation. Year: 1961.
Value: \$118,044.

Value per acre excluding fallowed or idle land, \$334.73.

The item "Duplicate areas" appearing in the tabulation above is made of the following:

Cottonseed	55, 172
Alfalfa grain, pasture	68, 383
Alfalfa grain	3, 762
Alfalfa seed	922
Grain sorghum	22, 622
Cantaloups	193
Lettuce, fall	2, 693
Lettuce, spring	703
Corn ensilage	2, 274
Sudan, Bermuda pasture	9, 730
Total	166, 454

Itemized list of truck miscellaneous

Kind	Acreage	Unit	Yield		Value of crops		
			Per acre	Total	Per unit	Per acre	Total
Broccoli	60	Hundred-weight.	70	4, 200	\$7.00	\$490.00	\$29, 400
Carrots	1, 986	do.	250	496, 500	3.00	750.00	1, 489, 500
Cabbage	466	do.	250	116, 500	4.00	1, 000.00	466, 000
Celery	43	do.	500	21, 500	2.00	1, 000.00	43, 000
Watermelons	396	do.	200	79, 200	1.80	360.00	142, 560
Total	2, 951		243.27	717, 900	3.0233	735.50	2, 170, 460

Small fruits

Kind	Acreage	Unit	Yield		Value of crops		
			Per acre	Total	Per unit	Per acre	Total
Apricots	14	Hundred-weight.	25	350	\$8.00	\$200.00	\$2, 800
Dates	49	do.	35	1, 715	20.00	700.00	34, 300
Olives	50	do.	30	1, 500	7.00	210.00	10, 500
Plums	15	do.	50	750	10.00	500.00	7, 500
Strawberries	44	do.	75	3, 300	20.00	1, 500.00	66, 000
Vineyard	10	do.	40	400	10.00	400.00	4, 000
Total	182		44.038	8, 015	15.608	687.36	125, 100

Stock report, Salt River project, year 1962

Items	Number	Inven- tory value	January 1, total value	Number	Inven- tory value	December 31, total value	Increased total value
Horses and mules.....	2,667	\$150.00	\$400,050	2,758	\$150.00	\$413,700	+\$13,650
Cattle, beef.....	48,367	230.00	11,124,410	56,345	240.00	13,522,800	+2,398,390
Cattle, dairy.....	23,325	230.00	5,364,750	18,604	240.00	4,464,960	-899,790
Sheep, range feeders.....	15,107	11.00	166,177	17,313	11.00	190,443	+24,266
Hogs.....	1,076	26.00	27,976	778	27.00	21,006	-6,970
Turkeys.....	1,059	4.00	4,236	1,191	4.00	4,764	+528
Fowls.....	89,497	.80	71,598	114,646	.75	85,985	+14,387
Other livestock or fowl.....			285,000			295,000	+10,000
Bees, hives.....	5,505	10.00	55,050	3,636	10.00	36,360	-18,690
Total.....			17,499,247			19,035,018	+1,535,771

Source: Compiled by J. F. Chambers, superintendent, irrigation services, Jan. 11, 1963.

Senator HAYDEN. You have demonstrated, sir, that what has been done can continue, and that even a great development can take place if the central Arizona project is constructed.

Mr. CORBELL. That is the only way we can continue, with additional water.

Senator HAYDEN. It is about 4 o'clock. I think I will adjourn this meeting until 10 o'clock tomorrow morning when we have some 12 other witnesses who desire to be heard, and we will see if we can do that tomorrow.

We stand in recess.

(Whereupon, at 4 p.m., the committee adjourned, to reconvene at 10 a.m., Wednesday, October 2, 1963.)

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CENTRAL ARIZONA PROJECT

WEDNESDAY, OCTOBER 2, 1963

U.S. SENATE,
SUBCOMMITTEE ON IRRIGATION AND RECLAMATION
OF THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS,
Washington, D.C.

The subcommittee met, pursuant to recess, at 10:04 a.m., in room 3110, New Senate Office Building, Senator Frank E. Moss presiding.

Present: Senators Moss, Hayden, Kuchel, and Jordan of Idaho.

Also present: Senators Bible and Goldwater.

Jerry Verkler, staff director; Roy M. Whitacre, professional staff member; and Stewart French, chief counsel.

Senator Moss. The subcommittee will come to order.

We will continue with our hearing today on S. 1658.

Yesterday we were able to hear from, I think, 13 witnesses, and we still have about that many to go.

And the purpose of the hearing, of course, is to build the record so that the subcommittee and the full committee will have before it all the information necessary when it comes to considering the bill.

I would suggest that, because of the pressure of time and the number of witnesses, that wherever possible a witness would submit his written statement to be placed in the record which will then preserve it fully for the committee and as far as his oral presentation is concerned, limit himself to highlighting or calling attention to certain parts that he thinks should be emphasized, if that is what he feels.

The thing that I am pointing out is that the record will be just as full as if the witness read orally, every bit of it.

As you recognize, all members of the subcommittee can't be here anyway, to hear the oral presentation and besides, there are many other members of the full committee who are going to have to read the record in order to be fully informed.

I say this also because of the fact that this afternoon in the Senate we have some controlled time on a bill that is before us and it would indicate that there would be a number of votes and when there is a vote, of course we will just have to fold up and all go over and vote.

And that will make it more difficult to proceed this afternoon.

So I would like to move along as rapidly as we can this morning.

I am not going to be able to be here all of the time and when I have to leave I will again ask my colleague, Senator Hayden, to preside.

Our first witness this morning is Mr. McMullin, general manager of the Salt River project.

We are very glad to have you, Rod, and you may proceed.

STATEMENT OF R. J. McMULLIN, GENERAL MANAGER, SALT RIVER PROJECT

Mr. McMULLIN. Mr. Chairman and gentlemen, my name is R. J. McMullin and I am general manager of the Salt River project located near Phoenix in central Arizona.

The Salt River project, as many of you are aware, is the oldest and most successful multipurpose project in the Nation, having delivered water to nearly 250,000 acres of member lands since soon after the turn of this century, and having made low-cost power available to over 5,000 square miles of service area for the better part of this period. I am sure you are also aware that this project has been an instrumental force in support of a burgeoning economy in the fastest growing part of our Nation. At the same time, the Salt River project has been a markedly successful economic entity in itself, having long since paid off its initial Federal loan.

It is my pleasure to have this opportunity to speak to you on behalf of the proposed central Arizona project. You gentlemen have explored—and will explore further—the many and varied technical features and feasibility of this great and worthwhile project. The Salt River project was also once a dream, then a feasibility study, then a reality and now a worldwide recognized, successful reclamation project.

The Salt River project is located in the central part of Arizona on what was desert wastelands a few short years ago. I would like to enumerate, in general, the project facilities, its effect on the local, State and National economy, and the benefits which it provides. This review will emphasize what the existing water supply has created, what has been done to conserve this supply and the need for additional water.

The major facilities of the Salt River project include six dams and reservoirs and a diversion dam, together with hydroelectric and thermal generating plants. The reservoir capacity on the Salt and Verde totals in excess of 2 million acre-feet. Our project has constructed, operates and maintains 250 deep well pumps and over 1,250 miles of canals, laterals, and supporting facilities.

The present project works represent an outlay of \$200 million. Of that amount, \$28 million was advanced by the Federal Government, and the balance financed through the sale of bonds and by retained earnings. Regular payments are being made to the Federal Treasury on \$11½ million balance. The Salt River project's \$101 million bonded indebtedness is exceeded only by the city of Phoenix. It thus becomes the second largest municipal borrower in the State of Arizona.

The project participates directly in the area's economy through purchases of materials and services amounting to over \$15 million annually, plus payrolls in excess of \$10 million per year to over 1,750 employees.

All annual taxes paid by the project currently approach \$1 million, and under a new agreement with the State taxes and annual payments in lieu of taxes within the next 10 years are expected to reach \$7 million.

For an initial investment of \$10 million the project area has returned to the Federal Treasury \$1,046 billion in excise and income

taxes during the 25-year period from 1943 through 1958. This represents a return to the Federal Government of over 10,000 percent during 25 years of the project's 60 years of existence.

In addition, the crops grown on project lands from 1911 through 1962 have been valued at \$1,421,169,565.

The project serves low-cost electricity to over 109,000 customers in its service territory, delivers water to 33,125 water customers through direct delivery accounts and to over 500,000 people through bulk water contracts with the cities of Phoenix and Glendale. Considering both water and power, the Salt River project provides service to approximately 725,000 people, or 50 percent of the entire population of the State of Arizona.

The project's six reservoirs are open to the public at no charge. According to fish and wildlife agency estimates, the project lakes furnish recreational benefits to all of the State and give a further boost to the Arizona economy amounting to \$20 million per year. A count conducted by the National Forest Service showed over 40,000 persons used these facilities on a single Sunday in the summer of 1962. Our lakes are open to the public on a 12-month basis for camping, water sports, fishing and related recreational activities.

The Salt River project represents about one-third of the 700,000 acres under cultivation in one south central part of the State which will be benefited by the central Arizona project.

Most of this vast area outside our project is irrigated primarily from deep well pumps with a water supply that is being depleted at an alarming rate. With the total State water production, surface and ground water, being 7,200,000 acre-feet, more than 60 percent comes from the underground. The underground supply must be recharged if we are to survive.

This mining of Arizona's underground water reservoir is rapidly approaching the critical stages. Water experts agree that 2,300,000 acre-feet per year would be considered a safe yield in Arizona but 4,500,000 acre-feet are being delivered per year. This deficit of 2.2 million acre-feet represents water that is not replaced in the underground reservoir.

It is evident that under the present conditions, and without looking toward the future, the use of water is 50 percent greater than the permanent water supply available. In other words, almost one-third of all the water used in central Arizona today is obtained by overdrawing or mining the precious ground water reserves.

In the Salt River project area, we find it necessary to pump about one-half of the water needed to grow a normal crop. As we are forced to go deeper for water each year, we find that the supply is decreasing and the costs increasing.

Last year the Salt River project spent \$262,000 in maintaining our deepwell pump equipment to provide us with the necessary water.

With an average drop of 10 feet in the static water table each year, it cost us \$26,000 to follow the water down every foot it receded last year. Since 1952, the water table has been lowered over 100 feet and the energy required to pump an acre-foot of water has increased from 250 kilowatt hours to 400 kilowatt hours.

Recognizing the necessity of conserving and increasing available water supplies to meet the needs of agriculture and the population

growth in the future, the Salt River project initiated a water facility rehabilitation and betterment program in 1950.

It is interesting to note that if it had not been for the active water savings program during the last 12 years our reservoirs would have been empty in 1957 and again in 1959. Not only would agriculture have been endangered but the supply of municipal water to the city of Phoenix would have been in serious jeopardy.

We are making every effort to increase our water availability through loss savings. During the period 1952-61 the project concrete lined and tiled over 177 miles of canals and laterals at a cost of \$11,917,441. In the next 10 years, we expect to spend \$17,577,000 for similar works. One of the proposed requirements of the central Arizona project is that all water users have their canals and laterals tiled or concrete lined to reduce waste as much as possible.

Other programs of water conservation in which the Salt River project has participated or is working on are: Chemical additives to reduce seepage in canals and laterals, low-cost canal and lateral lining experiments, control of algae in canals, weed and phreatophyte control, and evaporation control through the application of monomolecular films such as hexadecanal. These programs warrant attention as potential sources of additional water.

As an example of cooperation by interested agencies, experiments on evaporation control have been conducted in cooperation with U.S. Bureau of Reclamation and U.S. Geological Survey at one of the project reservoirs on the Salt River. With an average annual loss of 90,000 acre-feet of water through evaporation from project lake surfaces this possibility of water conservation is of great importance.

The project's water conservation practices have resulted in a savings of some 50,000 acre-feet of water annually. Such savings are an aid in offsetting, to a very minor degree, the losses sustained through evaporation and seepage.

The question has been raised as to why the Salt River project cannot expand its water conservation programs and provide the needed water at a cost much less than that of the central Arizona project. If our conservation program was 100 percent effective, that is, if we could reduce our losses to zero, we would only be offsetting the overdraft of the underground water supply in the Salt River project area. If this was accomplished, additional new water would still be needed to provide the quantity required to assure and maintain a supply of good quality water for domestic and industrial use and to bring the agricultural lands to full production. The central Arizona project will provide this needed source of water and eliminate the need for depleting our underground supply. With this source of supplemental water we would be able to restrict our pumping to the amount of anticipated recharge each year.

The gradual change in water use in certain areas further points up the absolute necessity of supplementing and obtaining an adequate and dependable water supply. The evergrowing demand for additional water for urban and industrial use has, in recent years, become of paramount importance to the citizens of Arizona.

From the population in Maricopa County in 1910 of less than 35,000 to over 800,000 in January 1963, we have seen the dynamic growth pattern develop and accelerate. The reasonable expectation now is that our present population figure will be double by 1975.

In years gone by the State of Arizona was famous for the three C's—copper, cattle, and cotton. Today, industry, recreation, and tourists have become substantial factors in our economy. As a result of this change, the State's economy has become diversified and stabilized. This diversification has stimulated population growth and the conversion of farmland to urban developments. Now instead of a few farmers and crops needing the Colorado River water, we have an expanding economy and an increasing number of people who need it.

However, urbanization has not brought the lower consumption of water that had been expected. In 1954, 214,000 of the project's 242,000 acres were in agriculture and 28,000 in urban development. This urban area had risen to 60,000 acres by 1962. We expect that by 1973, 107,000 acres will be devoted to urban use.

Even though earlier estimates indicated that residential and commercial use of water per acre was less than agricultural use in this area, recent studies do not bear out these estimates. Today with more than 66,000 acres of the project urbanized, water demands per acre are not diminishing. With every water authority predicting greater and greater residential and commercial use of water throughout the Nation in the future—we now believe that water demands will also increase in our area as urbanization develops. High-rise buildings and apartments may be the cause.

At the present time, Phoenix is experiencing the construction of many of these high-rise buildings ranging up to 32 floors. One example of water use in multistory buildings is the 20-story Guaranty Bank Building in Phoenix and its use of 11.39 acre-feet per acre in 1962 compared to agricultural use of 4 acre-feet per acre. But, regardless of whether the acreage is urban or agriculture, a dependable water supply at reasonable cost is essential. With urbanization has come new responsibilities because during water-short years it is possible to limit the apportionment of water to the farmer and he can lay aside part of his land to compensate for the shortage, but it is almost an impossibility to limit water for municipal and industrial use. There is no practical way to reduce the population to fit a diminished water supply.

Up to this point my remarks have been devoted to quantity of water. Now I would like to consider for a brief moment the quality of water, for this is also a very real problem. Without a good supply of potable water in the very near future to supplement the existing supply, the salt content will continue to rise.

In many cases the existing underground water is presently not potable. A good example is the city of Buckeye, Ariz., located approximately 25 miles west of Salt River project. The Buckeye domestic city water supply tested 4,000 parts of soluble salts per million. Recently it installed a desalinization plant to reduce this to a potable 450 parts per million.

Gentlemen, I wish to point out that we in the central area of the State are waiting anxiously for the central Arizona project for the area cannot hold its own without supplemental water from the Colorado River. This is not a reclamation project in the usual sense where new lands will be brought into cultivation, raising all the questions and fears of crop competition and surpluses.

This is a "rescue project" which will provide security for an area which presently produces \$300 million annually in Federal income

taxes and supplies a market for 1.6 billion in retail sales of services and goods which are produced in all parts of the Nation.

This supplementary water will bolster the existing economy and will provide the added foundation for more people, more markets, more products, and more taxes from the broadened economy.

Although the need for water is the primary reason justifying the central Arizona project, power is the critically important partner that becomes the cash register making it all possible. In the central Arizona project proposal, municipal and industrial water users will pick up a portion of the project cost, however, power will continue to be the largest contributor.

Gentlemen, this project is not "pork barrel." Arizona is not looking for a handout at the expense of the taxpayers in the rest of the country. Feasibility studies by responsible Federal agencies confirm that this new project will not be a burden on the people. To the contrary, it has been shown that the project is feasible, that the Government will be fully repaid and in addition, will benefit through the increased tax base resulting from the project construction.

Certainly with the contribution that will be made by the central Arizona project to the economy of Arizona and the Nation through irrigation, power, flood control, recreation, municipal and industrial water, and fish and wildlife benefits, this project warrants favorable consideration.

Gentlemen, I respectfully urge that the Nation can ill afford to allow the vital, growing economy we now have in central Arizona to "die on the vine" for lack of water which is available through construction of the self-liquidating facilities proposed in the central Arizona project development.

Arizona needs this water. We have fought for it; we have litigated for it; we have waited for it and we need it now if we are to survive.

Thank you.

Senator HAYDEN (presiding). Any questions?

Senator KUCHEL. No, sir.

Senator GOLDWATER. I would like to ask this.

Right on page 7 you mentioned that you have spent \$11,917,441 for lining and tiling the canals.

Mr. McMULLIN. Yes, sir.

Senator GOLDWATER. This was done with project money, wasn't it?

Mr. McMULLIN. Some of it was done with project money. Other was done with money borrowed from the Federal Government on the rehabilitation and betterment loan.

Senator GOLDWATER. Now, on page 11 you are talking about the Buckeye situation and you say that they tested 4,000 parts of soluble salts per million.

What is allowable for safe human consumption?

Mr. McMULLIN. I wouldn't like to say, Senator.

This can get into quite an area of argument and let's say that at 4,000 parts per million it is very disagreeable to try to drink.

And anything ranging above a thousand is not too pleasant.

Senator GOLDWATER. Do you happen to know the cost per thousand gallons of water out of that plant in Buckeye?

Mr. McMULLIN. No, sir; I do not.

We have others who will be able to answer those questions, Senator Goldwater.

Senator GOLDWATER. Thank you.

That is all I have.

Senator HAYDEN. Thank you.

Senator JORDAN. Mr. Chairman?

Senator HAYDEN. We would like to hear from——

Senator JORDAN. Mr. Chairman, I am interested in page 5 of this gentleman's statement.

I am looking now at the paragraph in the middle of the page where you say:

This mining of Arizona's underground water reservoir is rapidly approaching the critical stages.

Water experts agree that 2,300,000 acre-feet per year would be considered a safe yield in Arizona but 4,500,000 acre-feet are being delivered a year. This deficit of 2.2 million acre-feet represents water that is not replaced in the underground reservoir.

My question is, how long can that depletion continue before you reach the point of diminishing returns?

Mr. McMULLIN. Senator, we have already reached the point of diminishing returns in many areas because we have several hundred thousand acres that are out of cultivation.

So as this depth reaches this point where it is uneconomical or the quality of water is such that it isn't conducive to the proper growing of crops, why, these areas have been going out of cultivation and will continue to go out.

And it is critical now in all areas and it is just a slow death proposition.

Senator JORDAN. Do you know offhand what percent of the total acreage that has been irrigated has been forced out of production by reason of this excessive pumping cost?

Mr. McMULLIN. I believe it has already been put into evidence here. Somewhere on the order of 250,000 acres, Senator.

When I said "slow death" it is not so slow in some areas as others, I might add.

Senator JORDAN. Thank you.

Thank you, Mr. Chairman.

Senator HAYDEN. Thank you.

Mr. Raymond.

STATEMENT OF H. S. RAYMOND, DISTRICT ENGINEER AND MANAGER, MARICOPA COUNTY MUNICIPAL WATER CONSERVATION DISTRICT NO. 1, MARICOPA COUNTY, ARIZ.

Mr. RAYMOND. Mr. Chairman, my name is H. S. Raymond. I am district engineer of the Maricopa County Municipal Water Conservation District No. 1. I have spent my entire life in Arizona, mostly in Maricopa County, except for a period of service in the Navy during World War II.

I have a degree in civil engineering from the University of Arizona, and am a registered professional engineer in the State of Arizona. Almost all of my professional career has been as an employee of the district I now represent.

Irrigation in Arizona and more particularly irrigation in Maricopa County means to almost everyone the highly successful world-famous Salt River project. Actually, the Salt River project with its 240,000 acres constitutes less than one-half of the irrigated farmland in the county.

Surrounding it are a number of smaller irrigation districts and large blocks of farmland not presently in any irrigation district. On the east side of the Salt River project is the Roosevelt Water Conservation District with 39,000 acres.

Over on the west side of the valley there is the Maricopa County Municipal Water Conservation District No. 1 with 35,000 acres. Just south of the Maricopa Water District lies the Roosevelt Irrigation District with 39,000 acres, and just south of it is the Buckeye Irrigation District with 17,000 acres.

A number of smaller irrigation districts, electrical districts, and ranch operations make up the remainder of the irrigated acres in the valley. Incidentally, the Salt River project is the only Federal reclamation project in Maricopa County. The construction costs of the other projects were financed with private capital.

Most of the land in Maricopa County has been irrigated for many years. The land in the Salt River project was brought under irrigation by 1910, or shortly thereafter. The Buckeye Irrigation District dates back to around 1900. Some of the larger ranches not in irrigation districts were farmed prior to 1920. The Roosevelt Water Conservation District, the Roosevelt Irrigation District, and the Maricopa County Municipal Water Conservation District No. 1 completed their projects in the 1920's.

A large acreage of new land irrigated by pump water from wells was developed following World War II. Presently, it is estimated, there are more than one-half million acres of irrigated land in Maricopa County.

South of this area in Pinal County there are several hundred thousand acres under irrigation. I will not discuss the water problems of those areas in this statement. I know, however, that they are critically short of water and that water production costs are high. In Maricopa County surface water has been inadequate to supply the needs of the projects originally planned as gravity water projects; the Salt River project with the best gravity water supply in the valley has found it insufficient to meet irrigation demands and now almost one-half of its deliveries are from wells. The Buckeye Irrigation District, located on the Gila River, originally had an adequate supply of surface water. It is entitled to 1.1 percent of the water diverted at Granite Reef or from 5,000 to 11,000 acre-feet a year.

It is entitled, also, to divert from the Gila River. From 1900 to 1931, the district diverted all its needs. Diversions from the Gila ranged from 115,000 to 169,000 acre-feet a year. However, available surface water for this project has been steadily declining and pumping from wells has increased. In 1931, 116,000 acre-feet were diverted and, for the first time, pump water was used.

Four thousand acre-feet of pump water supplemented the gravity supply that year. Last year, 1962, 15,000 acre-feet were diverted and 84,000 acre-feet were pumped. The Roosevelt Water Conservation District is entitled to 5.6 percent of the water diverted at Granite Reef

or from 22,000 to 35,000 acre-feet a year from that source. The rest of its water supply comes from wells. The Roosevelt Irrigation District is an all-pump project and so are the other lands in the valley except the Maricopa County Municipal Water Conservation District No. 1.

Now, I will discuss this last district in more detail because I know its problems very well. The project was designed as an all-gravity water project. The watershed covers 1,430 square miles of the drainage area of the Agua Fria River including Lynx Creek and the southwestern slopes of Mount Mingus. Prior to the construction of the storage dam, runoff records developed by the district based on U.S. Geological Survey data, indicated that the mean annual flow of the river at Lake Pleasant was 188,000 acre-feet. This fact is illustrated on the graph entitled "Runoff Agua Fria River at Lake Pleasant."

This amount was adequate to supply the needs of the acreage in the proposed district. Since the construction of the dam, the mean flow has been 42,000 acre-feet. This is less than one-fourth of the mean flow before the dam was built. It became apparent to the district that wells had to be drilled to provide additional water for irrigation.

Statistical data pertaining to these wells are graphed on the chart entitled "Comparative Ground-Water Conditions." In 1939, 43 wells were drilled and equipped with pumping units. During 1946 and 1947, 17 more were drilled and equipped, making 60 in all.

Most of these wells were drilled and cased to 500 feet. Fifty-four of these have been deepened during the past few years to 1,000 feet or more. We are, at present, deepening the rest. From 1946 through 1954, landowners within the project drilled an additional 50 wells. In 1940, the average lift for the district wells was 245 feet, the static water level 172 feet, the average unit production was 7.38 acre-feet a day at a power cost of \$1.97 an acre-foot.

In July 1963, the average lift was 511 feet, a decline of 266 feet or 11½ feet a year. The static water level dropped from 172 to 456 feet. The average unit production has fallen to 0.47 acre-feet a day and the power cost to produce an acre-foot has risen to \$6.92. You can readily see by projecting these lines on the chart that, without supplemental water, the Maricopa County Municipal Water Conservation District No. 1, and I am sure, many areas similar to it in Maricopa County and elsewhere in the State, face economic disaster in the not-too-distant future.

Is it worth while to rescue this segment of our economy? We think it is. We know that agriculture with its allied industries is and should continue to be one of the State's best economic assets. With only two-thirds of the Maricopa Water District being farmed, because of the insufficient water supply, it produces annually \$10 million in crops. Specialty crops such as citrus, grapes, lettuce, melons, other vegetables, and rose bushes produce about \$6 million yearly; 30,000 head of cattle are pen fed annually in the district.

To make it possible to continue farming in this district we are conserving water by all possible means. We have concrete lined almost all of our distribution system and farm ditches.

We have leveled land to reduce the fall in order to get better water penetration. At the lower ends of fields we have built sumps to catch

the tail water which is then pumped through pipelines to the upper end of the fields for reuse. We are experimenting with artificial recharge of ground-water reservoirs. Near the north end of our project we have successfully injected floodwater into the ground-water aquifers through existing wells and in pits.

Water conservation, including improved irrigation practices, and the eventual possibility of increasing runoff from watersheds through vegetative changes and weather modification are and will be increasingly employed to alleviate the short water supply.

However, additional water must be brought into the central Arizona project area from the Colorado River to supplement existing supplies and reduce the overdraft on our ground-water basins. The need for this supplemental water has existed for many years. It must be brought into the central Arizona project area as soon as possible to save us from economic disaster.

Thank you very much.

Senator HAYDEN. Are there any questions?

Senator KUCHEL. No, sir.

Senator HAYDEN. Thank you for your statement, sir.

We will be glad to hear from Mr. Wilbur W. Weigold, secretary and general manager of the Buckeye Irrigation Co.

**STATEMENT OF WILBUR W. WEIGOLD, SECRETARY AND GENERAL
MANAGER OF THE BUCKEYE IRRIGATION CO., BUCKEYE, ARIZ.**

Mr. WEIGOLD. Mr. Chairman, I am Wilbur W. Weigold, of Buckeye, Ariz. I am appearing on behalf of the Buckeye Water Conservation and Drainage District and the Buckeye Irrigation Co., of which I am secretary and general manager.

The Buckeye district is located in central Maricopa County on the north side of the Gila River, immediately west of the confluence of the Gila, the Salt, and the Aqua Fria Rivers. The Buckeye Irrigation Co. is a nonprofit mutual corporation which provides water to about 17,400 acres under cultivation in this district.

The lands we serve have water rights in the Gila River dating back to 1885. However, since 1930 we have never been able to divert enough stream water to satisfy those decreed rights. The Gila is usually dry the year round at our headgate and we seldom get more than a few thousand acre-feet each year of streamflow.

Depletion of streamflow has made us almost totally dependent on a ground water supply from the 48 wells we now operate. Ground water levels in our district are continually falling; replacement costs are rising; power costs have increased; and the quality of available ground water is becoming progressively worse all the time.

We have done what we can to obtain the supplemental supply of water we need. We are diverting sewage effluent discharged into the Salt River by the city of Phoenix. We have supported flood-control programs to provide better runoff and upstream channel clearance. We have worked to conserve and more effectively use the water we have. However, our best hope is the availability of Colorado River water in Maricopa County.

Our district and company are debt free and we are not anxious to take on a heavy financial obligation. But we are proud that the

town of Buckeye was the first in the Nation to assume the obligation of financing, building, and operating a desalinization plant for an entire municipal water supply.

I might say here, to correct the record, that I think the amount of salt in the water was between 2,000 and 2,500 parts per million and not the 4,000.

Four thousand parts per million is about the quality of our pump water for irrigation in the district.

We are similarly willing to pay what is economically feasible for water to keep the land in the Buckeye district productive.

I urge the committee to give favorable consideration to this bill before you. We hope that Colorado River water does not come to central Arizona too late to do us any good.

Thank you.

Senator HAYDEN. Thank you for your statement, sir.

Any questions?

Senator KUCHEL. No.

Senator GOLDWATER. How much does it cost you per thousand gallons to treat that water in Buckeye?

Mr. WEIGOLD. Senator, I do not know the cost on that.

That is handled by the city of Buckeye and not the irrigation district.

Senator GOLDWATER. I see.

Thank you.

Senator HAYDEN. Hon. Lew Davis, the mayor of Tucson.

STATEMENT OF LEW DAVIS, MAYOR OF TUCSON, ARIZ.

Mr. DAVIS. Senator, my name is Lew Davis.

I am the mayor of Tucson. I deeply appreciate the opportunity to appear before you today on behalf of a community I came to as a visitor just 12 years ago.

Everyone is aware of Arizona's and Tucson's population explosion and that Tucson has been recognized as one of the fastest growing metropolitan areas in the Nation. We are not seeking a way to stop the growth, but we are seeking a way to cope with it.

Let me relate to you the story of Tucson in an attempt to depict both its most urgent problem, and the means for its solution.

Historically, Tucson is one of the oldest communities in this country. There have been some attempts to show that it might be the oldest. We are concerned here, however, with its growth during this century and, more particularly, the past 20 to 30 years.

Tucson is the only large city in Pima County and it shares a common border at one point with an Indian reservation which is nearly the size of Connecticut.

It is beautifully situated in a broad valley, fringed by mountain ranges including the pine-covered Catalinas and 9,000-foot high Mount Lemmon immediately to the north. During the winter months, people may ski in the morning on Mount Lemmon, take an hour's drive to Tucson for lunch, and swim in the afternoon.

Prior to World War II, Tucson had a small but steady growth, resulting primarily from health seekers and winter visitors who became permanent residents. Another factor contributing to its growth

was the University of Arizona, which has had a constantly increasing enrollment.

The dramatic upturn in population occurred during the war years. Southern Arizona, with an unrivalled number of clear days per year, was obviously a natural choice for training airplane pilots. Thousands were stationed there for training, and with them came other thousands who worked in auxiliary activities.

The population boom was on in Tucson, but didn't end with the war. The thousands of workers remained, and thousands more came. In fact, many of the airmen who trained at Tucson returned after the war. The influx has never let up. It continues today at a rate of more than 1,000 per month.

The Davis-Monthan Airbase continues as a Strategic Air Command installation now housing a missile wing, a bomber and fighter wing, and this country's sole base of the formidable U-2 Reconnaissance Wing. Tucson is the center, also, of a significant part of this Nation's nuclear deterrent ability. It is the site of 18 Titan II missile complexes.

Figures of all kinds might be cited to depict the extent of the boom around Tucson. The astonishing number of new homes could be mentioned, or the miles of roads built into former desert areas skyrocketing demands for electric power. But I am here today to speak of water.

As you know, the entire water supply for the Tucson area comes from wells which tap a diminishing underground source.

If we are overpumping that source now, where will we look for water for additional thousands?

The population explosion nationwide is continuing, as is the migration to the West and the Southwest. It is probable that some of your children, and almost certainly some of your grandchildren, will live in the Southwest.

Unfortunately, I cannot bring our full story home to you without resorting to figures and charts. It is my hope that the very magnitude of the figures and the bold projections of the charts will have their own dramatic effect.

The charts I have here are reproduced in smaller size and attached to this statement. The first, entitled "Tucson Metropolitan Area—Population," reveals that Tucson and its surrounding area had a population of 43,000 in 1930 and 58,000 in 1940. By 1950, the figure had climbed to 123,000, and today it is just short of 300,000.

By 1970, the population is expected to rise to 390,000, and by 1980 it will have jumped to 685,000.

May I say, in connection with these projections, that they are based on studies by our city-county planning department, and are confirmed by other projections made independently. We have erred in the past on these projections, but always on the conservative side. This, I understand, is an error made in most U.S. population forecasts in recent years.

What does this mean in terms of water usage in an area which is already seriously mining its underground supply? I call your attention to the chart entitled "Tucson Metropolitan Area—Water Demands. Acre-Feet per Year," and particularly to the column captioned "1980."

The present metered per capita use of water in Tucson is 160 gallons per day. This rate of usage in 1980 will require 123,000 acre-feet of water per year. But that per capita use does not account for all water consumed in Tucson.

That is only the amount that goes through individual water meters. Another 10 percent (12,300 acre-feet) will be lost in transmitting water from well fields to the meters. And we should add the following estimated usage by others who have sunk their own wells into that common underground supply: Military Establishments, 2,000 acre-feet; schools and recreation, 9,300 acre-feet.

Among the other figures on the exhibit, I should also refer to the 24,400 acre-feet for irrigating the agricultural areas around Tucson, and the 10,000 acre-feet for the San Xavier Indian Reservation. Plans for putting down wells on that reservation have already been discussed, and the Interior Department has under study a proposal for development.

You have then a ground total of probable use of 217,400 acre-feet by 1980, only 17 years away.

Measure this against the available supply of ground water from the Santa Cruz Valley surrounding Tucson, and from two adjoining valleys, and the picture becomes acute.

We will have 75,000 acre-feet available, and a need for 142,400 additional acre-feet. Translated to gallons, we would have to take from underground, in 1 year, approximately 46 billion gallons of water. It is obvious that water must be imported, since so enormous an overdraft cannot be made.

I have pointed out that we are now depleting the underground supply and that well levels are dropping. The need for importing water, therefore, is positive—it is urgent, it is immediate.

We look to the central Arizona project in our future planning. I venture to say that if this project were approved today, Tucson could not get any water from the project into its lines before 1972. That means a minimum of 9 years, during which time we will continue "mining" an underground supply that patently is not inexhaustible. The accumulated overdraft may approach 1 million acre-feet by that time.

I would be remiss if I did not extend our population projections to the year 2,000. This is less than 30 years away from Colorado import, if construction on the central Arizona project were to start now. We must plan that far ahead in terms of supply, but I will not go into all the figures in the table for that year. We have attempted to be realistic in projecting Tucson's population to 1,500,000, and also have contemplated usage by satellite communities, some of which have already started as conventional developments or retirement communities.

In this table we have eliminated all irrigation use except that on the Indian reservation, which we have placed at 20,000 acre-feet per year. With other farmland fully retired from use, the Papago Tribe would certainly farm their land or lease it for that purpose.

We have also been conservative in considering possible new industrial growth. Air conditioning that now makes living in Tucson even more delightful than heretofore can readily be utilized by industrial

plants. There is a labor market that can be drawn upon. More industries are certain to come as a part of the general move to the Southwest.

But even without anticipating any great industrial expansion, grand total of usage at the turn of the century will approach 390,000 acre-feet, with the available local supply remaining at 75,000 acre-feet. One could not be too sure of that much local supply after years of overdraft, but I have used the figure to again stay on the conservative side.

As you will note, by the year 2000, to meet its demands, Metropolitan Tucson will have to import 315,000 acre-feet of water per year.

In summary, Tucson should be importing water now; it must import water within a comparatively few years, and it must continue to import water in increasing quantities in successive years.

I repeat, gentlemen, the need is positive, it is urgent, it is immediate.

Senator HAYDEN. We thank you, sir, for your appearance.

Do do you have any questions, gentlemen?

Senator KUCHEL. Well, Mayor, that is an excellent statement and I don't have any doubt that there is an urgency that you and your people face.

I think we have a similar urgency in the State I come from.

Would you object, Mr. Mayor, if this Congress endeavored in one piece of legislation to be of assistance to both your State and mine?

Mr. DAVIS. I would be very happy if we solved our problems at the same time if we possibly could.

Thank you very much.

Senator HAYDEN. Thank you.

Mr. Neil Christensen, city attorney for the city of Flagstaff.

STATEMENT OF NEIL V. CHRISTENSEN, CITY ATTORNEY, CITY OF FLAGSTAFF, ARIZ.

Mr. CHRISTENSEN. Mr. Chairman, members of the subcommittee, by way of introduction I would like to state that my name is Neil V. Christensen; that I was born in Winslow in northern Arizona and my paternal grandparents were early settlers in St. Johns, Ariz. I am counsel for the city of Flagstaff and its water use and utilization commission.

Because of the fact that I have lived in northern Arizona all of my life and have practiced law there for many years, both in public and private capacities, I feel that I am acquainted with the water situation which exists in northern Arizona.

Flagstaff is one of the cities of northern Arizona which are generally referred to as the "tier cities." I believe that the water problems of Flagstaff are typical of the water problems existing in other northern Arizona cities, and what I have to say with respect to Flagstaff problems would be generally true of other communities.

Northern Arizona is an arid area and mostly the cities have available to them only very limited surface or stream water and even this source is further limited by virtue of the fact that many of the streams and surface rights are held by prior appropriators.

For the most part, the only additional source of water for the northern Arizona communities comes from wells. There are no other water rights which can be utilized by the cities for municipal purposes.

When we speak of drilling wells for municipal water supplies, we begin to talk in terms of great sums of money, not only for the cost of the drilling of the well and equipping it and constructing pipelines, but from the standpoint of production costs. The extreme scarcity of surface water and the high cost of wells make it very difficult to sustain our present economy, let alone to provide for future growth. For example, the city of Flagstaff has appropriated all available surface water for municipal purposes. Average cost of water supplied to a customer in the city of Flagstaff is 40 cents per thousand gallons, or approximately \$130 per acre-foot. It should be pointed out that this is the average cost, which is greater than the surface water cost, but less than the well water cost. It is fair to state that in these communities the water situation varies from critical to worse.

It is crystal clear that if these northern Arizona cities are to survive and prosper, additional sources of water must be made available to them. Studies have confirmed that the only additional source of water that might be available is water which is being presently used for nonmunicipal uses by downstream prior appropriators, and this source is not available unless water can be offered to these prior appropriators in exchange for waters appropriated by them. The Bureau of Reclamation, with funds made available to it by the State of Arizona, is currently engaged in surveys to develop feasible means of making exchanges of water which is physically available to these cities.

Commonsense indicates to us that negotiations looking to the acquisition of a portion of the waters of prior appropriators cannot even be undertaken until the holders of those rights know for a fact that replacement water will be made available to them. It is our judgment that the central Arizona project contemplated by Senate bill 1658 will provide the means by which such replacement water will become available from the Colorado River.

We are confident that, if and when it becomes clearly apparent by the passage of this bill that such replacement water will be available, the negotiation of the necessary exchanges can and will be undertaken in an atmosphere of harmony, and that the arrangements made will be such as to provide the northern Arizona communities with the water they need for municipal purposes.

It is for these reasons, in addition to our strong feeling that what is good for any part of Arizona is good for all of it, that we urge enactment of Senate bill 1658 to authorize the central Arizona project.

Thank you.

Senator HAYDEN. We thank you for your statement.

Are there any questions?

Senator KUCHEL. Just a couple.

Mr. Christensen, under the laws of Arizona the prior appropriation of water to beneficial use results in a right, does it, to the user?

Mr. CHRISTENSEN. Yes, sir.

Senator KUCHEL. So that under the laws of your State the existing uses of these waters to which you refer are protected?

Mr. CHRISTENSEN. Yes, sir.

Senator KUCHEL. Are we talking here about intrastate waters entirely in—

Mr. CHRISTENSEN. Well—

Senator KUCHEL (continuing). These streams that you mentioned?

Mr. CHRISTENSEN. Yes; mostly.

Senator KUCHEL. What is your view as a lawyer? Should equal consideration be given to existing uses in your State by people of interstate waters as well as intrastate?

Mr. CHRISTENSEN. Well, I believe that, certainly, in any exchange of water you would have to protect the use that is authorized by the law.

Senator KUCHEL. I don't mean to get into the problem here of exchanges of water.

My question, simply, is this: Do you believe that equal dignity should be given to existing use of interstate waters in your State that is given to intrastate waters?

Mr. CHRISTENSEN. Yes, sir.

Senator KUCHEL. Thank you.

Senator HAYDEN. We thank you, sir.

Hon. Jesse Udall, vice chief justice, Supreme Court of Arizona.

Senator GOLDWATER. I might point out, Mr. Chairman, that Judge Udall is the uncle of the Secretary of the Interior and Congressman Udall, and a distinguished Republican member of the Udall family.

Senator KUCHEL. That covers both sides of the street now.

STATEMENT OF HON. JESSE A. UDALL, VICE CHIEF JUSTICE, SUPREME COURT OF ARIZONA

Judge UDALL. Mr. Chairman, as has been stated, my name is Jesse A. Udall. I am vice chief justice of the Supreme Court of Arizona.

I have lived in Arizona all of my life and, since 1924, I have primarily lived in Graham County in eastern Arizona, and during all of that time that I have lived in Graham County I have been a practicing lawyer, and trial judge, a legislator, and of course, the last 31½ years I have been on the supreme court.

And likewise, I have been a member of the Arizona Stream Commission for a period of time, for about 5 years.

I had the privilege of serving with Senator Goldwater during the time that he was on the commission.

In this capacity I have had considerable experience in considering and handling water problems and I don't mean to pose as an expert by any means at that, but I am tremendously interested in this problem that we have now in Arizona.

In general, the water deliveries in the upper Gila River of Arizona and New Mexico are governed by a consent decree entered in the Federal court of the district of Arizona during the year 1935. In this decree, water from the Gila River was appropriated to lands in Greenlees, Graham, Pinal, and Gila Counties in Arizona and Hidalgo County in New Mexico.

I am advised that the area under irrigation in this region of Arizona is in excess of 37,000 acres and that about 12,000 acres of land have been developed for irrigation in New Mexico.

I am further informed that the amount now being used for municipal and mining purposes in the area of Arizona of which I speak amounts to approximately 18,000 acre-feet per year.

I can state from firsthand knowledge that in dry years this area in my State suffers from a grave shortage of available water. During

these dry years the water supply is augmented by pumping on an extensive scale, and as a result there has been a gradual long-term reduction of our stored underground water; that if this reduction is not brought to a halt it may well mean that thousands of acres of good stabilized agricultural land will return to the desert for lack of water.

It should be borne in mind, also, that the lack of regulatory storage of surface flow in the upper Gila River and its tributaries forces the water users to depend upon an uncontrolled and variable water supply.

At times, we may have water available from the surface supply at a season of the year when it is not particularly needed and later, when it is urgently needed, the streamflow will have diminished to such a point that adequate diversions are impossible.

The construction of a dam such as that which I understand is being considered as a part of the central Arizona project at Hooker's site in New Mexico, would provide some of the needed regulation of river-flow and assist in the establishment of a stable economic climate in the upper Gila River area.

To conclude, let me simply say that the upper Gila River Valley in Graham and Greenlee Counties, just like all the rest of Arizona, is faced with the serious dilemma posed by an increasing population with a decreasing supply of water for those irrigated areas that have been reclaimed from the desert by the toil, courage, and faith of the pioneers during many decades past.

If Arizona's agricultural valleys are to be preserved for the population that is now here and for those prospective citizens who are coming to our areas in increasingly large numbers, it is imperative that additional water be brought into central Arizona for distribution on those lands that are already under a high degree of cultivation.

It is not acres but acre-feet that spell prosperity and progress for us. If a million acre-feet of water, more or less, could be bought in the in the Salt River and Casa Grande Valleys from the Main Colorado River, our farmers in Graham and Greenlee Counties could be benefited directly by the development of additional water; and the farmers in the lower valleys could, for their own use, receive additional water brought in from the Colorado River.

Accordingly, I recommend and urge that the bill before you, S. 1658, be enacted into law at the earliest practicable moment.

Thank you.

Senator HAYDEN. Thank you, sir.

Any questions?

Senator KUCHEL. No, sir.

Senator JORDAN. No.

Senator HAYDEN. Next we will hear from Mr. Carl Anderson, district engineer of the San Carlos District.

STATEMENT OF CARL A. ANDERSON, DISTRICT ENGINEER, SAN CARLOS IRRIGATION AND DRAINAGE DISTRICT, ARIZONA

Mr. ANDERSON. Mr. Chairman, my name is Carl A. Anderson.

I am district engineer for the San Carlos Irrigation and Drainage District at Coolidge, Ariz. I assumed the position in 1938 and have served in that capacity since, except for about a year during 1955-56.

During the past 25 years I have been familiar with the water resources and water supply problems of the State of Arizona.

It is the purpose of my statement to bring to the attention of your committee information which will assist in an understanding of present water supply conditions and the pressing need for new supplemental water supply as proposed under the central Arizona project. Particular emphasis is given to the area embraced within the San Carlos irrigation project and those adjacent nonproject agricultural areas located in the Casa Grande Valley, Pinal County, Ariz.

The Casa Grande Valley is a part of a broad flat river plain formed by deep alluvial deposits from the Gila River and two large tributaries, the Salt River draining from the north and the Santa Cruz River entering from the south. This broad valley lies south of and adjacent to the area included within the great Salt River project. The irrigated portion lies about midway between the cities of Phoenix and Tucson.

This portion of Arizona is arid, the average annual rainfall within the Casa Grande Valley area is about 8 to 9 inches. The availability and use of water throughout the entire year is essential to successful agriculture.

The irrigated lands in this area are divided into two general classes. First, we have those lands with gravity water rights in the flow of the Gila River. These are confined to the area within the San Carlos project (100,000 acres), referred to generally as project lands or gravity lands. The other class of land is that which obtains its irrigation supply solely from underground sources through pumping. These lands are referred to locally as pump lands. The area of such lands improved for cultivation has been variously estimated at 250,000 to 300,000 acres, the actual area cultivated each year being variable under conditions imposed by declining ground water supply.

The San Carlos Federal irrigation project, outlined on the map for you, was constructed by the U.S. Indian Irrigation Service for the reclamation and irrigation of 100,000 acres of land located in the valley of the Gila River in central Arizona; 50,000 acres of the area, located within the Gila River Indian Reservation is in the ownership of the Pima Indians. The remaining 50,000 acres of the project is owned and farmed by non-Indians, this half of the project comprising the lands of the San Carlos Irrigation and Drainage District. Repayment of project construction costs is governed by the provisions of a repayment contract entered into between the United States and the district.

The maps displayed before the committee serve to show the general location of the project, the course of the Gila River through the valley area and the relative locations of other areas adjacent to the project area. I have attached a copy of a small map entitled "Designated Lands of San Carlos Project" which is essentially a small scale reproduction of the larger map titled "San Carlos Irrigation Project" which is now before you.

The Southern Pacific Railroad traverses the area with two lines. Modern paved highways extend to all towns in the valley.

The project works consist of the following general features:

(1) Those works which serve both Indian and non-Indian lands of the project, these being designated as "joint works."

I might say, Mr. Chairman, that it would be quite appropriate to call those common works inasmuch as they serve both Indian and non-Indian lands in common.

These works include the water storage facilities of Coolidge Dam and San Carlos Reservoir; the diversion works at Ashurst-Hayden Diversion; the main canal system; Picacho Reservoir; an irrigation well system consisting of about 100 operable deep wells equipped with electrically operated turbine pumps; a hydroelectric power generating plant at Coolidge Dam with installed capacity of 12,500 kilowatts; a diesel-electric plant of 3,900 kilowatts capacity located on the project, together with electric transmission and distribution lines to the project area and into adjacent nonproject areas. All such works are operated and maintained under the direction of the Bureau of Indian Affairs, Department of Interior.

(2) A system of canals and laterals which serve Indian lands exclusively, these being operated by the Gila River Indian Community.

(3) A system of canals and laterals extending to and serving only the non-Indian lands of the project. Designated as "district works," these are operated and maintained by the San Carlos Irrigation and Drainage District.

The basic water supply for the project lands is derived from surface flows of the Gila River. This supply may be considered in two categories—the normal or natural flow of the stream and secondly, the stored water at San Carlos Reservoir. This basic supply is supplemented by pumping, as will be discussed later in this statement.

The natural flow of the Gila River is that water which would have arrived at the project diversion point had no manmade obstructions or diversions been effected above that point. The Pima Indians, who have lived along the banks of the Gila since time immemorial, originally enjoyed the use of the natural or unobstructed flow of the stream at their ancient headings. However, settlement by the white man on the river above them minimized their usable flows and threatened their agriculture. These upper settlements began in the area near Florence about 1860 and in the upper Gila Valley near Safford some 10 years later.

This progressive diminution in the water supply of the Pimas, brought about two significant events—the construction of Coolidge Dam for storage and regulation of Gila River flows, and the litigation which resulted in the issuance of the Gila River decree (Globe Equity No. 59) by the U.S. district court, Tucson, Ariz., in June 1935.

Under the provisions of this decree the rights to natural flow of the Gila River are adjudicated, the rights of each separate parcel or tract of land then claiming rights being defined as to date of priority in accordance with a priority schedule set forth in the decree.

Thus, all lands are assigned specific priority dates and are entitled to divert and receive the natural flow of the stream in the order of their priorities.

The decree covers diversion rights to the waters of the Gila from the head of the Virden Valley in New Mexico downstream to a point known as Gila Crossing on the Gila River Indian reservation, a short distance below the western boundary of the San Carlos project.

Under present conditions the project lands receive natural flow waters, when such are available, as provided by the decree, including unregulated tributary inflow to the Gila River from sources below Coolidge Dam. The chief source of such useful tributary flows is the San Pedro River which enters the Gila some 30 miles above the project heading.

Project stored water is derived from flood flows of the Gila River captured in San Carlos Reservoir behind Coolidge Dam. Coolidge Dam was completed late in the year 1928 as a part of project works. The water which becomes stored is subsequently released for irrigation use on the project lands below.

Stored water at San Carlos Reservoir is considered, together with available ground water, for the purpose of distribution and each acre within the project is entitled to receive an equal portion of the total supply of stored and pumped water. An apportionment is made at the beginning of each year on the basis of the amount of available stored water at San Carlos Reservoir on January 1, plus an estimated amount of ground water pumpage, less an estimated loss in conveyance to the farms. The apportionment may be enlarged at various times during the year as additional stored water becomes available at San Carlos Reservoir.

It is generally accepted that lands in this locality and climate require about 4 acre-feet per acre per year delivered to the farm headgate to yield optimum production. A lesser water supply results in reduced yields or in the retirement of land, concentrating the short supply for use upon the reduced acreage the available waters will serve.

Owing to shortage of stored water and the limitations in pumped supply the annual apportionment of stored and pumped water to San Carlos project lands has seldom approached the amount required. During the 25-year period from 1936 (when the Gila River decree became effective) through 1960, yearly apportionments on the project have averaged about 2.1 acre-feet per acre.

The amount of stored water at San Carlos Reservoir has been generally insufficient to provide carryover storage from one irrigation season to the next.

During the period 1936-60, the total amount of surface water diverted to project lands at Ashurst-Hayden Dam, including both stored water and natural flow, has averaged about 179,000 acre-feet per year.

Because of the serious lack of sufficient water available from stream-flow, the project has been forced to make up a portion of the deficiency by drilling and operating wells for the production of supply from the underground. Since 1935 the shortage of gravity water has necessitated an average annual pumpage of nearly 100,000 acre-feet per year, or more than one-third of the average gross supply for the period. Even with this pumped water included, the total delivered to the lands has been considerably less than a normal supply.

With pumpage on the project area and adjacent lands greatly exceeding recharge to the underground reservoir, a continuing decline of water levels has resulted. Recent reports to the U.S. Geological Survey show that static water levels in wells in the area between Florence and Casa Grande have declined about 85 feet since 1940. An observation well of the U.S. Geological Survey, located north of Casa Grande, shows a drop in water level of 107 feet from 1940 to 1962.

Pumping lifts have increased proportionately with declines in the static water levels. In June of 1963 pumping lifts ranged from about 135 feet near the town of Sacaton to about 340 feet in the project area near Casa Grande.

The historically inadequate supply of water for the project has brought about many ill effects, principally the reduction of number of acres cropped each year. Project farmers generally have been forced to reduce their total cropped acreage at planting time to that on which there exists reasonable assurance that a crop can be completed with a given year's foreseeable water supply. Since there has seldom been an adequate annual supply to irrigate the full 100,000 acres of the project, the acreage actually cropped has ranged from as little as 35,000 acres in 1957 to a maximum of 80,600 acres in 1943. The average number of acres irrigated during the period 1934 through 1962 is 58,800 acres.

Excessive ground water pumpage, to supplement the inadequate surface water, has required increased well maintenance cost. Increased pumping lifts have caused correspondingly increased costs of power for pumping.

Under continued shortage of surface water supply, the San Carlos project will be able to sustain progressively less irrigated acreage than in the past. At the present rate of pumping, additional water-bearing zones will be depleted or economic pumping life will be exceeded.

It is believed that the feasible sustained annual rate of ground water pumpage for project lands will be reduced eventually to not more than one-half the historic rate of pumping.

Under this condition, and assuming surface water supply at past levels, it is apparent that the irrigated acreage on the San Carlos project ultimately will be reduced to an average of slightly less than 50,000 acres, or approximately one-half the irrigable acreage of the project, unless a new source of supply becomes available.

Earlier in my statement I made reference to those agricultural lands situated in the Casa Grande Valley outside the San Carlos project. These lands lie in large compact bodies contiguous to the areas served by the project. They are located generally to the south and west of project lands. Several thousand acres of pump lands are interspersed with project lands, in such a manner that problems affecting one class of land become common to the interests of all.

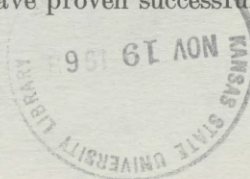
This community of interest extends to the vital problem now facing all agriculture in Pinal County and resolves itself into the question of how to obtain supplemental water if the agricultural economy is to survive.

Development of these lands by pumping began about 1920 and continued for about three decades.

It had become increasingly evident that, with the rapidly failing ground water levels, the requirement of the lands then in cultivation was greatly in excess of recharge.

Mounting costs of pumping precluded any further development. Failure of ground water sources under some of these lands has occurred and it is now evident that with some areas already out of production, the abandonment of large blocks of additional acreage will follow soon.

The owners of pump lands have organized their various areas into electrical districts and have bonded their lands for the construction of transmission lines and equipment for the conveyance of electrical energy used in pumping. Such organizations have proven successful



and electric transmission lines now extended to all parts of these valley lands.

In this statement I have attempted to point out some of the conditions which must be remedied if agriculture is to survive on the San Carlos project, and on adjacent areas of pump-irrigated land, and if this large and productive area is to continue to bear its important contribution to the economy of the State and the Nation. The welfare of some 62,700 residents of Pinal County, together with the interests of additional thousands in other portions of Arizona, is at stake.

There is but one source to which Arizona can look for the all-important supplement water supply required to stabilize its economy—the Colorado River. Importation of Colorado River water to the economic and agricultural heartland of the State, augmenting supplies from the Salt River and the Gila River, will furnish opportunity for improvement in water distribution and use not only in the central valley, but in the upper areas of these river basins as well.

Unless we do obtain this water and construct the works called for in S. 1658 now before your committee, the economy of our entire State will suffer to a disastrous degree.

Thank you, Mr. Chairman.

Senator HAYDEN. I want to compliment you on a very accurate statement of conditions that exist in your area of Arizona.

Any questions.

Senator KUCHEL. No, sir.

Senator HAYDEN. Thank you.

The next witness is Mr. Henness, a farmer.

STATEMENT OF K. K. HENNESS, CASA GRANDE, PINAL COUNTY, ARIZ.

Mr. HENNESS. Mr. Chairman and members of the subcommittee, my name is K. K. Henness. I live on my farm of 314 acres near Casa Grande, Pinal County, Ariz., and have lived there since 1936. Some of these lands are located on the San Carlos project and some are irrigated solely by means of pumps. I was, for many years county agricultural agent for Pinal County, and I now farm with my son.

My first experience with legislation to authorize the central Arizona project was on June 26, 1947. This is the same project now under consideration by this committee. On that date I appeared as a witness at hearings of the subcommittee of the Committee on Public Lands of the U.S. Senate, then considering S. 1175.

Two years later, on April 2, 1949, I appeared before the Subcommittee on Irrigation and Reclamation of the Committee on Public Lands of the House of Representatives, testifying in favor of H.R. 934 and H.R. 935.

Again, on March 9, 1951, I appeared before the Committee on Interior and Insular Affairs of the House of Representatives, testifying in behalf of H.R. 1500 and H.R. 1501.

This, then, is the fourth time over a period of 16 years, that I have testified on behalf of the central Arizona project.

My testimony today will largely be in the nature of bringing up to date my testimony given in previous hearings.

I shall first speak of the San Carlos project, a Bureau of Indian Affairs project, which includes 100,000 acres of land with surface water rights. Most of this land is irrigated when water is available. One-half of this project land is owned by Pima Indians, and the other half by non-Indian farmers.

In the hearings of 1951 I said:

During the more than 20 years since completion of Coolidge Dam, water deliveries to lands included in the San Carlos project have averaged only about 2 acre-feet per acre per year, about one-half of that required. These deliveries include not only gravity water but water developed within the project through the use of pumps.

Average total delivery of stored water during the 12 years from 1952 to 1963 was only slightly in excess of 1.53 acre-feet. It is also interesting to note that in only 3 of these 12 years was the allotment 2 acre-feet or more, the figures being exactly 2 acre-feet in 2 of those years, and 2.25 in the other. This demonstrates that available water supplies have averaged even less during the past 12 years than in the preceding 20.

Included in the plan for the San Carlos project was the recovery of water by pumping for reuse. But at that time no one could foresee that the day would come when the San Carlos project, instead of representing perhaps 90 percent of the irrigated farmland of Pinal County, would represent less than one-third. This was brought about by the great expansion in development of pump acreage. This pump acreage, plus pumping on San Carlos project lands, has continued to deplete underground water supplies.

The lowering of the underground water levels has reduced the amount of water which all pumps deliver. Some have gone dry or produce so little that it is not economical to operate them.

Lying adjacent to and on all sides of the San Carlos project is this greater area of lands watered entirely by pump. They have no surface water right, and were developed by men and women of courage and vision who asked no help of any kind. These lands total approximately 225,000 acres in Pinal County. Development of desert lands was effectively cut off with the passage by the Arizona Legislature of an underground water code, and almost immediate designation of what are called critical water areas.

Again referring to my testimony of March 9, 1951, I said:

As the water table drops, the expense of pumping increases, the volume of water produced decreases, and less land can be farmed. There are wells in our valley that 12 or 15 years ago produced enough water to properly irrigate 300 acres of land. Today some of those wells are only watering 200 acres, or 160 acres. As on the project lands, infrequency of cultivation and irrigation on parts of the acreage gives desert growth an opportunity to get established, and I can tell you that it is not difficult to find parts of farms that are almost back to their original uncleared desert condition.

The passage of 12 years since that statement was made has clearly demonstrated that this continuing diminution in water supply has accelerated and has reached the point where even whole farms are going out of production. Instances are frequent where the water supply is now sufficient for only perhaps 20 percent of the acreage watered 20 or 25 years ago.

New water is needed if our economy, both farm and urban, built upon the use of water for irrigation, is to survive. In our arid land water is the measuring stick of production, and what we produce depends upon the amount available. The specter of drought is ever present as supplies of water dwindle. To maintain their supply of water farmers deepen their wells, or drill new wells where permitted, install more powerful pumping equipment, and concrete line their ditches and better level their lands. Even now our economy in certain areas is shrinking and in time will be wrecked unless means are found to bring additional water into the area. When such means are found, continued wise use and conservation of water resources will stabilize our economy as a strong part of a strong nation.

That was my judgment of the situation in our valley as I saw it in 1951.

Twelve years have passed. Water supplies continue to diminish, even though replacement wells have been drilled or are being drilled. Almost every farmer has done everything he can to effectively conserve the water he has. Realizing that our agriculture is declining, civic leaders of our valley towns are searching for industries that will help take up the slack. Notwithstanding the tremendous growth in much of Arizona, two of our larger towns find business stagnant.

The Arizona Water Co. today is asking authority from our corporation commission to increase water rates at Casa Grande by 40 percent by reason of the higher cost of water produced. The company's several pumps lift water from the same basin that furnishes our irrigation wells.

If I would judge the future, I must forecast separately for the San Carlos project, which receives gravity water, and the pump lands, which do not. I would say that on project lands we shall have on the average not over a 40-percent water supply. That is the record. Farmers will struggle to combine their water and farm one-third to one-half of the cropland. Presently, rapidly increasing water costs will continue to increase. Already we have reached the point where we often pay water and taxes on 3 acres in order to farm 1. Pressure on the family operated enterprise will constantly increase, and more farmers will seek other fields in which to earn a living.

Operators of pump lands face a constantly dropping water level, higher pump lifts, and greater costs for less water. In less favorable pumping areas even whole farms will drop out of production, and more thousands of acres of what were fine farmlands will gradually return to the desert.

Finally will come almost complete exhaustion of underground water supplies, except in the more favored areas. All of us will struggle to keep solvent, awaiting the day when new water will be available.

Those of us who are older have for many years watched the progress of Colorado River matters. It has been over 40 years since representatives of the several States in the Colorado River Basin met and agreed on what they thought to be an equitable division. Thirteen long and mostly dry years ago we saw legislation which would have furnished us help, pass the U.S. Senate, and die in the House of Representatives.

Finally, the issue got into the highest court of the land, and now it appears that the Supreme Court of the United States has told each of us what our rights are.

Construction will take a long time. We have worked and struggled for 40 years, and it is now time for us to get on with the job.

We have built our economy largely through our own resources. Now we and it are in trouble. We are not asking for water to develop new lands, but for water to supplement the diminishing supply that we now have.

I probably won't be around, but I should like to hope that I helped to make it possible for my son, who works my farm, and my neighbors' sons, to see the day when they can order a head of new water from their sanjuero.

I thank you.

Senator HAYDEN. Thank you for a very accurate statement of the conditions there.

Mr. HENNESS. Thank you.

Senator HAYDEN. We will next hear from Mr. C. B. Shiflet.

STATEMENT OF C. B. SHIFLET, COOLIDGE, ARIZ.

Mr. SHIFLET. Mr. Chairman, my name is C. B. Shiflet.

I reside in Coolidge, Ariz. I have lived in Maricopa and Pinal Counties practically all my life. I was born in 1898 on a farm within $2\frac{1}{2}$ miles from the center of Phoenix. I have seen many changes in the social, economic, and agricultural life of central Arizona.

I am a farmer operating my own land. I am also a member of the board of directors of Electrical District No. 2 of Pinal County.

In 1920 I was given the job of clearing the desert brush from 320 acres located about 3 miles southeast of Coolidge in Pinal County. In that work I had the assistance of an average of 10 to 12 Pima Indians from the Gila River Indian Reservation close by and 1 non-Indian employee. My equipment consisted of eight head of horses and mules dragging fresno scrapers and old railroad rails.

In 1937 I brought 240 acres of this land, of which 160 acres is now located within the San Carlos Irrigation and Drainage District. It receives irrigation service from the district through gravity water from the Gila River and from project wells. I farm the remaining 80 acres of this tract by the use of ground water pumped from my own well on this land.

Due to the increasing shortage of water in the Florence-Casa Grande area, I find real difficulty in maintaining production on my land. My San Carlos project land has not received a normal allotment of water for several years.

For example, during this calendar year of 1963, the project allotment up to September 15, amounts to 1.10 acre-feet of water for each acre. Since I need at least $3\frac{1}{2}$ to $4\frac{1}{2}$ acre-feet per acre to raise crops, it follows that I can farm only one-fourth to one-third of my acreage under conditions which prevail this year.

Therefore, much of my land must lie idle even though I am required to pay taxes and irrigation charges on the full acreage.

On the acreage served by pumped waters, the prospect of maintaining production is even more discouraging. From time to time since 1937, I have had to deepen my well or drill new ones. Each well now comes in with a lowering supply and from a greater depth.

My first well yielded 2,600 gallons per minute. My last attempt yielded 350 gallons per minute. In the early days one could set a pump at 100 feet below ground surface and produce a good yield of

water. Because of falling ground water levels pumps must be lowered from year to year. I now have one pump set at 350 feet and the yield is falling off.

I am not alone in this; all other farmers in the Florence-Coolidge-Casa Grande valley area are facing the problem of what can be done in the face of the rapidly diminishing water supply.

If agriculture in central Arizona is to survive, if our State continues to grow, we must find additional water to maintain our present agriculture. The Colorado River offers our last and only source for this desperately needed supplemental supply, through the facilities of the planned central Arizona project.

On behalf of myself and on behalf of hundreds of other farmers in our valley similarly situated, we beseech your committee to give favorable consideration to this project so vital to the people of Arizona and the Southwest.

Thank you, sir.

Senator HAYDEN. Thank you for your statement.

Mr. SHIFLET. Thank you, sir.

Senator HAYDEN. The next witness is Mr. Alfred Jackson, of the Pima Indian Tribe.

**STATEMENT OF ALFRED JACKSON, MEMBER, PIMA INDIAN TRIBE,
GILA RIVER INDIAN RESERVATION, ARIZ.**

Mr. JACKSON. Mr. Chairman, my name is Alfred Jackson.

I am a member of the Pima Indian Tribe of Arizona. I was born in the village called Sacaton in 1895. I have lived on the Gila River Indian Reservation all my life. I was a member of the tribal council for a number of years. I have served twice as governor of the Gila River Indian community.

I am concerned with the authorization of the central Arizona project; and I appreciate this opportunity to appeal before your committee in support of it.

In spite of the fact that we have good land and that we have, over a long period of years, demonstrated that we are good and hard-working farmers, it has been a long time since we have been able to farm more than about 25 percent of our designated farmland. This is wholly because of lack of water. Within the Gila River Reservation 50,000 acres of land are included in the San Carlos project and could be served with water from that project, if it were available. We can get enough water for only slightly more than 12,000 acres under present water supply conditions.

Ours has always been a peaceful tribe. We have been under Spanish control, Mexican control, and U.S. Government control.

In all of these conditions we have sought to help, to cooperate, to live in peace and friendship. That attitude has been a way of life, beginning with our assistance to Captain Kearney after the Gadsden Purchase, continuing with our help by provisions and otherwise to white travelers and settlers; through the formation from members of our tribe of the first company of Arizona volunteers, thus making us the first Indians in our State to wear the uniform of the U.S. Army, and down to date. I ask you now whether the time has come when you will help us.

There was a time when everyone thought that our water problem was solved. This was when the Coolidge Dam was built. Unfortunately, there has never been enough water in the river to fill its reservoir. Others also use the water from the Gila River and Coolidge Dam. What we receive is pitifully small. It is enough only, as I said a moment ago, for one-fourth of that part of our land that is within the San Carlos project.

If the central Arizona project is authorized, we are told, we shall have a much more plentiful supply. We believe this. We rely on it. Therefore, we join our brethren in urging you to authorize that project upon which our survival as well as the survival of our white neighbors depends.

Senator HAYDEN. Thank you for your statement.

Any questions?

Senator KUCHEL. That is a good statement, Mr. Jackson.

Senator HAYDEN. Mr. Edison Evans, a member of the Tribal Council of the Pima Indian Tribe of Arizona.

STATEMENT OF EDISON EVANS, MEMBER, PIMA INDIAN TRIBE, GILA RIVER INDIAN RESERVATION, ARIZ.

Mr. EVANS. Mr. Chairman, my name is Edison Evans. I am a member of the Pima Indian Tribe of Arizona.

I was born on the Gila River Indian Reservation in 1908. I have lived on the Gila River Indian Reservation all my life. I am now a member of our tribal council and have been for 15 years. I have served twice as lieutenant governor of the Gila River Indian Community.

I thank you for this opportunity to appear before your committee in support of the central Arizona project, which means so much to us as well as to our non-Indian brethren.

The Gila River Indian Reservation has an area of almost 400,000 acres. Some 50,000 of these are included in the Indian portion of the San Carlos project, but only about one-fourth of this land can be cultivated, since that is all there is enough water for. We hope that you will help us to get more water. You can do so by authorizing the central Arizona project.

The central Arizona project is needed to preserve a civilization older than any in the State of Arizona; to save a culture that was ancient when the Spanish padres came into our country; to preserve our last heritage. I appeal to you to do everything in your power to get the central Arizona project authorized.

Senator HAYDEN. Thank you, sir.

Mr. T. Richmond Johnson, president of the Central Arizona Project Association.

STATEMENT OF T. RICHMOND JOHNSON, PRESIDENT, CENTRAL ARIZONA PROJECT ASSOCIATION

Mr. JOHNSON. Mr. Chairman, my name is T. Richmond Johnson and my home is in Phoenix, Ariz. I am president of the Central Arizona Project Association, a private nonprofit association organized in 1946. The association was formed for the purpose of studying the need of the State of Arizona for water and means of meeting the need.

This organization, for which I speak, is representative of organized irrigation districts, electrical districts, municipalities, business, industry, utilities, and financial institutions in that central portion of Arizona in which are concentrated approximately 80 percent of Arizona's population, 90 percent of the State's manufacturing production, 65 percent of its copper industry, 70 percent of the State's irrigated agricultural acreage, and 75 percent of its total tax base.

This is also the general area of lowest annual rainfall in Arizona, and the area in which it is now necessary to pump from a limited groundwater supply at a yearly rate estimated to be four times the rate of natural recharge, to supplement available surface water.

In fact, groundwater mining is now the major source of water in central Arizona. If our pumps were shut down today, central Arizona would be an extraordinary disaster area in less than 1 week. The populations of many of our cities and towns would have to be evacuated in a matter of days. Our agricultural industry would collapse.

Today most of our pumps are still running; drawing upon an ever-decreasing supply of groundwater to maintain our Arizona oasis civilization. It is a water deficit spending operation which we shall be forced to continue to the point of exhaustion unless the Congress of the United States, in its understanding and wisdom, brings the central Arizona project into being.

It was an act of Congress in 1902, the National Reclamation Act, and authorization of the Salt River project in 1903, that gave birth to modern Arizona.

It was those forward-looking acts of the Congress that put into Arizona hands the water with which to grow and develop into a great and productive State of the Nation; yes, and to grow beyond the limits of that water supply to this point at which we must say again to the Congress: We are young and strong, but thirsty. Help us to quench our thirst, that we may continue proud and productive in our family of States.

Mr. Chairman, with your permission, I should like to submit for the record a resolution by the League of Arizona Cities and Towns supporting the project and urging its prompt adoption by the Congress.

Senator HAYDEN. That may be included.

(The document referred to follows:)

RESOLUTION—THE LEAGUE OF ARIZONA CITIES AND 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 mainstream 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 and Towns in conference assembled:

1. That the League of Arizona Cities and 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,

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 and Towns, held in Nogales, Ariz., on the 10th day of May 1963.

THE LEAGUE OF ARIZONA CITIES & TOWNS,
By JOHN J. DEBOLSKA, *Executive Director*.

Attest :
[SEAL]

RICHARD D. MACRAVEY,
Notary Public.

My commission expires June 30, 1967.

Senator GOLDWATER. Mr. Chairman, this is the last witness?

Senator HAYDEN. Yes.

Senator GOLDWATER. Before we recess, if the chairman would allow me, and I regret that the Senator from California had to leave because what I had to say pertains to his argument that there was no precedent for the holding of these hearings.

I did a little research last night. And this indicates the following: In the 84th Congress, S. 926, the Ventura project, California, sponsored by Senators Kuchel and Knowland, the measure was introduced on February 4, 1955, referred on February 7, 1955.

Budget reported on February 18, recommending deferral—
until a project report has been submitted under established procedures.

On June 15, Interior reported that:

Until comments of the State of California and interested Federal agencies are received we can make no recommendations.

Yet without the project report or the comments of the State, a hearing was held on June 22, 1955.

Subcommittee considered, met on it on July 13.

The bill was reported favorably on July 19 and it passed the Senate on July 25, subsequently becoming Public Law 423.

Then in the 84th Congress, also S. 1333, the Hell's Canyon bill, of which Senator Anderson was a cosponsor, was referred on March 14, 1955.

Field hearings were held April 5 and 6 without benefit of reports.

In the 84th Congress, S. 2206, Ainsworth, Missouri Basin project, referred on June 16, 1955; the subcommittee hearing held June 17 without reports of any kind.

Eighty-fifth Congress, S. 3648, the San Juan-Chama project; referred April 23, 1958; hearing held July 9, 1958, without benefit of planning reports.

Eighty-sixth Congress, S. 1226, the Knowles Dam project, of which Senator Mansfield is a cosponsor; referred to the Army, Interior, and Budget in March of 1959; hearing without the planning report and the State's comments.

In the 86th Congress, S. 281, Burns Creek project, sponsored by Dworshak and Church, referred on January 19, 1959; hearing held March 10, 1959, without reports.

I merely introduce that to substantiate Senator Hayden's and my feelings that there is precedent for holding of these hearings, the portions of the Flood Control Act to which the Senator refers notwithstanding.

Senator KUCHEL. Well, until I study what the Senator has just said, I don't know that I can make any more comment than this.

I said it before and I repeat it now, the Executive Office of the President, on August 21, addressed a letter to the chairman of this committee in which he said, in part, that the Department of Interior has not submitted a report on the project proposed for authorization in this bill to the Bureau of the Budget.

Under procedures set forth in Executive Order No. 9384, until a report is received, together with the views and comments of the concerned States and Federal agencies, the Bureau of the Budget has no basis for appraising the merits of the proposed development.

Accordingly, it is recommended that action on S. 1658 be deferred until a report is submitted to the Congress in accordance with established procedures.

I want also to say that when the request was made for these hearings I opposed it.

I was overruled.

Then I said I wanted these hearings to be open to witnesses from my State who might be able to come forward and help me cross-examine some of the people who were going to testify in favor of it.

And I was foreclosed from that opportunity, Barry.

And that is not a fair way to proceed.

However, I must say that the testimony that I have listened to today and yesterday has been from good people who presented a problem which to me as a U.S. Senator, represents a situation, a very grave situation, with respect to my neighbors, the State so ably represented by my two colleagues.

And I don't like to quarrel and I don't like to quibble and I am not doing either one.

All I am doing is indicating again in this committee that the people of California face a very grave situation, too.

And it is my hope that the problems of Arizona and of California, so far as the Federal Government is concerned, may be solved together and not separately.

I objected to these hearings going on in advance of the report from the Secretary of Interior for another reason.

The Secretary has made some basic recommendations respecting the entire lower basin of the Colorado River system.

And I did think that it was in the interest of fairness and in the interest of equity and in doing equal justice to Arizona and to California, that we should wait 90 days, that the Governor of Arizona, the Governor of California, and the Governors of the other States involved under the law, would then give us their views on the basin development, hoping that that might be the basis for us to take constructive action that would help your people but not damage mine but, to the contrary, help us both.

As I say, I have forgotten the statistical information that you have furnished for the record and I shall not quarrel with it until I have had

a chance to check it out but, also, I shall not for a moment say that I agree with it.

I have just forgotten it and I would like to reserve my comments and have an opportunity to take a look at what the Senator from Arizona has placed in the record and have an opportunity, Mr. Chairman, to make any comments I want to regarding it.

But I come here not in any spirit of envy or bitterness.

I come here as a representative of a State that has suffered and continues to suffer from the possibility of water shortage.

I would like to see both of our States in good comradeship go forward together.

There has been too much fighting between California and Arizona over the years and that is too bad.

That is not my way of doing business. I hope we can find an honorable and constructive ground to assist both of our States.

That is all I have to say.

Senator GOLDWATER. Just one more point.

Senator, I couldn't agree with you more that we have been fighting to both of our disadvantage for many years, and that you are very sincere in your questioning in the lines that we should walk arm in arm down this path to solving our water problems.

Just the other day the Feather River Project Association voted unanimously to oppose the Pacific Southwest water plan and these are some of the actions or I will say one action that we have seen in California, with all due respect to that State, that gives us continued reason for worry because if the central Arizona project must wait upon the unanimity of the factions in your State before the Governor can place his approval on it, we may wait too long.

I think the evidence is conclusively that the central Arizona project is a "must" and I will say to my colleague that when the time comes to work for California projects, I am sure the Arizona delegation will work as hard and as diligently as we always have for California projects.

All we ask now is that our needs be given some attention.

Senator KUCHEL. Well, they will get attention and they are getting attention.

Senator GOLDWATER. Of the right sort.

Senator KUCHEL. But I want to say that the 90-day time is running.

The Governor of California is coming back here next week. Meetings are being held in California by the appropriate State agencies to sift a report that I have not studied.

I can't talk intelligently about the basin development.

I have read the news releases of the Department of the Interior concerning it.

I simply say that we will be in shape to go forward and have hearings here that can produce some sound results.

We will have people testifying for and against every one of the recommendations of the Secretary of the Interior, but this is the forum that has got to be used for us to make progress and I was most hopeful that at long last we might be able to help each other.

Senator HAYDEN. Well, as a practical matter, if I may interrupt the Senator, there is no possibility, under the conditions that I see in the Senate right now, of doing very much with this legislation until the 90 days has elapsed.

That means practically that we will have to go over with further proceedings under this bill until the Congress assembles in January.

And by that time we ought to be very well informed as to the situation in California and elsewhere and then we can see if we can proceed from there.

Senator KUCHEL. May I make one more comment before you close these hearings this morning?

Senator HAYDEN. Yes.

Senator KUCHEL. Everybody in the room and everybody in the Senate wants to join in saluting the dean of the Senate on his birthday and wish him many happy returns on his birthday because he is a great guy.

He is not just a great guy but a great American and I would like to lead in applauding the dean of the Senate. [Applause.]

Senator HAYDEN. Thank you, gentlemen.

The clipping will be inserted in the record.

(The clipping referred to follows:)

[From the Arizona Republic, Phoenix, Sept. 28, 1963]

CALIFORNIA GROUP RAPS UDALL PLAN

SAN BERNARDINO, CALIF.—The Feather River Project Association's board of directors voted unanimously yesterday to oppose the Pacific Southwest water plan proposed by Secretary of the Interior Stewart L. Udall.

They adopted a resolution that said in part:

"Under the first phase of Udall's plan, 1.2 million acre-feet of Colorado River water, water which California is now using, will be made available for Arizona via the central Arizona project.

"Udall's plan requires the California Aqueduct to be enlarged more than necessary for the State's need. * * *

"The association feels that the Udall plan would be particularly bad for California agricultural interests. The California water plan contemplates providing to farmers at lower prices any water that is surplus to domestic needs. The Udall plan would reduce the possibility of such surpluses.

"The Udall plan apparently assumes the eventual demise of the metropolitan water district's system. * * *

"California, with its vastly larger tax base, would pay a much greater relative share of the Udall plan's cost in comparison with the benefits it would receive.

Senator HAYDEN. We will hold the record open for a week for any insertions.

The meeting is now adjourned.

(Whereupon, at 12 o'clock, the committee adjourned, subject to the call of the Chair.)

(Under authority previously granted the following resolution was submitted:)

ARIZONA GAME PROTECTIVE ASSOCIATION, PHOENIX, ARIZ.

RESOLUTION NO. 13—TO SUPPORT THE PRINCIPLES OF THE CENTRAL ARIZONA PROJECT

Whereas for many years an attempt has been made to institute the central Arizona project; and

Whereas careful review and study of this overall program has conclusively shown its feasibility and desirability: Now, therefore, be it

Resolved, That the Arizona Game Protective Association approve and support the principles of the central Arizona project, and urge congressional approval at the earliest possible date.

(Adopted by the Arizona Game Protective Association 40th Annual Convention, September 8, 1963, Yuma, Ariz.)

APPENDIX

IN THE
Supreme Court of the United States

OCTOBER TERM, 1963

No. 8 Original

STATE OF ARIZONA,

Complainant,

v.

STATE OF CALIFORNIA, PALO VERDE IRRIGATION DISTRICT, IMPERIAL IRRIGATION DISTRICT, COACHELLA VALLEY COUNTY WATER DISTRICT, THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA, CITY OF LOS ANGELES, CITY OF SAN DIEGO, AND COUNTY OF SAN DIEGO,

Defendants,

UNITED STATES OF AMERICA and STATE OF NEVADA,
Interveners,

STATE OF NEW MEXICO and STATE OF UTAH,
Impleaded Defendants.

PETITION FOR REHEARING

Submitted by

STATE OF CALIFORNIA

In Which Join The Metropolitan Water District of Southern California, City of Los Angeles, City of San Diego, County of San Diego, Coachella Valley County Water District, and Palo Verde Irrigation District

SEPTEMBER 16, 1963

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IN THE
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OCTOBER TERM, 1963

No. 8 Original

STATE OF ARIZONA,

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v.

STATE OF CALIFORNIA, PALO VERDE IRRIGATION DISTRICT, IMPERIAL IRRIGATION DISTRICT, COACHELLA VALLEY COUNTY WATER DISTRICT, THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA, CITY OF LOS ANGELES, CITY OF SAN DIEGO, AND COUNTY OF SAN DIEGO,

Defendants,

UNITED STATES OF AMERICA and STATE OF NEVADA,

Interveners,

STATE OF NEW MEXICO and STATE OF UTAH,

Impleaded Defendants.

PETITION FOR REHEARING

The State of California, joined by The Metropolitan Water District of Southern California, the City of Los Angeles, the City of San Diego, the County of San Diego, Coachella Valley County Water District, and Palo Verde Irrigation District, respectfully petition under Rule 58 for rehearing of the Court's decision of

June 3, 1963,¹ with respect to errors of fact and law specified below.

SPECIFICATIONS OF ERROR

I. THE "STATUTORY APPORTIONMENT SCHEME"

The Court erred in holding (1) that the Boulder Canyon Project Act effected a mandatory "statutory apportionment" among Arizona, California, and Nevada instead of determining that the Act merely required California to enact a ceiling upon California appropriations (including those made pursuant to contracts with the United States); and (2) that Congress delegated to the Secretary of the Interior (a) power to originate and impose upon the states a formula for the interstate allocation of shortages, in displacement of this Court's powers to resolve such shortages by exercise of its doctrine of equitable apportionment, and (b) power to allocate waters within a state without regard to state law.

II. EXCLUSION OF THE TRIBUTARIES FROM THE LOWER BASIN ACCOUNTING, IF THEY ARE INCLUDED IN THE COLORADO RIVER COMPACT'S INTERBASIN ACCOUNTING

Unless the Court intended to agree with Arizona "that the Compact apportions between basins only the waters of the mainstream, not the mainstream and the tributaries" (p. 568), it should have held that uses which Arizona and Nevada make from the tributaries, to the extent that they reduce the total quantities of water that the lower basin may appropriate from the main stream within the "ceilings" imposed on the lower basin by the Colorado River Compact, likewise reduce

¹ 373 U.S. 546. All page references herein to the opinion of June 3, 1963, are to the preliminary print of the official report, *e.g.* (p. 546).

the quantities that Arizona and Nevada may take from the main stream as against California.

PRELIMINARY STATEMENT

The Court's opinion discloses a paradox and is founded upon a pair of serious factual misconceptions.

1. The Paradox

On the one hand: The Court construes the Project Act as making a "statutory apportionment" among Arizona, California, and Nevada, characterized by five features favorable to Arizona: (1) It not only excludes the Gila River from the fund of water to be divided, which Arizona wanted, but it also excludes the tributaries above Hoover Dam, which Senator Hayden, the leading Arizona spokesman, said Arizona did not seek (see p. 41, *infra*); (2) it gives Arizona 2,800,000 acre-feet of *consumptive use* (diversions minus return flow) from the main stream, whereas Senator Hayden told the Senate Arizona sought only 2,800,000 acre-feet of *diversions*, without credit for 948,000 acre-feet of return flow; it thus gives Arizona 948,000 acre-feet more than Senator Hayden said that Arizona asked (see p. 38, *infra*); (3) it makes this division a mandatory one, whether the states ever agree to it or not, which is far more coercive than Senator Hayden's proposal (which the Senate rejected), to condition the effectiveness of the Act on an agreement between Arizona and California (see pp. 14-15, *infra*); (4) it conceivably amended or construed the Colorado River Compact to exclude all lower basin tributaries, most of which are in Arizona (see p. 30, *infra*); and (5) it delegates to the Secretary of the Interior the power, which every opponent and proponent of the Swing-Johnson bills proclaimed Congress itself lacked, to

allocate water among the states and to satisfy Arizona's 2,800,000 acre-feet of consumptive use in disregard of the uses of water by California's existing projects, the very projects whose priorities Arizona feared (see pp. 14-24, *infra*).

On the other hand: If Congress really did all this, why did the Arizona delegation, Senators Hayden and Ashurst and Congressman Douglas, vote against the bill? Why did Senator Hayden vigorously oppose the initial appropriation to build Hoover Dam? Why did Arizona sue to have such a favorable statute declared unconstitutional and its enforcement enjoined? Why did Arizona call out her militia to stop the construction of Parker Dam, from which her Central Arizona aqueduct would now divert? Why did she sue here in 1935 for an equitable apportionment? Why did Arizona refuse to ratify the Compact for 15 years after passage of the Project Act?

The answer is that the Court's new construction of the Project Act conflicts with the plain language of the Act, with its legislative history, and with its construction by the Secretary of the Interior and the states for three decades.

2. The First Factual Misconception: The Magnitude of the Gila and Its Usefulness Outside Arizona

The Court apparently believes that when the Project Act was enacted the outflow of the Gila into the Colorado (1) was insignificant, and (2) was so located as not to be of much usefulness to anyone outside Arizona.²

Each of these assumptions is mistaken.

² Pp. 568-69: "Inclusion of the tributaries in the Compact was natural in view of the upper States' strong feeling that the Lower Basin tributaries should be made to share the burden of any

a. As to the magnitude of the Gila

In a state of nature the Gila contributed to the Colorado about a million acre-feet per annum—as much water as is now in dispute between Arizona and California.³ The Gila was not, as the Court believes, “reduced virtually to a trickle,” it did not “virtually evaporate,” before reaching the Colorado. Of course it does now, but only because Arizona and New Mexico are using most of it. The Court’s assertion begs the question: Shall Arizona be accountable, against her share of the waters of the Colorado River system, for the benefits she now receives from her depletion of an

obligation to deliver water to Mexico which a future treaty might impose. But when it came to an apportionment among the Lower Basin States, the Gila, by far the most important Lower Basin tributary, would not logically be included, since Arizona alone of the States could effectively use that river.”

Again, p. 569 n. 40: “Not only does the Gila enter the Colorado almost at the Mexican border, but also in dry seasons it virtually evaporates before reaching the Colorado.”

Again, pp. 573-74: “Arizona’s claim was supported by the fact that only she and New Mexico could effectively use the Gila waters, which not only entered the Colorado River too close to Mexico to be of much use to any other State but also was [sic] reduced virtually to a trickle in the hot Arizona summers before it [sic] could reach the Colorado.”

³ The Bureau of Reclamation in its 1953 “Memorandum Supplement” to its 1952 “Report on Water Supply of the Lower Colorado River Basin” reported that the average annual long-term virgin flow (the flow that would have occurred absent depletions by man) of the Gila River at its mouth was about 1,200,000 to 1,400,000 acre-feet. Ariz. Ex. 77-B, Table G (p. 33). Congress, in 1928, had before it the Bureau’s “Fall-Davis Report” (S. Doc. No. 142, 67th Cong., 2d Sess. (1922)), which showed that during the period 1903-1920, the Gila contributed to the main stream about 1 million acre-feet average annual flow. Ariz. Ex. 45, at 219. See also *Hearings on H.R. 6251 and H.R. 9826 Before the House Committee on Irrigation and Reclamation*, 69th Cong., 1st Sess. 209-10 (1926) (Delph E. Carpenter).

asset that was a common asset of the lower basin when the Project Act was passed?⁴

b. The Gila as a common lower basin asset, useful to California

California physically diverted, for 40 years, the outflow of the Gila River into the Alamo Canal and used the waters so diverted in Imperial Valley. Imperial's diversion point, from 1901 to 1941, was below the mouth of the Gila. The Court's assertion that the Gila entered the Colorado River too close to Mexico to be of much use to any other state is simply not so.⁵ Congress knew that. Senator Phipps of Colorado, chairman of the committee that reported this bill,

⁴ Neither in her pleadings filed with the Court in this case nor in any of her previous suits here did Arizona contend for the wind-fall that the Court may have given her, complete exoneration from accounting for the Gila as against her share of the waters of the lower basin. She contended, instead, that she should be charged only with the use of the million acre-feet that would have reached the Colorado if the flow of the Gila, which is nearly 2 million acre-feet in the Phoenix area, had not been consumed there. See Ariz. Bill of Complaint, par. XXII (2), p. 26.

⁵ See Calif. Op. Br. 96-98. The Court appears to be under a general misapprehension about the Imperial Valley diversion. At p. 553 it speaks of the "more or less primitive diversions made from the mainstream of the Colorado," and speaks of the time "after the Mexican canal provided a more dependable water supply." From the beginning the Alamo Canal constituted the only diversion and the only water supply for Imperial Valley. It diverted in the United States at a point below the mouth of the Gila, just north of the Mexican boundary, and followed the natural contour through Mexico and back into the United States to irrigate the Imperial Valley, which lies below sea level and drains into the Salton sea depression. The All-American Canal diverts above the mouth of the Gila, parallels the boundary by cutting through the sand dunes that the Alamo Canal went around. The outflow of the Gila, greatly reduced by Arizona uses, is now diverted by Morelos Dam into canals serving Mexico.

reported on the Senate floor how he had seen Gila River water flow into the California canal. He estimated its contribution to the Colorado as over 1 million acre-feet, citing an Arizona witness, and argued that California was entitled to have the Gila counted in as being part of the basic supply of water. 70 Cong. Rec. 335 (1928).

The mouth of the Gila is above Mexico and the Gila represents part of the common supply available to satisfy the senior treaty claims of Mexico. This is why the upper basin was insistent that it bear its share of the Mexican burden, as the Court acknowledges (pp. 568-69).

If the tributaries are in the Compact accounting at all, then, to the extent that Arizona consumes the Gila, the right of the lower basin (including California) to require the upper division states to deliver water for Mexico under Article III(c) is diminished. (Pp. 36-37, *infra*.) Therefore, if the flow of the Gila was a big enough contribution to the Mexican burden to be significant to the upper basin (pp. 568-69), it was big enough to have precisely the same significance to the lower basin, hence to California.

No one seeks to deprive Arizona of the "sole use of the Gila, upon which her existing economy depended" (p. 573). The question is simply: *If* the quantity that the lower basin may use out of the main stream under the Compact is diminished because Arizona uses the Gila, which state—Arizona or California—shall bear the burden of the resulting reduction in the quantity that the lower basin may use out of the main stream?

3. The Second Factual Misconception: Attempted Equation of the Flow of the Stream With Consumptive Use

The Court treats section 4(a) of the Project Act as a palimpsest, from which it erases the plain words "apportioned to the lower basin States by paragraph (a) of Article III of the Colorado River compact" and writes over the erasure "the first 7,500,000 acre-feet of . . . mainstream water" (p. 565); but this in turn is blurred, if not erased, by relating it to a proposal of the upper state governors at a convention in 1927 (pp. 569-70; 572-73), that is wholly inconsistent with both of the other readings.

The governors proposed a division among Arizona, California, and Nevada of the *flow of the stream*, the minimum quantity that the upper division is required by Article III(d) of the Compact to let down at Lee Ferry (p. 570). This is 75 million acre-feet in each series of 10 years. Congress did not accept this concept; it stated the limitation instead in terms of *consumptive use*, measured by diversions less returns, for use in California. *Consumptive use of water and flow of water are different measuring sticks—as different as cubic feet and square feet.*

Here the Court recreates the ambiguity that has plagued the Colorado River for nearly four decades, which the Master clearly saw, and we thought had laid to rest. As the Master made clear, delivery of 75 million acre-feet per decade at Lee Ferry could not alone support 7.5 million acre-feet per year of consumptive use (Rep. 144). It would fail to do so by as much as two million acre-feet. (P. 9, *infra*.) The Master pointed out that Senator Pittman was con-

fused in failing to realize the difference between the governors' proposal and what the Senate was doing.⁶

The Court now cements that confusion into the statute. Shall the decree be written in harmony with the governors' concept, which speaks in terms of the flow of the stream at Lee Ferry assured by Article III(d), or in tune with Article III(a), which speaks in terms of consumptive use? Suppose "III(a)" in the Project Act is rewritten, as the Court does, to mean 7.5 million acre-feet of consumptive use from the main stream, not the system: How can 7.5 million acre-feet of consumptive use (diversions less returns) possibly be supplied from a main stream whose gross income is the inflow of that same quantity at Lee Ferry (since all the lower basin tributary inflow may be withheld—"leaving each State its tributaries" (p. 565)), (1) from which nature's attrition exacts more than a million acre-feet of losses in transit (Rep. 124-25), and (2) from which, finally, another million acre-feet of return flow from Arizona's boundary projects into Mexico must be subtracted?

⁶ The Master concludes that "Congress never clearly understood" the governors' recommendation (Rep. 189). After quoting Senator Pittman's report on the governors' conference, the Master observes:

"This report by Senator Pittman did not adopt, or perhaps failed to grasp, that portion of the governors' resolution which expressly found the source of the allocated waters in the Article III(d) obligation of the Upper Division. Instead Senator Pittman related the limitation to Article III(a), not III(d)" (Rep. 189.)

"Thus Senator Pittman used Article III(a) to define the area against which the limitation was to operate. He did this in apparent misunderstanding of the governors' recommendation. All subsequent discussion in the Senate flowed in the same channel." (Rep. 190.)

ARGUMENT

I. THE "STATUTORY APPORTIONMENT SCHEME"

The Court erred in holding (1) that the Boulder Canyon Project Act effected a mandatory "statutory apportionment" among Arizona, California, and Nevada, instead of determining that the Act merely required California, as a condition precedent to the Act's effectiveness, to agree to a ceiling upon her appropriations (including those made pursuant to contracts with the United States); and (2) that Congress delegated to the Secretary power (a) to originate and impose upon the states a formula for allocation of shortages, in displacement of this Court's powers to resolve such shortages by exercise of its doctrine of equitable apportionment, and (b) to allocate waters within a state without regard to state law.

A. The Court Ignores Its Previous Decisions Holding That the Project Act Did Not Make Any Statutory Apportionment

The Court's decision scarcely reveals that the Colorado River controversy has been before the Court on four previous occasions and that in all four cases the Court construed the Project Act in a manner wholly at variance with the present decision.

1. If the Court now is right in holding that Congress made a "complete statutory apportionment" (p. 560) of the waters of the main stream, fixing California's share at 4.4 million, Arizona's at 2.8 million, and Nevada's at 300,000, leaving to each state its tributaries (p. 565), the Court was wrong in 1931 in deciding, in *Arizona v. California*, 283 U.S. 423, that Congress had done no such thing.

In that suit the Court rejected Arizona's contention "that the mere existence of the act will invade quasi-

sovereign rights of Arizona by preventing the State from exercising its right to prohibit or permit under its own laws the appropriation of unappropriated water flowing within or on its borders" (*id.* at 458), holding as follows (*id.* at 464):

"As we hold that . . . the Boulder Canyon Project Act does not purport to abridge the right of Arizona to make, or permit, additional appropriations of water flowing within the State or on its boundaries, and that there is no threat by Wilbur, or any of the defendant States, to do any act which will interfere with the enjoyment of any present or future appropriation, we have no occasion to consider other questions which have been argued."

If the Court is correct now, the "mere existence" of the Project Act had cut off all rights of appropriation both interstate and intrastate because it had made a "complete statutory apportionment" of all of the main stream waters. If so, ironically enough, it should have dismissed Arizona's case in 1931, not because she was not yet injured, but because she had already won in the Project Act more than she then claimed.

2. The present decision also collides with the Court's rejection in 1934 of Arizona's suit to perpetuate testimony of witnesses to show that in the Project Act and the California Limitation Act the Gila River was intended to be identified with the waters referred to in Article III(b) of the Compact, from which Arizona said the Limitation Act excluded California. *Arizona v. California*, 292 U.S. 341 (1934). The Court rejected this interpretation of the Compact and the Act, saying, *inter alia* (*id.* at 357):

"But the Act does not purport to apportion among the states of the lower basin the waters to which the lower basin is entitled under the Compact. The Act

merely places limits on California's use of waters under Article III(a) and of surplus waters; and it is 'such' uses which are 'subject to the terms of said compact.' " (Emphasis added.)

In each respect the Court now reverses what it said then: the Act, it now says, *did* apportion waters among three of the states of the lower basin and did *not* merely place limits on California's uses; the waters which it now says the Act apportioned are not Article III(a) waters as defined by the Compact, but are solely the waters of the main stream of the Colorado River, exclusive of the tributaries which feed it and which then provided and now provide the supply upon which California's projects in large measure depend.

3. In 1934 Arizona sent her militia to stop by force the construction of Parker Dam (a curious operation to prevent the building of part of the "vast, interlocking machinery" (p. 589) designed to effectuate the Project Act, if the Act did what the Court now holds that it did for Arizona). The United States sued to enjoin this interference and lost, because the Secretary lacked statutory authority to build the dam. *United States v. Arizona*, 295 U.S. 174 (1935). The Court reaffirmed its view that the Project Act had not abrogated either the doctrine of equitable apportionment or Arizona's jurisdiction over her equitable share of the river (*id.* at 183):

"Arizona owns the part of the river bed that is east of the thread of the stream. . . . Her jurisdiction in respect of the appropriation, use and distribution of an equitable share of the waters flowing therein is unaffected by the [Colorado River] Compact or federal reclamation law."

⁷ The Court had defined the "reclamation law" as including the Project Act (*id.* n. 2).

If the Project Act had made an interstate apportionment, Arizona (and California) had lost "jurisdiction in respect of the appropriation . . . of an equitable share," and if Congress had delegated to the Secretary authority to make intrastate allocations, those States had also lost their jurisdiction with respect to "use and distribution."⁸

4. In 1935 Arizona sued in this Court for an equitable apportionment, asking to have water reserved for her future appropriation. In *Arizona v. California*, 298 U.S. 558 (1936), the Court declined leave to file on the ground that the United States was an indispensable party, and had not consented to be sued. If the Court lacked jurisdiction to make a new apportionment because Congress had already made one—a lack that consent to sue would not cure—it did not then notice it.

The Court's present 180-degree turn from the course it plotted for the development of the lower basin in 1931, 1934, 1935, and 1936 is more than an academic change in a blueprint. More than a half billion dollars has been invested in California projects between the dates of those decisions and the present one. These projects, serving more than 8 million people, have put to use water that California was plainly entitled to appropriate under the Project Act as it was then construed by the Court but which could be taken from her under the present decision.

⁸ Congress subsequently authorized construction of Parker and Headgate Rock dams in the Act of August 30, 1935, 49 Stat. 1039. That Act refers to "waters . . . appropriated under the works hereby authorized" and later to "such . . . appropriation"—curious language if appropriative rights had all been cut off June 25, 1929, by the Project Act.

B. Congress Did Not Impose a Statutory Apportionment on the States or Authorize the Secretary of the Interior To Do So

The Court concludes that Congress intended to impose "its own comprehensive scheme for the apportionment among California, Arizona, and Nevada of the mainstream waters of the Colorado River" (p. 565).

If Congress really intended to impose such a scheme irrespective of the acquiescence of the states, then why did it make the whole Act contingent upon the ratification by seven states, or by six states, of the Colorado River Compact? Why condition the very launching of this great statute upon the concurrent judgment of six state legislatures? Why require, in the event that only six states ratified the Compact, that California's legislature enact a self-limitation act? Why not simply legislate the limitation by act of Congress alone? Why even delay effectiveness of the Act for six months to see what the states did? Why authorize a tri-state compact? Why provide (§18) that nothing in the Act should interfere "with such rights as the States now have either to the waters within their borders or to adopt such policies and enact such laws as they may deem necessary with respect to the appropriation, control, and use of waters within their borders"? Does it seem likely that a Congress so obviously sensitive to the wishes of the states intended to impose upon them an apportionment which would have exactly the same effect whether they followed the elaborately prescribed ritual of state legislation or did not?

The answer, which the majority wholly ignores, is in the most pointed exchange in the whole legislative history, when Senator Hayden, at Senator Pittman's urging, abandoned his effort to require California, as a condition to the effectiveness of the Act, to agree to a mandatory apportionment formula, and converted it

into a mere permission to compact. The exchange was this (70 Cong. Rec. 472):

"MR. JOHNSON. . . . [W]hat I want to make clear is that this amendment shall not be construed hereafter by any of the parties to it or any of the States as being the expression of the will or the demand or the request of the Congress of the United States.

"MR. PITTMAN. Exactly, not.

"MR. JOHNSON. Very well, then.

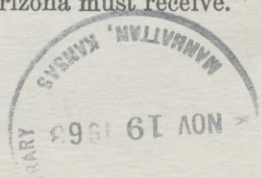
"MR. PITTMAN. It is not the request of Congress.

"MR. JOHNSON. I accept the amendment, then."

The formula stated in "this amendment" is the very one that the Court now fastens upon California as a "Congressional scheme of apportionment" (p. 567) as though every statement and answer in that crucial exchange that preceded Senator Johnson's acquiescence had been exactly the reverse of what was said. It is difficult to understand how a decision which overturns the plain language of a statute (the specific reference in section 4(a) to paragraph (a) of Article III of the Colorado River Compact) by reference to confused legislative history should reject the plain and decisive assurance which Pittman gave Johnson, and which alone got the Hayden amendment into the bill.⁹

⁹ The Master, who decided against us on other grounds, rejected Arizona's contention, which the Court now accepts, that the Act imposed a mandatory apportionment (Rep. 163): "But the second paragraph of Section 4(a) is plain in that it merely *authorizes* a tri-state compact for the division of water; it does not compel it; nor does it condition approval of the Colorado River Compact upon acceptance of the proposed tri-state compact. Indeed, the second paragraph was specifically amended on the floor of the Senate to make the suggested division permissive rather than mandatory. . . ."

See also Rep. 202: "I have rejected the contention that the second paragraph of Section 4(a) of the Act established a mandatory formula governing the amount of water Arizona must receive."



1. The Court's Reliance on Statements of Senator Hayden and Other Opponents of the Project Act Is Misplaced

The Court relies largely on utterances of three opponents of the bill, Senator Hayden and Representative Douglas of Arizona and Representative Colton of Utah, albeit with a footnote explaining that although "Statements of opponents of a bill may not be authoritative . . . they are nevertheless relevant and useful, especially where, as here, the proponents of the bill made no response to the opponents' criticism" (p. 583 n. 85).^{9a}

Aside from the majority's failure to suggest why it need look to the statements of opponents of the bill to interpret section 5 in disregard of the assurances of Delph Carpenter, its draftsman, that "it has nothing to do with the interstate relations between Arizona and California" and the similar statements of Representative Swing, author of the bill, and a host of other proponents of the measure,¹⁰ its reliance on the opponents' comments is unwarranted for at least two reasons.

First, the majority's reliance on Senator Hayden's remarks is truly misplaced. Senator Hayden never shared the views of federal power and omniscience that apparently underlie the majority opinion. Second, the Court mistakenly assumes that the comments of Representatives Colton and Douglas and other opponents of the bill were not answered by the bill's proponents. They were vigorously denied.

^{9a} Shall the same reasoning apply to statements by a Court's minority to which the majority opinion makes no response?

¹⁰ See, *e.g.*, Justice Harlan's dissenting opinion, pp. 604-05, 618-20.

a. Senator Hayden did not believe that the Project Act made a statutory apportionment

Senator Hayden stated his own views and the congressional consensus as follows:

“There are only two ways in which this controversy can be settled. Either the States can agree upon an equitable apportionment of waters of the Colorado River or, in the absence of a compact, the Supreme Court of the United States can determine what the rights of the various States are on that stream. . . .

“... *Arizona denies that it is within the power of Congress to apportion the waters of an interstate stream among the States.*”¹¹ (Emphasis added.)

Similarly, he assured Senator King, author of section 18 of the Act, that Senator Hayden’s proposed amendment (later rejected by the Senate) even though it then required California to ratify a tri-state compact as a condition precedent to the effectiveness of the Act, did not nullify the priority principles long established under state law (69 Cong. Rec. 169):

“Mr. HAYDEN. . . . The only thing required in this bill is contained in the amendment that I have offered, that there shall be apportioned to each State its share of the water. Then, who shall obtain that water in relative order of priority may be determined by the State courts.

“Mr. KING. If the Senator means by his statement that the Federal Government may go into a stream, whether it be the Colorado River, the Sacramento River, or a river in the State of Montana, and put its powerful hands down upon the

¹¹ *Hearings on H.R. 9826 Before the House Committee on Rules*, 69th Cong., 2d Sess. 75, 76 (1927).

stream and say, 'This is mine; I can build a dam there and allocate water to whom I please, regardless of other rights, either suspended, inchoate, or perfected,' I deny the position which the Senator takes.

"Mr. HAYDEN. *The amendment that I have offered contemplates no such possibility.*" (Emphasis added.)

With reference to this exchange, the majority suggests that since Senator Hayden was "so knowledgeable in western water law," his remark "makes sense only if one understands that the 'order of priority' being talked about was the order of present perfected rights" (p. 582 n. 84).^{11a} But Senator King had just referred to "suspended, inchoate *or* perfected" rights (emphasis added). Senator Hayden's assurances that his coercive condition did not contemplate federal preemption of the only existing body of law for the determination of water rights on the Colorado River could only have referred to appropriative water rights which "users or appropriators of water stored" (section 8(a)) might either "initiate *or* perfect" (section 4(a); emphasis added) under the Project Act.

The acid test, however, is what Senator Hayden *did*—not merely what he said: If Congress in the Project Act had abrogated priorities in the lower basin and had apportioned lower basin waters or authorized the Secretary to ignore the priorities of California projects and dedicate water now used by California to new projects

^{11a} The Court at n. 83, speaking of present perfected rights, mentions Los Angeles' appropriation, but it does not define the term "present perfected rights". We take it that this is one of the "questions on which we have not ruled" (p. 602), to be considered in connection with the proposed decree.

in Arizona, Senator Hayden should have announced a great Arizona victory. He did no such thing. He voted against the bill. Moreover, in 1930 he pleaded with Congress not to appropriate funds for the construction of Hoover Dam, explaining why the negotiation of an interstate compact dividing lower basin waters was still necessary to Arizona after the Project Act had been enacted:¹²

“Senator GLASS. Do you construe the provision of the law which you have just read so as to make the whole plan contingent upon the completion of the agreement? ¹³

“Senator HAYDEN. No. I say to you, Senator, very frankly, that that is not true. It could not be true, because *the Congress of the United States does not possess the power to divide the waters of rivers among States. That is a result which could only be accomplished by the States through compacts.*

“Senator McKELLAR. Senator Hayden, suppose the agreement is not made; suppose Arizona and Nevada and California are unable to agree. Then what happens?

“Senator HAYDEN. What will happen is that the waters of the Colorado River will be impounded in the Boulder Canyon Reservoir and made available for use; large quantities of water will be taken out of the Colorado River into the great all-American canal; over 1,000,000 acre-feet will be further taken out of the river by a pumping plant, and taken over into the coastal plain of California in

¹² *Hearings on H.R. 12902 Before a Subcommittee of the Senate Committee on Appropriations, 71st Cong., 2d Sess. 170-71 (1930).*

¹³ (Footnote ours.) Senator Hayden had just read the language of the second paragraph of § 4(a) of the Project Act, authorizing a tri-state compact among Arizona, California, and Nevada.

the vicinity of Los Angeles; *they will be put to beneficial use; and, once having acquired a prior right to its use, no other State can obtain the use of those waters.*

“Senator McKELLAR. What are the chances of an agreement? How far apart are you?

“Senator HAYDEN. That is why I asked Colonel Donovan to come here to testify regarding the negotiations between the States of Arizona and California.

“In answer to the question asked by Senator Glass—and then I shall ask Colonel Donovan to proceed—you will remember that the Senators from Arizona strenuously opposed the enactment of the Boulder Canyon project act. After many days of discussion we were approached, principally through the Senator from Wyoming, Mr. Kendrick, who said to us, ‘If we can work out in this bill a fair division of the waters of the lower Colorado River Basin, will you cease your opposition?’ Senator Ashurst and I answered, ‘That is exactly what it is all about. If you can do that, we are ready to quit right now.’ The Senator from Wyoming said, ‘I shall see what can be done.’ *Senator Kendrick afterwards came back and reported to us that it was impossible for Congress to make such an apportionment, because it is not within the power constitutional [sic] of Congress to divide waters.* The Senator, however, said, ‘We will come the nearest thing to it. Congress will limit California to 4,400,000 acre-feet of water out of the primary apportionment of lower basin water, and will *indicate* in advance the kind of an agreement which ought to be made by the three lower basin States in dividing the water among them.’

“*That is what was done in the Boulder Canyon project act. It was thoroughly understood at the time that there was no legal way of imposing such*

an agreement on the three States by an act of Congress." (Emphasis added.)

Senator Hayden later restated this analysis in debates on the Senate floor, repeating that "constitutional lawyers in this body said that it was impossible for the Congress of the United States to divide the waters of rivers." 72 Cong. Rec. 11770 (1930).

Similarly, he told the Senate (*id.* at 11755):

"[I]f the dam shall be built at Boulder Canyon and if Congress shall appropriate the money to build the all-American canal, and the cities of southern California do divert the water, as they contemplate doing, out of the Colorado River over on to the coastal plain—if those things shall be done first without an agreement between Arizona and California, California will acquire a *prior vested right* to the greater and an unfair proportion of the waters of the Colorado River." (Emphasis added.)

Senator Hayden's statement provides the conclusive explanation of his vote against the Project Act, his efforts to block the initial appropriations for the building of Hoover Dam, Arizona's attempt to have the Act declared unconstitutional, and Arizona's calling out its militia to halt the building of Parker Dam, the diversion structure for California's Colorado River aqueduct (and of the proposed Central Arizona Project). It reveals the consensus of contemporary understanding that the Act did not effect a statutory apportionment scheme, as the Court now finds in the Act. The basic reasons, pointed out in Justice Harlan's dissent but unanswered in the majority opinion, are evident. First, Congress, almost to a man, considered that it lacked the power to allocate waters among the

states. Second, the basic principles of equitable apportionment—priority of appropriation and protection of existing uses—were to be preserved and applied to both kinds of rights on which section 4(a) proposed that California enact a quantitative ceiling: (1) “All uses under contracts made under the provisions of this Act,” and (2) “all water necessary for the supply of any rights which may now exist.” Senator Hayden recognized the limited purpose of the Act then; this Court recognized it in its four earlier decisions; and four Secretaries of the Interior have consistently recognized it in administering the Act.¹⁴ A majority of this Court now refuses to so read the statute.

**b. The charges of the opponents of the bill were refuted
by the bill's proponents**

The majority's assertion that the criticisms of the opponents were not challenged is demonstrably wrong, as we detailed at length in appendix B of the legislative history appendixes accompanying the California reply brief. Mr. Colton's charges were refuted by Mr. White of Colorado, a proponent of the bill (and,

¹⁴ Cf. article 10 of Arizona's 1944 water delivery contract, which provides in part (Rep. app. 405):

“Neither Article 7, nor any other provision of this contract, shall impair the right of Arizona and other states and the users of water therein to maintain, prosecute or defend any action respecting, and is without prejudice to, any of the respective contentions of said states and water users as to . . . (5) what limitations on . . . relative priorities exist as to the waters of the Colorado River system”

In approving that contract, Secretary of the Interior Ickes issued a decision concluding that article 10 “is plain and unequivocal and adequately reserves all questions of interpretation of the . . . [Boulder Canyon Project Act].” Calif. Ex. 7607 for iden.

in effect, by Mr. Colton himself), in the following colloquy (69 Cong. Rec. 9648):

"MR. COLTON. Congress can not allocate water. . . .

"

"MR. WHITE of Colorado. A while ago the gentleman stated that he doubted whether or not Congress had the power at this late date to nullify, abrogate, or change the doctrine of priority in the use of the water.

"MR. COLTON. I think they have not that power.

"MR. WHITE of Colorado. *There is no attempt to do anything of that kind by this bill. . . .*" (Emphasis added.)

Shortly before the quoted exchange between Mr. Colton and Mr. White, similar assertions by Mr. Colton were denied by Mr. Bankhead who also favored the fourth Swing-Johnson bill (69 Cong. Rec. 9648 (1928)):

"MR. COLTON. . . . You are saying that you are going to take it [control] away from the States and place it in the Federal Government, and section 5 of this bill asserts that very principle. It provides that the Secretary of the Interior shall have control of all of the water stored in the reservoir and its delivery to any part of the river below. We deny that in principle and say it is against the very contract that this country has entered into with our Western States and contrary to the decisions of the United States Supreme Court.

"MR. BANKHEAD. As I understand, the whole theory of this bill is predicated on the recognition of the right that the gentleman is now asserting, for the reason that nothing can be done by Congress under this bill until the States acting through this compact shall determine what their respective rights are in reference to this matter."

Mr. Swing of California, the House author, responded as follows to Mr. Douglas (69 Cong. Rec. 9635):

"I only wish I had the time to go fully into each and every one of the contentions made by the gentleman from Arizona [Mr. Douglas]. They ought to be answered. They can be answered. *They have been answered in the investigations made of the project and in the hearings held on this bill.* No project has ever been presented to Congress which has been so thoroughly studied." (Emphasis added.)

Mr. Swing was correct; the contentions made by Mr. Douglas on the floor were repetitions of those made earlier, and which had been challenged and thoroughly refuted in detailed hearings held over a period of five years on the four Swing-Johnson bills. See Calif. Legis. Hist. App. Accompanying the Calif. Reply Brief, app. B, pp. 58-61.

2. The Court Has Overlooked the Legislative History of Section 18 and This Court's Previous Construction of That Section

Section 18 of the Project Act provides:

"Nothing herein shall be construed as interfering with such rights as the States now have either to the waters within their borders or to adopt such policies and enact such laws as they may deem necessary with respect to the appropriation, control and use of waters within their borders, except as modified by the Colorado River Compact or other interstate agreement."

The present opinion concedes (p. 588):

"Section 18 plainly allows the States to do things not inconsistent with the Project Act or with federal control of the river, for example, regula-

tion of the use of tributary water and protection of present perfected rights. What other things the States are free to do can be decided when the occasion arises. But where the Secretary's contracts, as here, carry out a congressional plan for the complete distribution of waters to users, state law has no place."

Section 18 went into the Act as an amendment offered by Senator King of Utah (70 Cong. Rec. 593) to remove any possible inference that the Secretary of the Interior or any other federal official would be authorized by the Project Act to do what the Court now concludes the Act did empower the Secretary to do. Senator King's fiery speech evidencing these views is quoted at pages 17-18, *supra*.

In *Arizona v. California*, 283 U.S. 423 (1931), this Court emphatically interpreted section 18 in accordance with Senator King's intent, holding that it negatived any idea of federal supersedure of state law relating to the acquisition and regulation of water rights, both interstate and intrastate (*id.* at 462):

"The Act does not purport to affect any legal right of the State, or to limit in any way the exercise of its legal right to appropriate any of the unappropriated 9,000,000 acre-feet which may flow within or on its borders. On the contrary, section 18 specifically declares that nothing therein 'shall be construed as interfering with such rights as the States now have either to the waters within their borders or to adopt such policies and enact such laws as they may deem necessary with respect to the appropriation, control, and use of water within their borders, except as modified' by interstate agreement. As Arizona has made no such agreement, the Act leaves its legal rights unimpaired."

The language of section 18 was reenacted as section 14 of the Boulder Canyon Project Adjustment Act of July 19, 1940, 54 Stat. 779, 43 U.S.C. § 618m (1958).

3. There Is No Present or Potential Conflict Between the Principles of Equitable Apportionment or State Law and Effective Implementation of the Objectives of the Project Act

The Court justifies its reading of section 8 of the reclamation law and section 18 of the Project Act on the ground that (p. 590):

“Subjecting the Secretary to the varying, possibly inconsistent, commands of the different state legislatures could frustrate efficient operation of the project and thwart full realization of the benefits Congress intended this national project to bestow.”

With due respect, this is not the point; the point is that Congress, as a matter of “*federal* statutory law,” and this Court, as a matter of “*federal* interstate common law,” both have adopted as the basic element the salutary principle which all of the arid states have stated in their own jurisprudence: the law of prior appropriation (upon which this Court has superimposed certain other features—primarily the protection of existing uses). Both section 8 of the reclamation law and section 18 of the Project Act are part of an unbroken series of at least 36 federal statutes, spanning the period 1866 to 1958, in which Congress has affirmed that, as a matter of federal law, the distribution of waters from federally constructed and operated projects by federal officials should conform to the appropriative principles of state law, and denied to such officials power to substitute their own discretion to

allocate water.¹⁵ Is it logical to believe that Congress, in this one statute, intended to go in the opposite direc-

¹⁵ § 9 of the Act of July 26, 1866, 14 Stat. 253, 30 U.S.C. § 51 (1958); § 17 of the Act of July 9, 1870, 16 Stat. 218, 30 U.S.C. § 52 (1958); § 1 of the Desert Land Act of March 3, 1877, 19 Stat. 377, as amended, 43 U.S.C. § 321 (1958); § 18 of the Act of March 3, 1891, 26 Stat. 1101, as amended, 43 U.S.C. § 946 (1958); Act of Feb. 26, 1897, 29 Stat. 599, 43 U.S.C. § 664 (1958); Act of March 2, 1897, 29 Stat. 603; Act of June 4, 1897, 30 Stat. 36, 16 U.S.C. § 481 (1958); § 8 of the Reclamation Act of 1902, 32 Stat. 390, 43 U.S.C. §§ 372, 383 (1958); § 25 of the Act of April 21, 1904, 33 Stat. 224; § 4 of the Act of Feb. 1, 1905, 33 Stat. 628, 16 U.S.C. § 524 (1958); Act of March 3, 1905, 33 Stat. 1020; Act of June 21, 1906, 34 Stat. 375; Act of March 1, 1907, 34 Stat. 1035; Act of May 30, 1908, 35 Stat. 560; Act of March 3, 1909, 35 Stat. 812; § 2 of the Warren Act of Feb. 21, 1911, 36 Stat. 926, 43 U.S.C. § 524 (1958); § 11 of the Act of Dec. 19, 1913, 38 Stat. 250; Federal Power Act of June 10, 1920, 41 Stat. 1068, 1077, 16 U.S.C. §§ 802(b), 821 (1958); § 18 of the Boulder Canyon Project Act of Dec. 21, 1928, 45 Stat. 1065, 43 U.S.C. § 617q (1958); § 3 of the Taylor Grazing Act of June 28, 1934, 48 Stat. 1271, 43 U.S.C. § 315b (1958); § 4 of the Act of Aug. 28, 1937, 50 Stat. 870, 16 U.S.C. § 590u (1958); § 14 of the Boulder Canyon Project Adjustment Act of July 19, 1940, 54 Stat. 779, 43 U.S.C. § 618m (1958); § 3(b) of the Great Plains Water Conservation and Utilization Projects Act of Oct. 14, 1940, 54 Stat. 1121, 16 U.S.C. § 590z-1(b) (1958); § 1 of the Flood Control Act of Dec. 22, 1944, 58 Stat. 888-89, as amended, 33 U.S.C. § 701-1 (1958); Reservation (c) to the Mexican Water Treaty, U.S. Treaty Ser. No. 994, 59 Stat. 1265 (1945); National Parks Act of Aug. 7, 1946, 60 Stat. 885, 16 U.S.C. § 17j-2 (1958); § 208 of the Act of July 10, 1952, 66 Stat. 560, 43 U.S.C. § 666(a) and (c) (1958); § 3(e) of the Submerged Lands Act of May 22, 1953, 67 Stat. 31, 43 U.S.C. § 1311(e) (1958); § 3(c) of the Act of July 28, 1954, 68 Stat. 577-78; § 4 of the Act of Aug. 4, 1954, 68 Stat. 667 (as amended by 70 Stat. 1088 (1956)), 16 U.S.C. § 1004 (1958); §4(b) of the Act of July 23, 1955, 69 Stat. 368-69, 30 U.S.C. § 612(b) (1958); Act of Aug. 4, 1955, 69 Stat. 491; § 7 of the Colorado River Storage Project Act of April 11, 1956, 70 Stat. 110, 43 U.S.C. 620f (1958); § 4 of the Act of July 2, 1956, 70 Stat. 484, 43 U.S.C. § 485h-4 (1958); § 4(b) of the Small Reclamation Projects Act of Aug. 6, 1956, 70 Stat. 1045, 43 U.S.C. § 422d(b) (1958); § 202 of the Act of Aug. 28, 1958, 72 Stat. 1059.

tion, without saying so, by implication, in a one-sentence requirement that water users must have federal contracts, which it had been requiring right along under the federal reclamation law even of water users who individually owned their water rights?

Congress, in section 5, did not intend to substitute a paper contract right for the requirement in section 8 of the reclamation law, incorporated in the Project Act by section 14, that "beneficial use shall be the basis, the measure, and the limit of the right." Instead, it enthroned as federal law this essential principle of the states' laws of priority of appropriation. This decision shatters that principle.

II. THE EXCLUSION OF THE TRIBUTARIES

A. The Court's Five Reasons for Rejecting the Plain Language of Section 4(a), and the Answers to Them

The question here is whether Congress expected that the consumptive use of the 7.5 million acre-feet which is identified in the first paragraph of section 4(a) of the Project Act by reference to paragraph (a) of Article III of the Compact should be supplied by the main stream alone, or by the Colorado River system, including its lower basin tributaries as well as the main stream.

Arizona has contended that the Compact was construed by the Project Act as encompassing only the main stream in the lower basin, excluding the tributaries (p. 568). See *Petty v. Tennessee-Missouri Bridge Com.*, 359 U.S. 275 (1959). California has contended that both section 4(a) of the Act and Article III(a) of the Compact, which it incorporates, include the tributaries. If either of these two constructions were adopted, there would be equilibrium and not conflict between the Compact and the Project Act with

respect to quantities that the lower basin may appropriate from the main stream within the "ceiling on appropriations" (the Master's term) imposed by Article III(a) of the Compact.

Thus:

If the Compact, as construed by the Project Act, excludes the lower basin tributaries (Arizona's contention), then Arizona, California, and Nevada may appropriate from the main stream, within the III(a) ceiling, that full 7.5 million if it is physically available. California may use 4.4 million of it, and Arizona and Nevada 3.1 million.

Or:

If the Compact includes the tributaries (as California has contended), then Arizona, California, and Nevada may appropriate within that same III(a) ceiling only 5.5 million from the main stream,¹⁶ because the lower basin must account for some 2 million acre-feet of consumptive use on the tributaries. Of this 5.5 million, California may use 4.4 million, and Arizona and Nevada 1.1 million.¹⁷

¹⁶ Article III(b) permits the use of an additional million.

¹⁷ The Master construed the reference in section 4(a) to additional "excess or surplus waters unapportioned" by the Compact, of which California might use one-half, Arizona one-half, as including the additional million acre-feet referred to in Article III(b). If that extra million is physically available (which we doubt), and if the lower basin may appropriate up to the III(a) and (b) ceiling from the main stream alone, California may use altogether 4.9 million (4.4 under III(a) plus one-half of 1 million under III(b)), and Arizona and Nevada may use 3.6 million (3.1 plus one-half of that 1 million). Similarly, if the tributaries' 2 million is encompassed by the Compact and section 4(a), California may use 4.9 million (4.4 plus one-half million), and Arizona and Nevada 3.6 million, but since 2 million of this is used on their tributaries, they may claim only 1.6 million from the main stream.

In either event, the supply available to the Secretary under the Compact is in balance with the demand he is expected to recognize under the Project Act.

But the Court, without reaching Arizona's contention as to the meaning of the Compact (p. 568), construes the Project Act itself as dealing only with the main stream, *i.e.*, that Congress expected Arizona, California, and Nevada to use 7.5 million acre-feet from the main stream, which means 9.5 million from the System¹⁸ (including 2 million from the tributaries). Of this 9.5 million, California is limited to 4.4 million, and Arizona and Nevada were expected by Congress to consume 5.1 million (3.1 million from the main stream plus 2 million from the tributaries).

Manifestly, if Article III(a) of the Compact is construed as including 2 million acre-feet of uses on the tributaries, thereby limiting the lower basin to the appropriation of a residual 5.5 million acre-feet from the main stream under Article III(a), but section 4(a) is construed as expecting Arizona, California, and Nevada to use 7.5 million from the main stream alone, Congress either (1) intended that the Compact ceiling should not be enforced against the lower basin, or (2) legislated a built-in shortage into what the Court calls the "statutory apportionment scheme."¹⁹

¹⁸ Note that this is 1 million in excess of the 8.5 million "aggregate of the quantities specified in paragraphs (a) and (b)" of Article III, hence encroaches on the supply that Article III(c) dedicates to Mexico before the upper basin may be called upon for contribution to the Mexican burden.

¹⁹ As a practical matter, if consumptive use of 7.5 million acre-feet from the main stream is to be made, this will necessitate the delivery of more than 95 million acre-feet per decade at Lee Ferry,

This mischief follows from the severance of section 4(a) of the Project Act from Article III(a) of the Compact which it purports to incorporate. The Court gives five reasons for doing this.

1. *The Court's first reason:* that the California limitation is on "water of and from the Colorado River," not of and from the "Colorado River System" (p. 568).

This is true, but irrelevant. Section 19 of the Project Act authorizes subsidiary compacts among Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming for a comprehensive plan for the development of the "Colorado River," not the "System." But New Mexico and Wyoming do not touch the Colorado River, are traversed only by tributaries. Obviously, this does not exclude them from the scope of section 19.

2. *The Court's second reason:* that while inclusion of the tributaries in the Compact was natural in view of the upper states' strong feeling that the lower basin tributaries should be made to share the burden of any obligation to deliver water to Mexico which a future treaty might impose, when it came to an apportionment among the lower basin states, the Gila would not logically be included, since Arizona alone of the states could effectively use that river (pp. 568-69).

Earlier in the same paragraph, the Court has declined to rule on Arizona's contention that the Com-

not merely the 75 million referred to in Article III(d) (Rep. 124, 125, 144-45). This is because of intervening losses and the requirements of the Mexican Treaty, quite aside from the legal question of whether use of 7.5 million from the main stream exceeds the "ceiling on appropriations" established by Article III(a) and (b).

fact apportions only the waters of the main stream, not the main stream and the tributaries. But later, the Court seems to construe the Compact as encompassing the tributaries. Which is the holding? That the Compact includes the tributaries, or that the Court leaves this question open? This is of the utmost importance to all seven states of the basin, particularly to California, with respect to the Mexican burden. See pp. 28-30, *supra* and pp. 36-37, *infra*.

3. *The Court's third reason*: that the governors of the upper division states, at a conference in 1927, proposed allocations to Arizona, California, and Nevada out of "the average annual delivery of water to be provided by the states of the upper division at Lees Ferry, under the terms of the Colorado River Compact" (p. 570), and that this was the starting point for the debate in the Senate (pp. 569-73).²⁰

The Special Master answered this argument conclusively: the 7.5 million acre-feet per annum of *consumptive use (diversions less returns)* under Article III(a) cannot be equated with the 7.5 million acre-feet per annum of *flow* at Lee Ferry under Article III(d). See pp. 8-9, *supra*.

4. *The Court's fourth reason*: That the legislative history of the first paragraph of section 4(a) shows that the limitation on California of 4.4 million acre-feet was

²⁰ The Master said (Rep. 188-89): "The recommendations of the governors' conference designated a body of water out of which the allocation would be made by reference to the contemplated deliveries derived from the Upper Division performance of its obligation under Article III(d) of the Compact.

"However, Congress never clearly understood this, and, indeed, never seems to have considered the relationship of the limitation on California to some actual body of water."

intended to relate to the main stream, notwithstanding its incorporation of Article III(a), from which the inference is drawn that the residue of 3.1 million acre-feet from which California was excluded was also intended to relate to the main stream (pp. 570-71).

This is answered by the decisive amendment of Senator Phipps of Colorado, chairman of the Senate Committee which reported the bill:

The Court says (p. 567): “. . . we look to the Compact for terms specifically incorporated in the Act. . . .” But it refuses to do so with respect to the most specific incorporation in the whole Act, made in the one place where it counted most, by the chairman of the committee in charge of the bill, and with the explanation of why he was doing this. We refer to Senator Phipps’ perfecting amendment to his limitation on California, which previously read “four million four hundred thousand acre-feet of the waters apportioned to the lower basin States by the Colorado River Compact” His perfecting amendment added, as the following emphasis shows, “*by paragraph (a) of Article III of the Colorado River compact.*” He introduced it, and secured its adoption, after Senators Hayden and Pittman had shown that they were not clear as to whether “waters apportioned” meant the III(d) flow at Lee Ferry (the governors’ suggestion) or the 7.5 million of consumptive use apportioned by III(a).²¹ His explanation was that this would “show that the allocation of waters refers directly to the seven and one-half million acre-feet of water” described by Article III(a) of the Compact (70 Cong. Rec. 459 (1928)), and this, by definition, includes the

²¹ Rep. 188-89.

tributaries. Chairman Phipps had already said (*id.* at 335):

“But I do not think that the water from the Gila River, one of the main tributaries of the Colorado, should be eliminated from consideration. I think that California is entitled to have that counted in as being a part of the basic supply of water.”

In the teeth of this history, is it credible that when the Senate unanimously adopted the Phipps' amendment thus perfected it meant “paragraph (a) of Article III of the Colorado River compact, *but excluding the tributaries*” (70 Cong. Rec. 459), while simultaneously contemplating that language in Article III(a) itself would include them? Would an upper basin Senator deliberately create such a possible imbalance between Project Act demand and Compact supply? The Court notes Chairman Phipps' perfecting amendment (p. 571 n. 52) but is silent on its authorship and overlooks its significance. It asserts: “That this change was not intended to cause the States to give up their tributaries may reasonably be inferred from the fact that the amendment was agreed to by Senator Hayden, who was a constant opponent of including the tributaries” (*ibid*). But it is clear that Senator Hayden was one of those who had confused Article III(a) with the Article III(d) delivery,²² the very point that the Phipps perfecting amendment put at rest.

5. *The Court's fifth reason:* that the second paragraph of section 4(a) authorizes a tri-state compact among Arizona, California, and Nevada, which would divide 7.5 million acre-feet among those three states,

²² Rep. 188-93.

but does not mention New Mexico and Utah, lower basin states traversed by tributaries, and this implies that the first paragraph, which proposes the limitation on California, must have meant the main stream only.

The answer is quite clear. Senator Hayden, like Senator Pittman, "failed to grasp" (the Master's expression, Rep. 189) that the Phipps perfecting amendment, just adopted, had related the California limitation to Article *III(a)* of the Compact (which Chairman Phipps believed encompassed the tributaries, and is stated in terms of consumptive use, diversions less returns). Senator Hayden went right ahead with an attempt in the second paragraph to divide up the *III(d)* deliveries by the upper division (which includes only the flow of the main stream at Lee Ferry, and is stated in terms of flow, not consumptive use). See p. 34, *supra*. The first and second paragraphs of section 4(a) are thus not the two halves of the same apple. The second paragraph, as the debates show, confuses Article *III(a)* with the flow at Lee Ferry guaranteed by Article *III(d)*, and this is the reason for failure to mention New Mexico and Utah. Senator Phipps' perfecting amendment cured this confusion in the first paragraph. Senator Hayden nevertheless continued to believe that *III(d)* and *III(a)* meant the same water. But his abandonment of his effort to make the second paragraph mandatory and his agreement to make it conditional on California's acceptance of it, coupled with the addition of clause 6, subjecting the tri-state compact to the Colorado River Compact "in all particulars," ended any independent significance of the conflict between the second paragraph and the first. The first paragraph became operative because California agreed

to it as written. The second did not, and could not without rewriting the Colorado River Compact.

B. The Compact's Provisions With Respect to the Mexican Treaty Burden Require That the Tributaries Shall Be Accounted for Between the Two Basins, and Among the States of the Lower Basin, in Precisely the Same Manner. Failure To Do So Not Only Would Produce a Result Grotesquely Unfair to California, But Would Create an Insoluble Administrative Problem for the Secretary of the Interior.

1. The consequences of including the tributaries in the interbasin accounting with respect to the Mexican Treaty burden,²³ while simultaneously excluding them from the allocation of the lower basin's share of the treaty burden among Arizona, California, and Nevada, would be these:

If the tributaries are encompassed by the Compact, then, because of the provisions of Article III(c), to the exact extent that the waters of the Gila are consumed in Arizona, the lower basin's right to require the upper division to supply water to Mexico is diminished. There is nothing in the Project Act that requires California to undertake, nor that relieves Arizona from the responsibility for, the burden thus cast upon the lower basin.

The United States, in its proposed findings, conclusions, and supporting brief before the Master, recognized the inescapable equity of requiring Arizona to account, out of her share of main stream waters, for whatever additional Mexican burden her exclusive benefit from the tributaries may cast upon the lower

²³ Note the possible conflict between the Court's two statements on pages 568-69 of its opinion, as to whether the Compact does this.

basin.²⁴ Even if the Court adheres to its erroneous ruling that section 4(a) of the Project Act, by its reference to Article III(a) of the Compact, refers solely to main stream water, it is nevertheless true that if the main stream "fund" is to be further diminished in consequence of the added exposure of the lower basin to the Mexican Treaty burden occasioned by Arizona's uses of the tributaries, then Arizona, not California, should bear out of her main stream allocation the added burden so occasioned.

We will invite the Court's attention to the Government's one-time proposal again when the draft decrees are here for consideration.²⁵

²⁴ The United States proposed in U.S. Conclusion 11.11 (p. 67 of U.S. Op. Br. before the Special Master):

"In case of shortage of water requiring that the States of the Lower Basin contribute from the waters apportioned by the Colorado River Compact for use in that Basin for satisfaction of the Mexican Treaty, each of the States of Nevada, Arizona, and California is obligated to contribute from its contract entitlement to the delivery of stored water a quantity of water which is proportionate to the use within that State of the total Colorado River system water available for use within the three States to the extent such system water could be available for delivery to Mexico if not used within the States."

In explanation, the United States said, *inter alia* (*id.* at 69):

"In construing the agreement between the Lower Basin States as contained in Article III(c) of the Compact to arrive at the proportionate shares of California, Nevada, and Arizona in the Lower Basin's share of the Mexican Treaty burden, it is necessary to take into account the aggregate use within each contributing State of Colorado River system water to the extent such would be available for delivery to Mexico if not used within the States. Thus, the uses in Arizona from the tributaries below Lake Mead should be included on the same basis as tributary uses above Lake Mead in Arizona and Nevada. For such water, if not used in Arizona, would in part at least be available for delivery to Mexico."

²⁵ See opinion, p. 571 n. 51: "Arizona's Senators Ashurst and Hayden voted against the bill, which did not exempt the Gila from the Mexican burden. 70 Cong. Rec. 603 (1928)."

2. Must the Secretary keep two sets of books, one accounting for Arizona's uses of the Little Colorado and Gila under the Compact, which will govern the quantity of water he must release from Glen Canyon Dam to flow into Lake Mead, and the other excluding those same uses under the Project Act, which will govern the quantity he must release from Hoover Dam to supply Arizona, California, and Nevada? The Colorado River Storage Project Act, 70 Stat. 105 (1956), 43 U.S.C. §§ 620-620o (1958), enacted while this case was being tried, directs the Secretary to operate Glen Canyon and Hoover Dam alike in compliance with the Compact and the Project Act (§ 7 (43 U.S.C. § 620f)), in the obvious belief that the Compact and the Act were compatible and not severable.

C. The Court's Construction of Section 4(a) Gives Arizona 948,000 Acre-feet More Than Senator Hayden Told the Senate That Arizona Asked

Senator Hayden three times told the Senate that he sought from the main stream only 2,800,000 acre-feet of *diversions*, from which the return flow was estimated to be 948,000 acre-feet, to which Arizona made no claim and for which she asked no credit. Thus Arizona's allocation of consumptive use, diversions less returns, would not be 2,800,000 acre-feet but less than 1,900,000. This is the only possible way of harmonizing his second paragraph of section 4(a) with the upper basin governors' proposal to allocate among Arizona, California, and Nevada the III(d) deliveries at Lee Ferry, on which he said his proposal was based.

Senator Hayden, addressing the Senate December 12, 1928, stated:

"But to get back to the point that I desire to impress upon the Senate, which is that if the State

of Arizona carries out the plan that I have indicated, and we should *divert* 2,800,000 acre-feet of water out of the Colorado River and apply it to beneficial use on this land, according to the estimate of an expert of the United States Geological Survey, Mr. E. C. La Rue, who has devoted his life to studies of conditions on the Colorado River, there will be a return flow from that area sufficient to take care of every demand for water that Mexico now has." (70 Cong. Rec. 464 (1928).)

"I have specified in the amendment which I have offered that the State of Arizona lays no claim to that return flow. We do not ask to have any credit for it after it arrives in the main stream of the Colorado River. It will be surplus and unappropriated waters which Arizona can not use, and that water, and that alone, will be sufficient to supply any demand for water to meet the existing uses in Mexico." (*Ibid.*; emphasis added.)

"I have pointed out to the Senate that estimates made by Mr. La Rue are that if we take out 2,800,000 acre-feet from the Colorado River and use it for irrigation of lands in the lower Gila Valley, 900,000²⁶ acre-feet of that water will return to the Gila and thence into the Colorado River and that it can not be used anywhere else except in Mexico. That statement I can verify by figures from the tables which Mr. La Rue prepared and which appear upon pages 122 and 123 of the report that I have cited." (70 Cong. Rec. 465.)

The Court, if it now intends Arizona's 2,800,000 acre-feet to be measured by diversions *less* returns, would

²⁶ At 70 Cong. Rec. 463 the Senator gave a more precise figure, 948,000 acre-feet, as the return flow from a *diversion* of 2,844,000 acre-feet, saying "It is a coincidence that the Senate has fixed 2,800,000 acre-feet as the quantity that may be used in that manner."

thus award Arizona 948,000 acre-feet more than Senator Hayden told the Senate Arizona asked. To give Arizona 2,800,000 acre-feet of consumptive use (diversions less returns) would require the delivery of at least 3,800,000 acre-feet for diversion (*cf.* p. 9, *supra*). Such a quantity is wholly inconsistent with the plan offered by the governors in 1927.²⁷ *Cf.* pp. 8-9, *supra*.

D. Arizona's Windfall on the Little Colorado

The Court properly rejects the Master's redefinition of the "mainstream" as the waters in Lake Mead and below; properly recognizes the "mainstream," for the purposes of this suit, as the waters in the main river from Lee Ferry to Mexico; properly rejects the Master's holding that the diversions by Arizona and Nevada from the river between Lee Ferry and Lake Mead are not to be charged to their shares. The reason given is (p. 591):

"If Arizona and Nevada can, without being charged for it, divert water from the river above Lake Mead, then California could not get the share Congress intended her to have."

This being unquestionably so, there is a manifest flaw in the Court's prior holding, about the tributaries that contribute to this stretch of the river an average

²⁷ Note that the second paragraph of section 4(a) is consistent with Senator Hayden's explanation that he only asked 2.8 million acre-feet of diversions, not 2.8 million of consumptive use, diversions less returns. The second paragraph would allocate 2.8 million acre-feet, not *of*, but "*for* exclusive beneficial consumptive use" (emphasis added), *i.e.*, for diversion for that purpose.

of a million acre-feet of water a year, for it says of these tributaries (pp. 590-91):

"We hold that the Master was correct in deciding that the Secretary cannot reduce water deliveries to Arizona and Nevada by the amount of their uses from tributaries above Lake Mead, for, as we have held, Congress in the Project Act intended to apportion only the mainstream, leaving to each State its own tributaries."

There is no rational difference between a diversion from the Little Colorado or Virgin rivers a hundred feet above the point of confluence with the Colorado, and a diversion from the main stream a hundred feet below. Both such diversions impair the quantity available for diversion from the main stream further down.

Indeed, Senator Hayden specifically disclaimed any intent to relieve Arizona from accounting for Arizona's uses from the Little Colorado and all tributaries other than the Gila. In a letter to Governor Dern of Utah which he read to the Senate on May 22, 1928 (69 Cong. Rec. 9455), Senator Hayden proposed that of the water apportioned to the lower basin by the Compact, Arizona would include as her proposed share "all tributaries of the Colorado River above the Laguna Dam, so that the users of water on the Little Colorado, for example, would be in exactly the same position as a water user on any tributary of the Colorado in the upper basin which contributes water to the total supply that is actually capable of division."

But even if uses by Arizona on the tributaries above Lake Mead are not to be charged to her main stream allocation, what has become of the rights preserved

by the Master to California (and other main stream users) to protect existing main stream uses by suit to enjoin junior uses from these same tributaries? The Master correctly held that neither Congress nor California's legislature had intended that California waive her claims against these substantial contributions to the main stream water supply. (Rep. 317.)

**POINTS TO BE CONSIDERED IN CONNECTION
WITH THE PROPOSED DECREE**

At page 602, the Court points out, *inter alia*, that there are some questions upon which it has not ruled, and which apparently are to be considered in connection with the drafts of a decree which the parties are invited to submit. We will accordingly defer discussion of points not ruled upon until the drafts of decree are before the Court.

Respectfully submitted,

[Signatures follow on next page]

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CERTIFICATE

I, Northcutt Ely, counsel for the Petitioning Defendants, certify that the annexed Petition for Rehearing is presented in good faith and not for delay.

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