No. 9, Original

In the Supreme Court of the United States

OCTOBER TERM, 1959

STATE OF ARIZONA, COMPLAINANT

v.

STATE OF CALIFORNIA, PALO VERDE IRRIGATION DISTRICT, IMPERIAL IRRIGATION DISTRICT, COACHELLA VALLEY COUNTY WATER DISTRICT, METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA, CITY OF LOS ANGELES, CALIFORNIA, CITY OF SAN DIEGO, CALIFORNIA AND COUNTY OF SAN DIEGO, CALIFORNIA, DEFENDANTS

THE UNITED STATES OF AMERICA AND STATE OF NEVADA, INTERVENERS

STATE OF UTAH AND STATE OF NEW MEXICO, IMPLEADED DEFENDANTS

Before: Honorable Simon H. Rifkind, Special Master

FINDINGS OF FACT AND CONCLUSIONS OF LAW PROPOSED BY THE UNITED STATES OF AMERICA

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The United States of America proposes the following findings of fact and conclusions of law.

I. INTRODUCTORY AND WATER DELIVERY CONTRACTS

Finding 1.1

The Colorado River is a navigable stream. The main stream of the river rises in the high mountainous regions of north-central Colorado where the highest peaks are over 14,000 feet above sea level. Flowing a distance of approximately 1,300 miles, the river is the third longest in the United States, exceeded only by the Mississippi River System and the Rio Grande. The Colorado flows through the western portion of Colorado for a distance of 245 miles and then traverses the State of Utah for 285 miles. The portion above the confluence with the Green River was formerly known as the Grand River. After crossing the boundary between Utah and Arizona, it proceeds in a south and westerly direction through the Grand Canyon of the Colorado for 295 miles to a point from which it forms the boundary between Arizona and Nevada for a distance of 145 miles. Flowing almost due south, the river then forms the California-Arizona boundary for 235 miles and then becomes an international boundary between Arizona and the Republic of Mexico. This limitrophe section extends for between 16 and 20 miles. The last 75 miles of the river's journey to the Gulf of California are entirely within the Republic of Mexico.

Arizona v. *California,* 283 U.S. 423 (1931); Agreed Facts, Pre-Trial Order, Appendix I, p. I–3

Finding 1.2

The Colorado River System drains an area of approximately 242,000 square miles in the United States. Comprising portions of the States of Wyoming, Colorado, Utah, New Mexico, Arizona, Nevada and California, this area constitutes one-twelfth of the continental United States. The drainage basin from Wyoming to the Mexican border is approximately 900 miles long and varies in width from about 300 miles in the

upper section to about 500 miles in the lower section. It is bounded on the north and east by the Continental Divide in the Rocky Mountains, on the west by the Wasatch Range and other divides, and by minor divides on the south and southwest. The table on the following page shows the way in which the area of this drainage basin is divided among the seven basin states and the approximate percentage of each state's total area which is within the basin.

Agreed Facts, Pre-Trial Order, Appendix I, p. I–1

Finding 1.3

A canyon section, approximately 1,000 miles long in southern Utah and northern Arizona, divides the Basin of the Colorado River System into two natural parts, corresponding roughly with the division into upper and lower basins contained in the Colorado River Compact. In both parts, most kinds of agriculture can be practiced successfully only by means of irrigation because of the prevailing arid and semiarid conditions. However, there are significant geographical and climatic contrasts between the two basins. Above the canyon section, the Colorado River Basin lies at relatively high elevations in contrast to the comparatively low elevations below the canyon section. Thus, in the Upper Basin, the growing season is relatively short; in the Lower Basin the growing season is much longer, lasting in many places throughout the year. The extreme aridity of climate and the long growing season in the lower basin make the annual water consumption per irrigated acre relatively high. Throughout the basin, considerable quantities of water are consumed by evaporation and transpiration. These losses are greater in the lower part of the river system than in the upper.

Agreed Facts, Pre-Trial Order, Stipulation I, p. I–8

Finding 1.4

Major tributary systems to the Colorado River exist in every basin State with the exception of California. The most important of such systems are: the Green, in Utah, Colorado and Wyoming; the Gunnison, in Colorado; the Dolores, in Colorado and Utah; the San Juan, in Utah, Colorado, New Mexico

State	State's Total Square Miles	Square Miles Within Drainage Basin	Percentage of State's Total Area in Drainage Basin	Percentage of Drainage Basin in State	State's Square Miles in Lower Basin Drainage Area	Percentage of State's Total Area in Lower Basin Drainage Area	Percentage of Lower Basin Drainage Area in State
Arizona	113, 909	107, 242	94. 1	44. 3	100, 306	88. 5	75. 8
California	158, 693	3, 599	2. 3	1. 5	3, 599	2. 3	2. 7
Nevada	110, 540	13, 922	12. 6	5. 8	13, 922	12. 6	10. 5
New Mexico	121, 666	20, 538	16. 9	8. 5	10, 892	9. 0	8. 2
Utah	84, 916	40, 824	48. 1	16. 9	3, 659	4. 3	2. 8
Colorado	104, 247	38, 501	36. 9	15. 9	none	none	none
Wyoming	97, 914	17, 210	17. 6	7. 1	none	none	none

Agreed Facts, Pre-Trial Order, Appendix I, p. I–1

and Arizona; the Little Colorado, in Arizona and New Mexico; the Bill Williams, in Arizona; the Gila, in Arizona and New Mexico; and the Virgin, in Nevada, Utah and Arizona. The drainage areas of the Little Colorado, the Bill Williams, the Gila, and the Virgin are within the Lower Basin of the Colorado River, as defined by Article II(g) of the Colorado River Compact, while the drainage areas of the other major tributary systems above named are within the Upper Basin.

Agreed Facts, Pre-Trial Order, Appendix I, pp. I–3, I–4

Finding 1.5

The water resources of the Colorado River system are essential for the maintenance of human life throughout the entire area of the Lower Basin. Because of the arid and semi-arid conditions which prevail throughout the region, irrigation of agricultural crops by the application of river water has been practiced from prehistoric times. There is evidence that even before the Christian era the ancient Hohokam constructed and maintained in the Salt River valley in the vicinity of Phoenix, Arizona, a great system of irrigation canals. By decree of the United States District Court for the District of Arizona, there has been awarded to the United States of America a right with an immemorial date of priority to use waters of the Gila River for the irrigation of lands on the Gila River Indian Reservation. The record is replete with other references to the practice of irrigated agriculture by Indians in the region prior to and at the time of exploration and settlement by white men.

Calif. Ex. 8; Plf. Ex. 103; See part 4 of these proposed findings

Finding 1.6

Increased utilization of the waters of the Lower Basin of the Colorado River System occurred as the white settlers moved into the area and established a permanent economy. Lands in the Salt River Valley in Arizona have been accorded priorities with respect to irrigation by such settlers as early as 1869, and on the Gila River above its confluence with the Salt as early as 1868. On the Muddy River, a tributary of the Virgin, irrigation by white settlers first occurred about 1865.

Even earlier, in 1857, white settlers diverted water for irrigation from the Virgin River at Washington in southwestern Utah, and before that a Mormon missionary and Indians in the area had constructed a dam for irrigation on Santa Clara Creek. One of the earliest Federal reclamation projects constructed under authority of the Reclamation Act of 1902 was the Salt River Project for the reclamation of arid lands near Phoenix, Arizona. This project was first authorized by the Secretary of the Interior on March 14, 1903, and construction of Roosevelt Dam, the first structure of the project built by the Reclamation Service, was initiated in March, 1904.

Plf. Ex. 101; Plf. Ex. 103; Tr. 16,231; 16,241; Utah Ex. 2 (pp. 210–211); U.S. Ex. 24, Agreed Facts, Pre-Trial Order, Appendix I, p. I–18

Finding 1.7

In 1867 Congress made the first of several appropriations for the construction of a canal to divert the waters of the main stream of the Colorado River for the irrigation of lands of the Colorado River Indian Reservation, that reservation having been established by the Act of March 3, 1865, and in 1870 water was first diverted from the river by means of that canal onto the lands of the reservation. While this project was for the benefit of Indians living upon and to be settled upon this reservation, it represents the first project for the utilization of waters of the main stream of the Colorado River undertaken by or under the sponsorship of others than the native Indian inhabitants of the area. Although there is no clear evidence of the time when waters of the main stream were first diverted for irrigation by white settlers in the Palo Verde Valley, the first of several notices of appropriation claiming a right to divert water from the river for use in that valley was dated July 17, 1877, and an intake from the river and canals was constructed prior to 1900. A system for irrigation in the Yuma Valley from the Colorado River was constructed in 1892. After years of preliminary investigations and preparations, in 1901 waters of the main stream of the Colorado River were first diverted into Imperial Valley, California. In 1904, a Federal project for the reclamation and irrigation of lands in Arizona

and California in the vicinity of Yuma, Arizona, was authorized under authority of the Reclamation Act of 1902 and the first irrigation by the Reclamation Service of lands within the project occurred in 1907. This project is known as the Yuma Reclamation Project. In 1922, lands on the Yuma mesa, as distinguished from the valley lands, were first irrigated with water diverted from the Colorado River within a project authorized as an auxiliary reclamation project or unit upon lands withdrawn under the reclamation law in connection with the Yuma Project.

U.S. Ex. 523, 14 Stat. 514; U.S. Ex. 501 (13 Stat. 541, 559); Calif. Ex. 327, Tr. 8,656–7; 8,678–80; Plf. Ex. 45 (p. 64); Tr. 7,315, Calif. Ex. 140; Plf. Ex. 45 (p. 62); Tr. 2,269–2,270; 39 Stat. 868

Finding 1.8

But the main Colorado River was not easily to be controlled, and many of these early developments for reclamation of the arid lands to which its waters were diverted were seriously impeded by its habit of frequent and violent floods. After several years of attempting to maintain the diversion canal on the Colorado River Indian Reservation against the effect of those floods without adequate funds, the efforts to develop the lands of that reservation extensively for irrigated agriculture were generally deferred until a substantial system for pump diversion of the waters of the river was initiated in 1911 and 1912. The old intake and canals in Palo Verde Valley were unused for 15 or 20 years prior to 1908, and when the development of the valley was resumed after that time levees were required for protection against flooding. A levee system constructed in the Mohave Valley in 1912 and 1913 to make possible the development and utilization of lands of the Fort Mohave Indian Reservation and other lands in the Mohave Valley was destroyed by the floods of 1914. It was necessary

to construct levees for protection of the lands and the irrigation systems in the Yuma Valley.

Tr. 8,645; 8,686; 6,484; 7,016–16A, Plf. Ex. 45 (pp. 7–8, 62); U.S. Ex. 522 (p. 116), 523 (p. 131), 524, 526 (p. 285), 528, 531, 532 (p. 2), 537, 539 (p. 1), 541, 542, 543, 544, 545, 548; Tr. 8,657; 8,680; 8,700–02, Tr. 8,750; 8,693, Plf. Ex. 45 (p. 56); Plf. Ex. 45 (pp. 50–51); U.S. Ex. 1313; Plf. Ex. 45 (p. 62)

Finding 1.9

In 1905, the river broke through a cut which had been made in 1904 by the Colorado Development Company in Mexico a short distance below the International Boundary for the diversion of waters from the main stream into the Alamo River and from thence into the Imperial Valley in Mexico and California. When the flood receded practically the entire flow of the river continued in this course, rather than down the former channel to the Gulf of California. By reason of the much steeper grade of this new channel in comparison with the grade of the former channel the natural tendency of the river was to continue to flow in this course to discharge into the below sea level Salton Sink, as it had last flowed approximately 500 years before. Eventual inundation of the entire Imperial Valley was threatened, but the river successfully resisted all efforts to return it to its former channel until February 1907. At that time, the Southern Pacific Railroad Company finally closed the break where the river had turned into its new channel and the river again flowed to discharge into the Gulf of California. The aggregate cost of closing the break and restoring the river to its old channel was in excess of $2,000,000.

Tr. 6,552; 7,202; 7,041–2, Plf. Ex. 45 (pp. 8, 73); Tr. 7,395–6; Calif. Ex. 185 (pp. 9, 16); Plf. Ex. 45 (p. 7), Tr. 6,439–41, Tr. 6,449; Tr. 7,397; Plf. Ex. 45 (p. 73)

Finding 1.10

However, the steeper slope away from the river toward the west and northwest as compared to the grade of the channel to the Gulf of California was a continuing hazard to the maintenance of the river in a course away from the Imperial Valley. In 1909, the river again broke through to the west and, following an old channel known as Bee River, flowed into the Volcano Lake area along the divide in Mexico between the Salton Basin, or Imperial Valley, and the Gulf of California. Thereafter, the river was held in a channel discharging into the Gulf only by the construction and continual maintenance in Mexico, with funds furnished by the landowners of the Imperial Valley, and by the United States, of an elaborate system of levees. These levees fairly accomplished their purpose, but not without actual and threatened breaks that might have precipitated a calamity at any time. Under date of July 22, 1919, it was reported to the Secretary of the Interior and the Board of Directors of the Imperial Irrigation District that "Throughout some 20 miles of the river's course where it forms the boundary and now for some 40 miles or more farther downstream, where the river is entirely on Mexican territory, the river, as already stated, has been and now is a menace to large areas of lands and large property interests in the United States and Mexico. If allowed to do what human operations in Mexico have predisposed it to do, it would discharge inland into the Salton Sea and it would be only a question of time before this sea would expand to the full limit of the Salton Basin, with a surface area of some 1,250,000 acres, extending from above Indio in California to about 20 miles south of the international boundary."

Plf. Ex. 45 (p. 76); Calif. Ex. 185 (p. 16); Plf. Ex. 45 (p. 71); Calif. Ex. 185 (p. 10); Tr. 7,002; Calif. Ex. 185 (pp. 11, 15, 29), Tr. 7,000–7,009; Plf. Ex. 45 (pp. 73, 75); Calif. Ex. 185 (p. 22)

Finding 1.11

In addition to the urgency to control the floods of the Colorado River, the developing projects for the utilization of the

main stream waters demonstrated an increasing need for regulation and conservation of the river's floods to assure a firm water supply for the irrigation of lands within those projects and of lands in additional projects not yet initiated. Even after construction in 1906 of the concrete headgate of the Imperial canal at Hanlon, difficulty was experienced as early as 1910 in diverting at the river's low stages an adequate quantity of water for irrigation of the then developed lands in Imperial Valley. In 1915 and 1919 actual shortages were experienced in Imperial Valley during part of the time, even though during such periods all, or practically all, of the river's waters reaching the intake of the Imperial canal were there diverted and applied in irrigation of the Valley. Had flows as low as those of 1902 and 1903 occurred, those shortages would have been even greater. While in 1922 it was estimated that 6,000,000 acre-feet of storage capacity below the Grand Canyon of the Colorado would be required for full development of all lands then contemplated for irrigation on the lower river, it was stated that much larger storage capacity would be required "to remove the menace of flood from the Colorado River."

Plf. Ex. 45 (pp. 5–7, 72); Calif. Ex. 185 (pp. 12, 23); Plf. Ex. 45 (p. 5); Plf. Ex. 45 (p. 7)

Finding 1.12

With the exception of the cut through which the river broke into the Imperial Valley in 1905, the points utilized for diversion of the waters of the Colorado into that Valley were located on American soil. However, shortly below such point the canal system through which the waters of the river were transported to the Valley entered Mexico and continued there generally along the course of the Alamo River to points on the International Boundary where the waters not diverted for use in Mexico were then brought back into the United States for use in Imperial Valley. It was thus necessary that much of the work of construction and maintenance of the canal for service of lands in the Imperial Valley be done in Mexico, and the entire protective levee system above referred to was of necessity constructed and maintained in that country.

While the American interests by whom the project had been developed had formed a corporation under Mexican law to conduct their necessary operations in Mexico, the need so to operate presented numerous problems, among which was the difficulty of functioning by the Government of the United States in connection with the works for flood protection. In a report of March, 1917, on "Irrigation and Flood Protection Problems of Imperial Valley, California," it was stated: "The political obstacles encountered in constructing and operating the system have been almost as serious as the physical difficulties and have at times jeopardized the integrity of the enterprise. From its inception the project has been financed by American capital and built with American equipment, although practically all of the main canal and the flood-protection works and about one-third of the irrigable area are in Mexican territory. The customs and other regulations of Mexico governing movement of persons and materials across the border often cause serious and costly delays which, in cases of emergency, might be disastrous. The situation is at times so critical and the ability to act promptly is so vital to the safety of the enterprise that these restrictions should be abolished. The present Mexican concession is unsatisfactory because inadequate in several respects. It does not establish equality of irrigation charges on the two sides of the boundary; it does not authorize enlargement of the main canal or construction of any higher canal; it does not provide for any flood-protection works. The unstable political conditions in Mexico add to the gravity of this situation."

Plf. Ex. 45 (pp. 72–76); Calif. Ex. 185 (pp. 12, 14–15, 22); Pl. Ex. 45 (p. 73)

Finding 1.13

On February 16, 1918, the United States of America and Imperial Irrigation District entered into a contract providing "that investigations, surveys, and cost estimates of an all American canal from the Laguna Dam, Arizona-California, into Imperial Valley, California, will be made in order to determine the possibility and feasibility of carrying an adequate supply of water for the irrigation of arid lands in the Imperial

Valley, * * *." The work to be done under this contract was to be financed cooperatively by the District and the United States and was to "follow a general plan of operation jointly agreed upon by a board, one member to be selected by the district, one by the Director of the United States Reclamation Service, and a third by the University of California."

Calif. Ex. 183

Imperial Irrigation District was organized in 1911 under the laws of California and in 1916 had acquired the assets of the organizations by which the diversion of Colorado River water into Imperial Valley had thus far been accomplished, including the stock of the Mexican operating company.

Tr. 7474; 7010

Laguna Dam had been constructed by the United States Reclamation Service as the diversion structure for the Yuma Reclamation Project. It is located on the main stream of the Colorado River about 10 miles northeast of and 13 miles upstream from Yuma, Arizona.

Agreed Facts, Pre-Trial Order, Stipulation I, pp. I–16 and I–17

Finding 1.14

The "Report of The All-American Canal Board on A Canal Located Entirely within the United States from the Colorado River at Laguna Dam into the Imperial Valley, California, July 22, 1919" was the product of the agreement of February 16, 1918. By that report the All-American Canal Board, composed as specified in the 1918 agreement, recommended, *inter alia:*

> 1. That the all-American canal, or an equivalent high-line canal, from the Laguna Dam into the Imperial Valley be constructed under one of the above-noted methods or under some other similar procedure for financing the enterprise, and that Congress pass such laws as may be necessary to put into effect any plan that may be agreed upon between the Secretary of the Interior and the Imperial Irrigation District.

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2. That the connection of the Imperial Canal with the Laguna Dam be made at once.

* * * * *

7. The United States should undertake the early construction of storage reservoirs on the drainage basin of the Colorado River as part of a comprehensive plan for the betterment of the water-supply conditions throughout the entire basin of this river. The stored water should be made available for power and irrigation at a fair charge for this service. By storage on a large scale in well-distributed reservoirs the peak of the lower river's flood discharge will be cut down and the menace to the submersible lands along the Colorado River below the Grand Canyon, and in particular to the delta region and the Imperial Valley, will be reduced.

With respect to water conservation by storage, the report stated:

Whenever the river drops to a low stage early in the season, as was the case, for example, in 1915 and in 1918, the demand of the irrigator upon the lower river will be in excess of the water supply. This situation will become more pronounced when all the land in Imperial Irrigation District and in the Yuma project susceptible of cultivation shall have been brought under irrigation.

The irrigated lands and the lands susceptible of irrigation with water from the lower Colorado River are therefore directly concerned with the conservation of the river's flow, and particularly with the regulation thereof by storage. The construction of storage reservoirs should go hand in hand with the building of any irrigation system that will add so large a body of arid land to the irrigable area as would the construction of a full-capacity all-American canal.

When, therefore, project features are outlined for the full utilization of such a canal, or its equivalent, there should be assurance that some water will be obtainable for it from storage. It is assumed that within the time that such a canal could be built the United States Gov-

> ernment will have made suitable provision for storage works that will be of general benefit.
>
> Calif. Ex. 185 (p. 23)

After reviewing some of the facts relative to the problem of controlling the river below the International Boundary the Board observed:

> These facts are recited because the usefulness of an all-American or any other canal for the irrigation of lands in the Imperial Valley would soon be in large measure destroyed if adequate protection is not had against the danger from the south which threatens the area already under irrigation. This danger, moreover, will continue to grow so long as the Colorado River is allowed to run wild in the Volcano Lake region. It is evident that the problem of irrigation in the Imperial Valley is interwoven with the other problem of protection against the river at its high stages.
>
> Calif. Ex. 185 (p. 22)

Subsequently, in similar vein:

> The situation as described is serious, and the menace is growing. The control of the lower river is an international problem. The area to be protected by putting the river upon a direct course to the gulf lies in both Mexico and the United States. No time is to be lost in dealing with the problem, which can not be adequately handled by the Imperial Irrigation district.
>
> The construction of an all-American canal, while it may relieve the irrigated areas in California from compliance with the conditions named in the Mexican concession, will not solve this other problem, which is also of vital importance to Imperial Valley.
>
> Calif. Ex. 185 (p. 29)

Finding 1.15

Before the Report of the All-American Canal Board was completed, another agreement, dated October 23, 1918, was entered into between the United States and Imperial Irrigation District. This agreement provided that the District should

proceed with diligence to secure additional data which, with other data and the data to be gathered under the agreement of February 16, 1918, "will constitute a complete detailed survey with specifications and estimates of cost" for (a) all works and structures necessary for the diversion at Laguna Dam, "thence through [the] existing main canal of the Yuma project" to the point known as Siphon Drop, of "all water needed by the District for the irrigation of its lands * * *," and (b) a main canal entirely within the United States "of sufficient capacity and proper construction to irrigate all lands in Imperial County, State of California, susceptible of economic irrigation from said canal." The agreement further provided, among other things, that upon approval by the Secretary of the Interior of such survey, specifications, and estimates, the District at its cost would begin and carry to completion with due diligence "the work of construction and installation at Laguna Dam and on the main canal * * * contemplated by this agreement * * *."

Calif. Ex. 184 (par. 6, par. 7)

This contract was referred to in the Fall-Davis report (see Finding 1.16) in this language:

> The construction of a high-line canal is provided for in a contract with the United States dated October 23, 1918. In addition to this the district is pledged to connection with the Laguna Dam by contract with the Yuma County Water Users' Association in order to terminate the dangerous practice of maintaining a diversion dam at Hanlon Heading. This connection should be made at the earliest possible date in accordance with the existing understandings and contracts.
>
> Plf. Ex. 45 (p. 12)

The connection with Laguna Dam contemplated by the October 23, 1918, contract was never made.

Finding 1.16

By the Act of May 18, 1920 (41 Stat. 600), Congress took cognizance of the problems hereinabove reviewed. The Sec-

retary of the Interior was directed to have made an examination of Imperial Valley with a view to determining the unirrigated lands of said valley which could be irrigated at reasonable cost, and the character and cost of an irrigation system adequate for irrigation of all such lands in said valley and adjacent thereto, by diversion of water from the Colorado River at Laguna Dam. Among other things, the Secretary was further directed to report in detail as to the character and estimated cost of the plan or plans on which he might report, "and if the said plan or plans shall include storage, the location, character, and cost of said storage, and the effect on irrigation development of other sections or localities of the storage recommended and the use of the stored water in the Imperial Valley and adjacent lands."

Plf. Ex. 5

Responsive to the Act of May 18, 1920, commonly known as the Kinkaid Act, the Secretary of the Interior, under date of February 28, 1922, submitted his report to the President of the Senate. The report was printed as Senate Document No. 142, 67th Congress, 2d Session, and is commonly known as the Fall-Davis report. The recommendations of that report were as follows:

> 1. It is recommended that through suitable legislation the United States undertake the construction with Government funds of a high-line canal from Laguna dam to the Imperial Valley, to be reimbursed by the lands benefited.
>
> 2. It is recommended that the public lands that can be reclaimed by such works be reserved for settlement by ex-service men under conditions securing actual settlement and cultivation.
>
> 3. It is recommended that through suitable legislation the United States undertake the construction with Government funds of a reservoir at or near Boulder Canyon on the lower Colorado River to be reimbursed by the revenues from leasing the power privileges incident thereto.

4. It is recommended that any State interested in this development shall have the right at its election to contribute an equitable part of the cost of the construction of the reservoir and receive for its contribution a proportionate share of power at cost to be determined by the Secretary of the Interior.

5. It is recommended that the Secretary of the Interior be empowered after full hearing of all concerned to allot the various applicants their due proportion of the power privileges and to allocate the cost and benefits of a high-line canal.

6. It is recommended that every development hereafter authorized to be undertaken on the Colorado River by Federal Government or otherwise be required in both construction and operation to give priority of right and use:

First. To river regulation and flood control.

Second. To use of storage water for irrigation.

Third. To development of power.

Plf. Ex. 45

Finding 1.17

The Fall-Davis report, which is entitled "Problems of Imperial Valley and Vicinity," opens with this statement:

The control of the floods and development of the resources of the Colorado River are peculiarly national problems for several good reasons:

1. The Colorado River is international.

2. The stream and many of its tributaries are interstate.

3. It is a navigable river.

4. Its waters may be made to serve large areas of public lands naturally desert in character.

5. Its problems are of such magnitude as to be beyond the reach of other than national solution.

Plf. Ex. 45 (p. 1)

Under the heading "Urgency of Relief," the factual review opens with these paragraphs:

In the valleys of the lower Colorado, and especially the Imperial Valley, storage is needed for the extension

> of irrigation and for safety against drouth of the areas already irrigated when the cycle of low years rolls around.
>
> The need is also vital for protection from floods of the Colorado which theaten the levees along the river valley and which are a constant menace to the Imperial Valley, threatening a repetition of the experience of 1906. Both of these problems are urgent and vital.
>
> Plf. Ex. 45 (p. 5)

In addition to lands in the Imperial Valley, in Mexico as well as in California, the report considers the relationship of the plan therein proposed to existing and contemplated irrigation and development of lands in the Upper Basin, and in the Yuma, Palo Verde, Parker (Colorado River Indian Reservation) and Mohave Valleys "and at some other points where development has been undertaken, or is likely to be undertaken in the near future * * *." At page 6 of the report the following appears:

> The above data are certainly convincing that no large area, such as the East Mesa lands and Coachella Valley, can be added to the irrigated acreage without certainty of water shortage, or if so added would constitute a serious menace to the water supply of the present irrigated lands in the Imperial and Yuma valleys unless a large amount of storage be provided.
>
> Plf. Ex. 45 (p. 6) and see App. C

Finding 1.18

Subsequent to passage of the Kinkaid Act, the Congress of the United States, by the Act of August 19, 1921 (42 Stat. 71), gave its consent to the States of Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming, to negotiate and enter into a compact not later than January 1, 1923, providing for an equitable division and apportionment among said States of the water supply of the Colorado River and of the streams tributary thereto. Such consent was conditioned upon the participation in such negotiations by a person to be appointed by the President who would act as representative of and for the protection of the interests of the United States.

The Act further provided that any such compact should not be binding or obligatory upon any of the parties thereto until approved by the legislature of each of the States and by the Congress of the United States.

Plf. Ex. 5; Sp. Master's Ex. 4 (p. A13)

The Act of August 19, 1921, was preceded by the appointment by the several States of their respective commissioners for the negotiation of such an agreement, and by the joint request by the several Governors to the President for the appointment of a representative of the United States to represent the interests of the United States. (Preamble, Act of August 19, 1921.) The preamble of the act further recited:

> Whereas the territory included within the drainage area of the said stream and its tributaries is largely arid and in small part irrigated, and the present and future development necessities and general welfare of each of said States and of the United States require the further use of the waters of said streams for irrigation and other beneficial purposes, and that future litigation and conflict respecting the use and distribution of said waters should be avoided and settled by compact between said States; and * * *.

In recommending passage of H.R. 6877, which upon enactment became the Act of August 19, 1921, the Committee on the Judiciary of the House of Representatives stated:

> The purpose of this bill is to permit the States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming to enter into an agreement for the equitable division and apportionment of the water supply of the Colorado River. The necessity for this grows out of the possibility of conflict in the diversion and use of the waters of the Colorado River in the various States through which the river and its tributaries flow. Without an agreement between the States interested respecting the division and apportionment of the waters for irrigation purposes, conflicts as to the amount of water which may be diverted on the various portions of the river and its tributaries, without interference with di-

version and use elsewhere, are certain to occur and to lead to expensive litigation, in the meanwhile holding up and preventing development. Most irrigation projects on the Colorado River and its tributaries involve large expenditures, and complete or even considerably further development can not be had or secured without an agreement under which development can be carried on without conflict and litigation.

House Report No. 191, 67th Cong., 1st Session

Finding 1.19

On November 24, 1922, agreement was reached by the compact commissioners representing the seven States of the Colorado River basin and the representative of the United States signed the agreement to indicate his approval. The agreement so reached is known as the Colorado River Compact. It was promptly ratified by the legislatures of all of the seven states except Arizona. When ratification by Arizona was not forthcoming, the other states in 1925 waived the Compact's requirement of seven-state approval and ratified the same to become effective upon approval by at least six of the states and consent of the United States. Utah's 1925 act of ratification was repealed in 1927.

Plf. Ex. 1, Sp. Master's Ex. 4 (p. A17); Sp. Master's Ex. 4 (pp. A135–A145; A147–A157), Plf. Ex. 16–22, 24–25

By section 13 of the Act of December 21, 1928 (45 Stat. 1057), commonly known as the Boulder Canyon Project Act and hereinafter referred to as the Project Act, Congress gave its consent to the Colorado River Compact, waiving the Compact's requirement of seven-state approval, and provided that "this approval shall become effective when the State of California and at least five of the other states mentioned, shall have approved or may hereafter approve said Compact as aforesaid and shall consent to such waiver, as herein provided." Section 4(a) of the Project Act provided that the Act should not take effect and no authority should be exercised there-

under unless and until (1) all of the States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming had ratified the Compact, or (2) if all of said States failed to ratify the Compact within six months from passage of the Act, until the same should be ratified by six of such States, including California, and California should agree to certain limitations upon "the aggregate annual consumptive use (diversions less returns to the river) of water of and from the Colorado River for use in the State of California."

Sp. Master's Ex. 4 (p. A213), Plf. Ex. 7

Ratification by Arizona did not occur within the six-month period specified in Section 4(a) of the Project Act. By an Act of March 4, 1929, the State of California again waived the Compact's requirement of seven-state approval and provided that the Compact should become binding and obligatory upon the State of California when at least six of the signatory states should likewise have waived the requirement of seven-state approval and ratified the same without such approval, and the United States should have consented thereto. By a separate act of the same date, California agreed to the limitation upon aggregate annual consumptive use of Colorado River water for use in California required by Section 4(a) of the Project Act as a condition to that act's becoming effective in the absence of approval of the Compact by all seven signatory States.

Plf. Ex. 13; Sp. Master's Ex. 4 (p. A161); Plf. Ex. 14; Sp. Master's Ex. 4 (p. A231)

By Act of March 6, 1929, the State of Utah again waived the Compact's requirement of seven-state approval and agreed that the Compact should become binding upon Utah upon approval by at least six of the states and consent by the United States.

Plf. Ex. 22; Sp. Master's Ex. 4 (p. A163)

Under date of June 25, 1929, the President of the United States issued Public Proclamation No. 1882 (46 Stat. 300).

In accord with Section 4(a) of the Project Act, it was declared (1) that the seven states referred to in Section 13(a) of the Project Act had not ratified the Colorado River Compact within six months after passage and approval of that Act, (2) that all of those states except Arizona had consented to waive the Compact's requirement of seven-state approval and had approved the Compact without condition except that of six-state approval as prescribed in Section 13(a) of the Project Act, (3) that the State of California had met the requirements of Section 4(a) of the Project Act necessary to render that Act effective on six-state approval of the Compact, and (4) that the Boulder Canyon Project Act was effective that date.

Plf. Ex. 3; Sp. Master's Ex. 4 (p. A233)

By Act of February 24, 1944, the State of Arizona "unconditionally approved, ratified, and confirmed" the Colorado River Compact.

Plf. Ex. 10; Sp. Master's Ex. 4 (p. A165)

Finding 1.20

The Colorado River Compact did not accomplish a division or apportionment of the waters of the river system between the States of the basin. Instead, it provided for division of the river basin into an Upper Basin and a Lower Basin, and apportioned "the use of part of the water of the Colorado River System * * * to each of them with the provision that further equitable apportionments may be made" (Article I).

The provisions of the Colorado River Compact pertinent to this controversy are contained in Articles II, III and VII.

Plf. Ex. 1, Sp. Master's Ex. 4 (p. A17)

Finding 1.21

In addition to extending the consent of Congress to the Colorado River Compact upon the terms therein stated, the Boulder Canyon Project Act authorized the Secretary of the Interior to construct, operate and maintain "a dam and incidental works in the main stream of the Colorado River at Black Canyon or Boulder Canyon adequate to create a storage reservoir of a capacity of not less than twenty million acre-

feet of water and a main canal and appurtenant structures located entirely within the United States connecting the Laguna Dam, or other suitable diversion dam * * * with the Imperial and Coachella Valleys in California * * *."

Plf. Ex. 7, Sp. Master's Ex. 4 (p. A213)

Finding 1.22

Construction of Hoover Dam was initiated on September 17, 1930, and water was first impounded on February 1, 1935. The first power was generated on September 11, 1936.

Hoover Dam is the principal structure of the Lower Basin main stream development. It impounds the waters of the Colorado River to form Lake Mead. It is situated in Black Canyon on the main channel of the Colorado River 330 miles above the upper Mexican border. The middle of the channel of the river at the site in question is the common boundary between the States of Nevada and Arizona.

This is the world's highest dam: a concrete arch, gravity-type structure having a height of 726.4 feet and a hydraulic height of 575.8 feet. There have been constructed in connection with it two side-channel spillways with a capacity of 400,000 cubic feet of water per second of time. The outlet works have a capacity of 91,000 c.f.s. The power plant discharge (17 turbines) is 30,560 c.f.s. The rating of the generators presently installed, including two small station-service units, is 1,249,800 kw. Ultimately the generator rating installation will be 1,354,300 kw.

Total original, unsilted storage capacity of Lake Mead was 32,359,000 acre-feet. At elevation 1229, the maximum surface area is 162,700 acres. The present usable capacity is approximately 27,200,000 acre-feet.

Additional structures have since been constructed by the United States on the main stream of the Colorado River below Hoover Dam. These are Davis Dam, 67 miles below Hoover, Parker Dam, 155 miles below Hoover, Headgate Rock Dam, 170 miles below Hoover, Palo Verde Dam, approximately 212 miles below Hoover, and Imperial Dam, 303 miles below Hoover.

These structures and the purposes they serve are hereinafter referred to in greater detail.

Pre-Trial Order, Agreed Facts, Stipulation I, pp. I–12—I–16

Conclusion 1.1

The Boulder Canyon Project Act was enacted by Congress in valid exercise of its powers (1) to control the navigable waters of the United States for the purposes of commerce, including, *inter alia,* the control of floods, improvement of navigation, power production, and watershed and river development, *Oklahoma* v. *Atkinson Co.,* 313 U.S. 508 (1941); *Arizona* v. *California,* 283 U.S. 423 (1931); *United States* v. *Appalachian Power Co.,* 311 U.S. 377 (1940); (2) to promote the general welfare through large-scale projects for reclamation, irrigation, and other internal improvement, *United States* v. *Gerlach Co.,* 339 U.S. 725 (1950); and (3) to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States. *Constitution of the United States,* Article IV, Section 3, Clause 2.

Conclusion 1.2

The requirement by Section 4(a) of the Project Act that, in the absence of seven-state ratification of the Colorado River Compact, the State of California agree to a limitation upon the aggregate annual consumptive use of Colorado River water for use in California as a condition precedent to the Act's taking effect and the expenditure of any moneys thereunder was a reasonable condition relevant to the federal interest in the project and to the over-all objectives thereof.

Similarly, the provision of Section 5 of the Project Act that "No person shall have or be entitled to have the use for any purpose of the water stored" in the reservoir authorized by Section 1 except by contract made by the Secretary of the Interior in conformity with "paragraph (a) of Section 4" of the Act is a reasonable condition and limitation on the use of federal funds, federal property, and federal privileges. *Ivanhoe Irrig. Dist.* v. *McCracken,* 357 U.S. 275 (1958).

Finding 1.23

Under date of February 21, 1930, representatives of the Metropolitan Water District of Southern California, the

Coachella Valley County Water District, the Imperial Irrigation District, the Palo Verde Irrigation District, and others interested in the use of Colorado River water in California executed an instrument stating they had reached an understanding "for the division of Colorado River water which will be available to California upon the following basis":

> Class A water: Agricultural groups, 3,850,000 acre-feet per annum; Metropolitan District, 550,000 acre-feet per annum; total 4,400,000 acre-feet per annum.
>
> Next 550,000 acre-feet per annum, available for California use; Metropolitan District, 550,000 acre-feet per annum.
>
> All water in river available for California use in excess of above 4,950,000 acre-feet per annum: Agricultural group, all.

Plf. Ex. 26

Finding 1.24

On April 24, 1930, the Secretary of the Interior executed an agreement with the Metropolitan Water District of California providing for the delivery of water to be stored by Hoover Dam. This was the first water delivery contract made by the Secretary under authority of Section 5 of the Project Act.

Plf. Ex. 38

Finding 1.25

The agreement of February 21, 1930, between the principal prospective users in California of the waters to be stored by Hoover Dam was submitted to the Secretary of the Interior. However, on November 5, 1930, the Secretary of the Interior, by letter addressed to the Imperial Irrigation District, called attention to the essentiality of a more specific division of California's share of Colorado River water among the various California interests for the drafting and execution of water-delivery contracts with those interests. He suggested that the California Division of Water Rights might submit recommendations for such division and that such allocation, when finally determined, presumably through agreement of all interests and

approval by the proper State authority, might be included as a uniform clause in every California water contract.

Calif. Ex. 1810

Finding 1.26

In response to the Secretary of the Interior's suggestion, an agreement dated August 18, 1931, was arrived at between Palo Verde Irrigation District, Imperial Irrigation District, Coachella Valley County Water District, Metropolitan Water District of Southern California, City of Los Angeles, City of San Diego, and County of San Diego. By this agreement these seven parties adopted a table of apportionments and priorities of water of and from the Colorado River for use in California and requested the California Division of Water Resources to recognize the same in all matters relating to State authority "and to recommend the provisions of Article I hereof to the Secretary of the Interior of the United States for insertion in any and all contracts for water made by him pursuant to the terms of the Boulder Canyon Project Act * * *." They further agreed that in every water contract which any of the parties might thereafter enter into with the United States, provisions in accordance with Article I should be included "if agreeable to the United States."

Plf. Ex. 27

This agreement is commonly, and is hereinafter, referred to as the "Seven Party Agreement." So for as here pertinent, Article I thereof is as follows:

ARTICLE I

> The waters of the Colorado River available for use within the State of California under the Colorado River Compact and the Boulder Canyon Project Act shall be apportioned to the respective interests below named and in amounts and with priorities therein named and set forth, as follows:

SEC. 1. A first priority to Palo Verde Irrigation District for beneficial use exclusively upon lands in said district as it now exists and upon lands between said district and the Colorado River, aggregating (within and without said district) a gross area of 104,500 acres, such waters as may be required by said lands.

SEC. 2. A second priority to Yuma Project of the United States Bureau of Reclamation for beneficial use upon not exceeding a gross area of 25,000 acres of land located in said project in California, such waters as may be required by said lands.

SEC. 3. A third priority (a) to Imperial Irrigation District and other lands under or that will be served from the All-American Canal in Imperial and Coachella Valleys, and (b) to Palo Verde Irrigation District for use exclusively on 16,000 acres in that area known as the "Lower Palo Verde Mesa," adjacent to Palo Verde Irrigation District for beneficial consumptive use, 3,850,000 acre-feet of water per annum less the beneficial consumptive use under the priorities designated in sections 1 and 2 above. The rights designated (a) and (b) in this section are equal in priority. The total beneficial consumptive use under priorities stated in sections 1, 2, and 3 of this article shall not exceed 3,850,000 acre-feet of water per annum.

SEC. 4. A fourth priority to the Metropolitan Water District of Southern California and/or the City of Los Angeles, for beneficial consumptive use, by themselves and/or others, on the coastal plain of Southern California, 550,000 acre-feet of water per annum.

SEC. 5. A fifth priority (a) to the Metropolitan Water District of Southern California and/or the City of Los Angeles, for beneficial consumptive use, by themselves and/or others, on the coastal plain of southern California, 550,000 acre-feet of water per annum and (b) to the City of San Diego and/or County of San Diego, for beneficial consumptive use, 112,000 acre-feet of water per annum. The rights designated (a) and (b) in this section are equal in priority.

SEC. 6. A sixth priority(a) to Imperial Irrigation District and other lands under or that will be served from the All-American Canal in Imperial and Coachella Valleys, and (b) to Palo Verde Irrigation District for use exclusively on 16,000 acres in that area known as the "Lower Palo Verde Mesa," adjacent to Palo Verde Irrigation District, for beneficial consumptive use, 300,000 acre-feet of water per annum. The rights designated (a) and (b) in this section are equal in priority.

SEC. 7. A seventh priority of all remaining water available for use within California, for agricultural use in the Colorado River Basin in California, as said basin is designated on map No. 23000 of the Department of the Interior, Bureau of Reclamation."

* * * * *

SEC. 12. The priorities hereinbefore set forth shall be in nowise affected by the relative dates of water contracts executed by the Secretary of the Interior with the various parties."

By Article III of this agreement, all the parties requested that the April 24, 1930, agreement between the United States and Metropolitan Water District be amended in conformity with Article I.

Finding 1.27

On September 28, 1931, the Secretary of the Interior, as provided by Section 5 of the Project Act, issued general regulations relating to "Contracts for the Storage of Waters in Boulder Canyon Reservoir, Boulder Canyon Project, and the Delivery Thereof." Among other things, these regulations provided that "deliveries of water to users in California shall be in accordance with the following recommendation of the State Division of Water Resources." The recommendation then quoted duplicates Article I of the Seven Party Agreement.

Calif. Ex. 1811

Finding 1.28

A supplementary contract dated September 28, 1931, was entered into between the United States and the Metropolitan

Water District of Southern California. This supplementary contract amended the contract of April 24, 1930, so as to change the point of delivery previously provided for and so as to make the provisions of the basic contract respecting the delivery of stored water conform to Article I of the Seven Party Agreement as requested by Article III thereof.

Plf. Ex. 39

As so amended, this contract provides, *inter alia*, that "subject to the availability thereof for use in California under the Colorado River Compact and the Boulder Canyon Project Act," the United States shall, from storage available in Lake Mead, deliver annually to the District at its point of diversion, "so much water as may be necessary to supply the District a total quantity, including all other waters diverted by the District from the Colorado River, in the amounts and with priorities in accordance with the recommendation of the Chief of the Division of Water Resources of the State of California, as follows." There is then set forth verbatim Article I in its entirety of the Seven Party Agreement.

Certain reservations and limitations on the delivery obligation of the United States which follow this quotation from the Seven Party Agreement need not be detailed in this connection.

Finding 1.29

Thereafter, contracts containing provisions substantially identical with those of the Metropolitan Water District contract detailed in Finding 1.28 were entered into between the United States and, respectively, the Imperial Irrigation District, dated December 1, 1932, the Palo Verde Irrigation District, dated February 7, 1933, the City of San Diego, dated February 15, 1933, and the Coachella Valley County Water District, dated October 15, 1934.

Plf. Exs. 34, 33, 40, 36

The execution of their respective contracts by Imperial Irrigation District, Palo Verde Irrigation District, and Coachella Valley County Water District has been confirmed by decree of courts of competent jurisdiction.

Calif. Ex. 208; Calif. Ex. 342; Calif. Ex. 308

Finding 1.30

The contract of February 7, 1933, with the City of San Diego contemplated use of the All-American Canal for transportation of the water to be delivered and provided for delivery at a point in the Colorado River immediately above Imperial Dam. A contract of October 2, 1934, between the United States and the City of San Diego provided for repayment by the City of a part of the cost of the All-American Canal and Imperial Dam.

Calif. Ex. 486

However, under date of October 17, 1945, the United States agreed with the City of San Diego to construct an aqueduct running from a connection with the Colorado River Aqueduct of the Metropolitan Water District to San Vicente Reservoir in San Diego County and, upon completion thereof, to lease the same to the City for use in its water system upon the basis set forth in the contract. The Act of April 15, 1948 (62 Stat. 171) ratified that contract and the actions of the various departments and agencies of the Federal Government in connection therewith. By supplemental contract of September 23, 1946, between the United States, the City of San Diego, and the San Diego County Water Authority, the October 17, 1945, contract was assigned to the Authority, subject to certain conditions and contingencies not here important. Under date of October 4, 1946, the United States, the City of San Diego, the San Diego County Water Authority, and the Metropolitan Water District agreed that, subject to the annexation of the corporate area of the Authority to the corporate area of the District, the rights of the City under its contract of February 7, 1933, were transferred to the District and merged with and added to the rights of the District under its water-delivery contract "without reference to priority as between the Authority and any other part or parts of the District." This assignment and merger was subject to the proviso that, as between the District (including the Authority) and the United States and other parties to the Seven Party agreement, nothing therein should be construed as increasing the amount of water available to the District and/or the Authority under the fourth priority

of the Seven Party Agreement or otherwise prejudicing the respective rights of other parties to the Seven Party Agreement in the water of the Colorado River.

Calif. Ex. 490; Calif. Ex. 500; Calif. Ex. 491; Plf. Ex. 41

The agreement of October 4, 1946, also provided for changing the point of delivery specified in the February 7, 1933, contract to the Metropolitan Water District's intake above Parker Dam.

Satisfaction of the conditions to which the 1946 modification of the February 7, 1933, contract was subject was evidenced by a contract dated March 17, 1947, between the City of San Diego and the Metropolitan Water District.

Plf. Ex. 42

Finding 1.31

Construction of the All-American Canal for the delivery of Colorado River water to lands in the Imperial and Coachella Valleys in California, as authorized by Section 1 of the Project Act, was initiated by the Secretary of the Interior in August, 1934, and the canal was first utilized for the transportation of Colorado River water into Imperial Valley in October, 1940. Imperial Irrigation District was first fully served by the All-American Canal on February 12 or 13, 1942.

Tr. 7,764–68; 7,776; 7,783

As a diversion structure for that canal the Secretary of the Interior, pursuant to the authorization under Section 1 of the Project Act, determined to build and built Imperial Dam rather than connecting the canal to Laguna Dam. Imperial Dam is situated on the main stream of the Colorado River about 18 miles above Yuma, Arizona. It is a slab and buttress-type concrete facility with a structural height of 31 feet at the overflow sections and a hydraulic height of 23 feet. It now serves as the diversion point for the Gila Project in Arizona, hereinafter referred to, and for the Yuma Project, as well as for the All-American Canal. Laguna Dam, which is situated on the main stream about five miles downstream from Imperial Dam and which was originally the diversion

dam for the Yuma Project, is no longer used as a diversion structure.

Plf. Ex. 34; Pre-Trial Order, Agreed Facts, Stipulation I, pp. I–15—I–17

Repayment to the United States of the cost of constructing the All-American Canal and Imperial Dam is provided for under the contracts of December 1, 1932, and October 15, 1934, with Imperial Irrigation District and Coachella Valley County Water District, respectively, and the contract of October 2, 1934, between the United States and the City of San Diego.

The All-American Canal, including the Coachella Main Canal, is of sufficient capacity fully to utilize the quantities of water specified in Sections 3 and 6 of the Seven Party Agreement, and in the Imperial Irrigation District and Coachella Valley County Water District water-delivery contracts, for use in Imperial and Coachella Valleys.

Plf. Exs. 34, 36; Calif. Ex. 482

Finding 1.32

Parker Dam was constructed by the United States under a cooperative contract dated February 10, 1933, with the Metropolitan Water District of Southern California. Although the contract provided that the funds for its construction were to be advanced by the District, it further provided that title to the dam and all other structures erected by the United States is to remain in the United States.

Calif. Ex. 459

In *United States* v. *Arizona,* 295 U.S. 174 (1935), it was determined that the Secretary of the Interior was not authorized under existing law to construct this dam. Thereupon, Congress, by Section 2 of the Act of August 30, 1935 (49 Stat. 1039), authorized and adopted the project "for the purpose of controlling floods, improving navigation, regulating the flow of the streams of the United States, providing for storage and for the delivery of the stored waters thereof, for the reclamation of public lands and Indian reservations, and other beneficial

uses, and for the generation of electric energy as a means of financially aiding and assisting such undertakings * * *." This act of authorization further validated and ratified all contracts which had been executed in connection therewith and authorized the making of all necessary additional and amendatory contracts.

Calif. Ex. 472

Several contracts, supplemental to the February 10, 1933, contract between the United States and Metropolitan Water District, relative to the construction of Parker Dam and incidental works, the operation thereof and of the Parker power plant, and allocation of energy produced were made. Varying provisions respecting the costs of construction, operation and maintenance were included therein.

Calif. Exs. 460, 461, 462, 463

As set forth in finding 1.22, Parker Dam is situated on the main channel of the Colorado River 155 miles below Hoover Dam, and 17 miles above Parker, Arizona. The reservoir which it creates is called Lake Havasu. It is a concrete variable-radius arch structure with power plant intakes and penstocks through the abutments on the California end of the dam. The structural height of the dam is 320 feet and the hydraulic height is 75 feet. The overflow spillway is controlled by five 50 ft. x 50 ft. regulating gates. There has been constructed in connection with it a power plant with four 30,000 kw. units for a total of 120,000 kw. The total original, unsilted storage capacity of Havasu Lake was 717,000 acre-feet. Construction of Parker Dam was initiated on October 1, 1934, and water was first impounded on June 29, 1938. The first power was generated on December 13, 1942.

Agreed Facts, Pre-Trial Order, Stipulation I, p. I–14

Finding 133

The Metropolitan Water District diverts the waters of the Colorado River from Lake Havasu through its intake above Parker Dam and transports the same through its Colorado River Aqueduct for distribution and use in the coastal plain area of Southern California. The capacity of the Colorado

River Aqueduct is sufficient fully to utilize the quantities of water specified in Sections 4 and 5 of the Seven Party Agreement, and in the Metropolitan Water District's water-delivery contract, modified as set forth in Finding 1.30, for use on the coastal plain of Southern California, including the City of San Diego and the County of San Diego.

Agreed Facts, Pre-Trial Order, Stipulation I, p. I–13; Calif. Ex. 455 (p. 14)

Finding 1.34

Pursuant to the Act of August 31, 1954 (68 Stat. 1045), and a contract dated October 7, 1955, with Palo Verde Irrigation District, the United States has constructed on the main stream of the Colorado River Palo Verde Dam as a diversion structure for the Palo Verde Irrigation District, in place of the former structure known as Palo Verde Weir. The Palo Verde Weir and the Dam which replaces it serve to raise the level of the water in the river so that it can be diverted into the canal system of the Palo Verde Irrigation District.

Calif. Ex. 361; Agreed Facts, Pre-Trial Order, Stipulation I, p. I–15; Tr. 8,706

Finding 1.35

Water for service of the Reservation Division, in California, of the Yuma Reclamation Project (as well as for the Valley Division of that Project in Arizona) is now diverted at Imperial Dam and thence carried through the All-American Canal to Siphon Drop. At Siphon Drop, most of the water required for service of the lands within the Yuma Project is diverted from the All-American Canal into the Yuma Main Canal, although there are several turnouts from the All-American Canal for the diversion of water to lands of the Reservation Division between Imperial Dam and Siphon Drop. From Imperial Dam to Siphon Drop the All-American Canal has 2,000 second feet of capacity for the transportation of water for the Yuma Project. The capacities of the All-American Canal and the Yuma Main Canal are sufficient fully to utilize the waters of the Colorado River required for beneficial use on the lands of

the Yuma Project, including those located in said Project in California referred to in Section 2 of the Seven Party Agreement and in each of the water-delivery contracts with California users referred to in Findings 1.28 and 1.29, *supra*.

Tr. 8,814–15; 8,817–19; Plf. Ex. 34 (Arts. 7, 15); Tr. 8,818–19; 8,824–27

The Reservation Division of the Yuma Reclamation Project includes lands of the Yuma Indian Reservation and a so-called non-Indian section. All project construction charges have been paid on substantially all of the Indian lands within the Project. Contracts in the form of water-right applications for the delivery and use of project water exists between the Secretary of the Interior and the owners of substantially all lands in the non-Indian portion of the Project. All but a small part of the construction charges on the lands within the non-Indian portion of the Project have also been paid.

Tr. 8,820; 8,824; 8,817; 8,854; 8,859; Calif. Ex. 381; Tr. 8,855–6; 8,820; 8,850; Calif. Exs. 377, 378, 379, 380; Tr. 8,854

Conclusion 1.3

Valid contracts for the delivery of Colorado River water stored by Hoover Dam, made in pursuance of Section 5 of the Boulder Canyon Project Act, and in conformity with paragraph (a) of Section 4 of that Act, exist between the United States and the Palo Verde Irrigation District, the Imperial Irrigation District, the Coachella Valley County Water District, and the Metropolitan Water District of Southern California. The contracts between the United States and the individual land-owners in the Reservation Division of the Yuma Project likewise constitute compliance with the provisions of Section 5 of the Project Act. With respect to the Indian lands within the Reservation Division of the Yuma Project, Section 5 of the Project Act is not to be construed as requiring contracts by the Secretary of the Interior with himself respecting the delivery of Colorado River water, stored or otherwise, for use on lands under his sole jurisdiction.

Conclusion 1.4

By reason of the several water delivery contracts mentioned in Conclusion 1.3, but subject to and including—

(1) the rights of the United States in connection with the Reservation Division of the Yuma Reclamation Project,

(2) the rights of the United States in connection with the Fort Mohave, Colorado River, and Chemehuevi Indian Reservations in California, hereinafter referred to, and

(3) such other rights of the United States hereinafter enumerated to the use of Colorado River System water in California as are hereby determined to be included within the California entitlement to the use of water of and from the Colorado River,

and subject to—

(1) those rights, interests, and obligations of the United States hereinafter enumerated with respect to use of the waters of the Colorado River System available for use in the Lower Basin which are hereby determined not to be limited or restricted by the entitlements of the several Lower Basin States,

(2) the provisions of Section 4(a) of the Project Act and the California Limitation Act, and

(3) such other matters hereinafter enumerated, including the water supply in the Colorado River from time to time available for use in the Lower Basin, as affect the physical and legal availability of Colorado River water for use in California under the Colorado River Compact and the Project Act,

the State of California is entitled to have delivered from storage in Lake Mead, in accordance with the provisions of said contracts, such quantities of water as may be necessary to provide for the aggregate annual consumptive use of water of and from the Colorado River for use in California in an amount of 5,362,000 acre-feet.

Finding 1.36

Under authority of Section 5 of the Project Act, the Secretary of the Interior, on February 7, 1933, issued "General Regulations for the Storage of Water in Boulder Canyon Reservoir and the Delivery Thereof in Arizona." Those regulations stated the form of a water delivery contract which the United States would at that time enter into with the State of Arizona, subject to certain conditions therein stated.

The proposed contract made a part of these regulations would have provided for the delivery from storage in Lake Mead of "so much available water as may be necessary to enable the beneficial consumptive use in Arizona of not to exceed * * * 2,800,000 acre-feet annually by all diversions affected [*sic*] from the Colorado River and its tributaries below Lee Ferry (but in addition to all uses from waters of the Gila River and its tributaries), subject to [certain] provisions."

Plf. Ex. 28

Arizona did not enter into the proposed contract, and those regulations were withdrawn by letter dated June 29, 1933, from the Secretary of the Interior to the Governor of Arizona.

Plf. Ex. 29

Finding 1.37

Under date of February 9, 1944, a contract between the United States and the State of Arizona for the delivery of stored water for use in Arizona, as provided for by Section 5 of the Project Act, was executed. Paragraph 14 thereof provided that the contract should not be effective unless unconditionally ratified by an Act of the Legislature of Arizona within three years from the date thereof and unless within such three-year period Arizona should unconditionally ratify the Colorado River Compact.

Plf. Ex. 32

As set forth in Finding 1.19, *supra,* the State of Arizona unconditionally ratified the Compact by Act of its legislature of February 24, 1944, approved by the Governor of Arizona the same day. By separate act of the same date the Arizona legislature unconditionally "ratified, approved and confirmed" the

water delivery contract dated February 9, 1944, and that act also was approved by the Governor of Arizona the same day.

Sp. Master's Ex. 4 (p. A559)

Finding 1.38

The pertinent portions of the Arizona contract of February 9, 1944, relating to the delivery of water are as follows:

> 7. (a) Subject to the availability thereof for use in Arizona under the provisions of the Colorado River Compact and the Boulder Canyon Project Act, the United States shall deliver and Arizona, or agencies or water users therein, will accept under this contract each calendar year from storage in Lake Mead, at a point or points of diversion on the Colorado River approved by the Secretary, so much water as may be necessary for the beneficial consumptive use for irrigation and domestic uses in Arizona of a maximum of 2,800,000 acre-feet.
>
> (b) The United States also shall deliver from storage in Lake Mead for use in Arizona, at a point or points of diversion on the Colorado River approved by the Secretary, for the uses set forth in subdivision (a) of this Article, one-half of any excess or surplus waters unapportioned by the Colorado River Compact to the extent such water is available for use in Arizona under said compact and said act, less such excess or surplus water unapportioned by said compact as may be used in Nevada, New Mexico, and Utah in accordance with the rights of said states as stated in subdivisions (f) and (g) of this Article.
>
> (c) This contract is subject to the condition that Boulder Dam and Lake Mead shall be used: First, for river regulation, improvement of navigation, and flood control; second, for irrigation and domestic uses and satisfaction of perfected rights in pursuance of Article VIII of the Colorado River Compact; and third, for power. This contract is made upon the express condition and with the express covenant that the United States and Arizona, and agencies and water users therein, shall observe and be subject to and controlled

by said Colorado River Compact and the Boulder Canyon Project Act in the construction, management, and operation of Boulder Dam, Lake Mead, canals and other works, and the storage, diversion, delivery, and use of water for the generation of power, irrigation, and other uses.

(d) The obligation to deliver water at or below Boulder Dam shall be diminished to the extent that consumptive uses now or hereafter existing in Arizona above Lake Mead diminish the flow into Lake Mead, and such obligation shall be subject to such reduction, on account of evaporation, reservoir and river losses, as may be required to render this contract in conformity with said compact and said act.

(e) This contract is for permanent service, subject to the conditions stated in subdivision (c) of this Article, but as to the one-half of the waters of the Colorado River system unapportioned by paragraphs (a), (b), and (c) of Article III of the Colorado River Compact, such water is subject to further equitable apportionment at any time after October 1, 1963, as provided in Article III(f) and Article III(g) of the Colorado River Compact.

(f) Arizona recognizes the right of the United States and the State of Nevada to contract for the delivery from storage in Lake Mead for annual beneficial consumptive use within Nevada for agricultural and domestic uses of 300,000 acre-feet of the water apportioned to the Lower Basin by the Colorado River Compact, and in addition thereto to make contract for like use of 1/25 (one twenty-fifth) of any excess or surplus waters available in the Lower Basin and unapportioned by the Colorado River Compact, which waters are subject to further equitable apportionment after October 1, 1963, as provided in Article III(f) and Article III(g) of the Colorado River Compact.

(g) Arizona recognizes the rights of New Mexico and Utah to equitable shares of the water apportioned by the Colorado River Compact to the Lower Basin and

also water unapportioned by such compact, and nothing contained in this contract shall prejudice such rights.

(h) Arizona recognizes the right of the United States and agencies of the State of California to contract for storage and delivery of water from Lake Mead for beneficial consumptive use in California, provided that the aggregate of all such deliveries and uses in California from the Colorado River shall not exceed the limitation of such uses in that State required by the provisions of the Boulder Canyon Project Act and agreed to by the State of California by an act of its Legislature (Chapter 16, Statutes of California of 1929) upon which limitation the State of Arizona expressly relies.

* * * * *

(1) Deliveries of water hereunder shall be made for use within Arizona to such individuals, irrigation districts, corporations or political subdivisions therein of Arizona as may contract therefor with the Secretary, and as may qualify under the Reclamation Law or other federal statutes or to lands of the United States within Arizona. All consumptive uses of water by users in Arizona, of water diverted from Lake Mead or from the main stream of the Colorado River below Boulder Dam, whether made under this contract or not, shall be deemed, when made, a discharge pro tanto of the obligation of this contract. Present perfected rights to the beneficial use of waters of the Colorado River system are unimpaired by this contract.

By paragraph 5, in its "Explanatory Recitals," the contract provides that nothing therein "shall be construed as affecting the obligations of the United States to Indian tribes."

Plf. Ex. 32

Finding 1.39

As provided for in subdivision (1) of Article 7 of the Arizona water delivery contract the United States has made a number of contracts for the delivery of water to individuals, irrigation districts, corporations and political subdivisions within the State of Arizona and has made deliveries to lands of the United States within that State. All such contracts and the uses on

lands of the United States are set forth in detail in the findings which are hereinafter made.

Conclusion 1.5

The contract of February 9, 1944, between the United States and the State of Arizona relating to the delivery of water from storage in Lake Mead was made in pursuance of Section 5 of the Boulder Canyon Project Act and in conformity with paragraph (a) of Section 4 of that Act. It is a valid contract.

Conclusion 1.6

By reason of the Arizona water delivery contract of February 9, 1944, but subject to and including—

(1) the rights of the United States in connection with the Navajo, Hopi, Kaibab, Havasupai, Hualapai, Fort Mohave, Colorado River and Cocopah Indian Reservations in Arizona, hereinafter referred to, and

(2) such other rights of the United States hereinafter enumerated to the use of Colorado River System water in Arizona as are hereby determined to be within the Arizona entitlement to the use of water of and from the main stream of the Colorado River and of and from those tributaries which join the main stream above Hoover Dam,

and subject to—

(1) those rights, interests, and obligations of the United States hereinafter enumerated with respect to use of the waters of the Colorado River System available for use in the Lower Basin which are hereby determined not to be limited or restricted by the entitlements of the several Lower Basin States,

(2) the rights of New Mexico and Utah, in their capacity of Lower Basin States, to an equitable share of the waters of the tributaries, within those states, which join the main stream of the Colorado River below Lee Ferry and above Hoover Dam,

(3) such other matters hereinafter enumerated, including the water supply in the Colorado River from time to time available for use in the Lower Basin (ex-

clusive of the tributaries which join the main stream below Hoover Dam), as affect the physical and legal availability of water stored in Lake Mead for use in Arizona under the Colorado River Compact and the Project Act, and

(4) the other conditions and provisions of said contract,

the State of Arizona is entitled to have delivered from storage in Lake Mead to qualified agencies or other water users, or for use on lands of the United States, within the State of Arizona as specified in subdivision (1) of Article 7, and otherwise in accordance with the provisions of said contract and contracts between the United States and the water users, such quantities of water as may be necessary to provide for the beneficial consumptive use for irrigation and domestic uses in Arizona of a maximum of 2,800,000 acre-feet each calendar year, together with such part of one-half of any excess or surplus waters unapportioned by the Colorado River Compact which is not used by the States of Nevada, New Mexico and Utah in accordance with their respective entitlements as recognized in subdivisions (f) and (g) of said Article 7.

Conclusion 1.7

While the quantity of stored water to be delivered for beneficial consumptive use in Arizona is to be diminished to the extent of all consumptive uses in Arizona of water diverted from Lake Mead or from the main stream below Hoover Dam, to the extent that consumptive uses in Arizona above Lake Mead diminish the flow into Lake Mead, and by such amounts on account of evaporation, reservoir and river losses "as may be required to render this contract in conformity with" the Colorado River Compact and the Project Act, the obligation of the United States to deliver, and Arizona's entitlement to receive water from storage in Lake Mead, is not affected by uses of the waters of the tributaries which join the main stream below Hoover Dam.

Finding 1.40

On March 30, 1942, the United States entered into a contract with the State of Nevada for the delivery of water from storage

in Lake Mead. By supplemental contract dated January 3, 1944, subdivision (a) of Article 5 of that contract was amended to read as follows:

> Subject to the availability thereof for use in Nevada under the provisions of the Colorado River Compact and the Boulder Canyon Project Act, the United States shall, from storage in Lake Mead, deliver to the State each year at a point or points to be selected by the State and approved by the Secretary, so much water, including all other waters diverted for use within the State of Nevada from the Colorado River system, as may be necessary to supply the State a total quantity not to exceed Three Hundred Thousand (300,000) acre-feet each calendar year. Said water may be used only within the State of Nevada, exclusively for irrigation, household, stock, muncipal, mining, milling, industrial, and other like purposes, but shall not be used for the generation of electric power.
>
> Plf. Exs. 43, 44

Conclusion 1.8

The water delivery contract dated March 30, 1942, as modified by the supplemental contract of January 3, 1944, by the United States with the State of Nevada is a valid contract, made in pursuance of Section 5 of the Project Act and in conformity with paragraph (a) of Section 4 of that Act.

Conclusion 1.9

By reason of the said water delivery contract with the State of Nevada, but subject to and including—

> (1) the rights of the United States in connection with the Moapa and Fort Mohave Indian Reservations in Nevada, hereinafter referred to, and
>
> (2) such other rights of the United States hereinafter enumerated to the use of Colorado River System water in Nevada as are hereby determined to be included within the Nevada entitlement to the use of water of and from the Colorado River system,

and subject to—

(1) those rights, interests, and obligations of the United States hereinafter enumerated with respect to use of the waters of the Colorado River System available for use in the Lower Basin which are hereby determined not to be limited or restricted by the entitlement of the several Lower Basin States, and

(2) such other matters hereinafter enumerated, including the water supply in the Colorado River from time to time available for use in the Lower Basin, as affect the physical and legal availability for use in Nevada of Colorado River water under the Colorado River Compact and the Project Act,

the State of Nevada is entitled to have delivered from storage in Lake Mead, in accordance with the provisions of said contract, such quantities of water as may be necessary to provide for beneficial use in Nevada a total annual quantity not to exceed 300,000 acre-feet each calendar year, including all other waters diverted for use within the State of Nevada from the Colorado River System.

Conclusion 1.10

The United States of America has certain rights, interests, and obligations with respect to the use of the waters of the Colorado River System which bear upon and must be determined in order that there may be known the availability, under the Colorado River Compact and the Project Act, of the waters stored in Lake Mead for use in the States of California, Arizona, and Nevada under the several water delivery contracts hereinabove considered. Those rights, interests, and obligations must also be determined in order to judge the equitable shares of New Mexico and Utah in the waters of the tributaries of the Colorado River within those States which join the main stream below Lee Ferry and above Hoover Dam, and the equitable shares of Arizona and New Mexico in the waters of the Gila River and its tributaries. Such rights, interests and obligations of the United States are considered and determined in the findings and conclusions which immediately follow.

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II. FLOOD CONTROL, NAVIGATION, RIVER REGULATION

Finding 2.1

The first of the Congressional purposes in authorizing the construction and operation of Hoover Dam and reservoir and the All-American Canal is specified in Section 1 of the Boulder Canyon Project Act as that of "controlling the floods, improving navigation, and regulating the flow of the Colorado River."

By Section 6 of that Act Congress directed that Hoover Dam and reservoir be used "First, for river regulation, improvement of navigation and flood control."

Section 2 of the Act of August 30, 1935 (49 Stat. 1039) authorizing the Parker Dam project contains similar provision.

Plf. Ex. 7, Sections 1 and 6
Finding 1.32, *supra*

Finding 2.2

The constitutionality of the Boulder Canyon Project Act was sustained as an enactment in aid of navigation in *Arizona* v. *California et al.*, 283 U.S. 423 (1931).

Finding 2.3

Authority to construct, operate, and maintain the dam and incidental works for the specified purposes was vested by Section 1 of the Project Act in the Secretary of the Interior.

Finding 2.4

The act of December 22, 1944 (58 Stat. 890) provided that it should be the duty of the Secretary of the Army to prescribe regulations for the use of storage allocated to flood control or navigation at all reservoirs constructed wholly or in part with Federal funds provided on the basis of such purposes, and the operation of any such project should be in accordance with such regulations.

33 U.S.C. 709

Finding 2.5

In pursuance of the Act of December 22, 1944, Flood Control Regulations prescribing the quantity of flood control storage space in "Hoover Reservoir" and releases from Hoover Dam for flood control purposes were promulgated by the Department of the Army on February 18, 1954.

U.S. Ex. 50

Conclusion 2.1

The United States has the right to impound and release waters of the Colorado River as necessary in the discretion of the duly designated officer or officers of the United States for flood control, improvement of navigation, and river regulation, and all use of waters of the Colorado River within the United States is subject to said right of the United States.

III. POWER

Finding 3.1

By Section 1 of the Boulder Canyon Project Act the Secretary of the Interior was authorized to construct, operate, and maintain Hoover Dam and incidental works for the purposes of flood control, improvement of navigation, and regulating the flow of the Colorado River, providing for storage and the delivery of the stored waters for reclamation of public lands and other beneficial uses exclusively within the United States, "and for the generation of electrical energy as a means of making the project herein authorized a self-supporting and financially solvent undertaking." By Section 6 of that Act it was directed that the use of the dam and reservoir for power be subordinate to their use for the other authorized purposes.

Plf. Ex. 7, Section 5

Finding 3.2

The Boulder Canyon Project Act authorized the Secretary of the Interior, under such general regulations as he might prescribe, to contract for the generation and delivery of electrical energy at Hoover Dam.

Plf. Ex. 7, Section 5

Finding 3.3

The Boulder Canyon Project Adjustment Act authorized the Secretary of the Interior to promulgate such regulations and enter into such contracts as he might find necessary or appropriate for carrying out the purposes of the Act and the Boulder Canyon Project Act.

Section 8 of Act of July 19, 1940 (54 Stat. 774)

Finding 3.4

In pursuance of the Boulder Canyon Project Adjustment Act, the Secretary of Interior on May 20, 1941, promulgated general regulations for generation and sale of power for the Boulder Canyon Project.

U.S. Ex. 51

Conclusion 3.1

Subject to the contracts it has made respecting the generation and sale of electrical energy, the United States has the right to use any and all waters of the main stream of the Colorado River reaching its reservoirs and power plants for the generation of electrical energy to the extent that such use does not jeopardize the use of those waters for river regulation, improvement of navigation, flood control, irrigation and domestic uses. The discretion to determine whether stored waters may be released exclusively for power generation without jeopardizing existing or foreseeable requirements for preferred uses resides in the Secretary of the Interior.

IV. INDIAN RESERVATIONS AND SAN CARLOS PROJECT

General

Finding 4.0.1

Within the Lower Colorado River Basin as defined in Article II(g) of the Colorado River Compact, there are 25 Indian Reservations on which the United States claims rights to the use of water.

U.S. Ex. 100

Finding 4.0.2

Use of water for irrigation of agricultural crops is necessary for the livelihood of the Indians residing on or entitled to reside on these Reservations. The lands on each of the Reservations which are susceptible of irrigation from existing irrigation systems or extensions thereof or additional systems have been carefully classified for suitability for irrigation according to depth, texture and permeability of soil and subsoil, slope, erosion, drainage, salinity, and alkalinity. The annual consumptive use and diversion requirements for each of the many irrigation areas on the several Reservations are set forth in the findings which follow. Consumptive use, as employed in this connection, includes that quantity of water which must be applied to the crop artifically to meet the consumptive requirements of the crop (denominated by witness Criddle as the "consumptive irrigation water requirement"), plus the consumptive requirements for domestic use, including stock watering, incidental to operation of the irrigation areas. Diversion requirement, as so employed, is that quantity of water which must be diverted from the source in order to meet the consumptive use requirement, including such domestic use, taking into account a reasonable application efficiency, conveyance losses, etc.

U.S. Ex. 200, Tr. 12,958–12,967, Tr. 12,970–12,973, Tr. 13,406; U.S. Exs. 163, 349, 570, Tr. 13,407–8, Tr. 13,-497

Finding 4.0.3

On some of the Reservations, as, for example, the Navajo, Hopi, Zuni, Fort Apache, Hualapai, many inhabitants reside away from the irrigation areas and the raising and maintenance of livestock is in many instances a substantial element of the economy on such Reservations. Water for domestic use, including stock watering, is provided by utilization of springs, surface flow in streams, the interception and impoundment in small reservoirs of runoff, and wells. Such uses are within the reserved rights of the United States with respect to the several Reservations where they occur. However, because the quantities of water consumed thereby are relatively small it is unnecessary for the purposes of this case that such rights be quantitatively measured.

Tr. 12,635, Tr. 12,733, Tr. 12,643, Tr. 12,632, Tr. 14,650, Tr. 13,763, Tr. 13,497, Tr. 13,487

Finding 4.0.4

The general trend of the population of the tribes and communities of Indians which inhabit the several Reservations of the Lower Colorado River Basin is one of increase. With respect to certain Reservations sufficient reliable data is available to permit determination of the population trend of the particular tribe residing on or entitled to reside on the Reservation, and in such cases specific findings are made concerning the population trend for those Reservations. As to the Reservations with respect to which such specific findings are not made, it is nevertheless reasonably to be expected that the trend of population of the Indians residing on or entitled to reside on the Reservations will be generally upward as is true of all Indians of the Lower Colorado River Basin, but in varying degrees.

U.S. Ex. 500, Tr. 15,235–7

Zuni Pueblo and Indian Reservation

Finding 4.1.1

The Zuni Pueblo was established by grant of September 25, 1689, from the Government of Spain.

U.S. Exs. 103, 104

Finding 4.1.2

The Spanish grant of September 25, 1689, was respected by the United States according to the provisions of the Treaty with the Republic of Mexico of February 2, 1848.

U.S. Ex. 101, (9 Stat. 922)

Finding 4.1.3

Pursuant to the Act of July 22, 1854, the United States confirmed the territory of the Pueblo of Zuni and a patent was issued.

U.S.Exs. 102, 115, 115A

Finding 4.1.4

The Zuni Indians have historically engaged in irrigation and agriculture.

U.S. Exs. 119, 120

Finding 4.1.5

By the Executive Order of March 16, 1877, the President set aside additional lands of the Territory of New Mexico as a reservation for the use and occupancy of the Zuni Pueblo Indians.

U.S. Ex. 109

Finding 4.1.6

By the Executive Order of May 1, 1883, the President described with additional definiteness the boundaries of the reservation set apart for the Zuni Pueblo Indians so as specifically to include within those boundaries Nutria Springs and Pescado Springs.

U.S. Ex. 110

Finding 4.1.7

The boundaries of the Reservation set aside for the use and occupancy of the Zuni Indians and such other Indians as the Secretary of Interior may see fit to locate therein was redefined by later statutes, Executive Orders and Proclamations.

U.S. Exs. 111 through 114; U.S. Exs. 117–118

Finding 4.1.8

The Zuni Indian Reservation, including the Zuni Pueblo, contains approximately 404,000 acres situated in the western part of the State of New Mexico.

Tr. 12,628–9

Finding 4.1.9

The Zuni Indians have increased in number from approximately 1,500 at the time of the establishment of the Zuni Indian Reservation to over 3,000 at the present time and their population is still increasing.

U.S. Ex. 500, Tr. 12,630–1; Calif. Ex. 2600–26

Finding 4.1.10

The Zuni Indians are mainly subsistence farmers and stockmen, living in villages on the Reservation, including the Zuni Pueblo, and during the farming season they move into temporary villages near the irrigation projects on the Reservation.

Tr. 12,630; Tr. 12,632

Finding 4.1.11

The largest of the irrigation projects on Zuni Indian Reservation is the Zuni Unit composed of lands adjacent to the Zuni River, including a portion of the tract of the original Zuni Pueblo, which lands are supplied water from the Zuni River by means of an irrigation system of four reservoirs, a siphon across the Zuni River and a distribution system. The Zuni River is tributary to the Little Colorado River.

U.S. Ex. 149, Tr. 12,775–6

Finding 4.1.12

The Tekapo Irrigation Unit of the Zuni Indian Reservation is also located on both sides of the Zuni River and is supplied with water from the Zuni River diverted into an off-stream reservoir and thence through canals and a flume across the river to the irrigated lands.

U.S. Ex. 151, Tr. 12,778–9

Finding 4.1.13

The Ojo Caliente Irrigation Unit of the Zuni Indian Reservation is near and within the drainage area of the Zuni River but is supplied by water from springs, part of which water is

diverted directly into the distribution system and part of which is collected in the Ojo Caliente Reservoir and from there distributed to the lands below that reservoir.

U.S. Ex. 153, Tr. 12,784–5

Finding 4.1.14

The Nutria Irrigation Unit of the Zuni Indian Reservation is located on both sides of the Nutria River, a tributary of the Zuni River, and is supplied with water from a reservoir on the Nutria River.

U.S. Ex. 155, Tr. 12,786, 12,786A, 12,787

Finding 4.1.15

The Pescado Irrigation Unit of the Zuni Indian Reservation is located on both sides of the Pescado River, a tributary of the Zuni River, and is supplied by water diverted from the Pescado Reservoir which receives the flow of the Pescado River and two nearby springs.

U.S. Ex. 157, Tr. 12,787–8

Finding 4.1.16

There are within the five irrigation units of the Zuni Indian Reservation 8,570 acres suited for irrigation.

U.S. Exs. 150, 152, 154, 156, 158, 200, Tr. 13,068–75

Finding 4.1.17

The 8,570 irrigable acres within the five irrigation units of the Zuni Indian Reservation are susceptible of irrigation from existing irrigation systems or extensions thereof.

Tr. 12,763, 12,776, 12,779, 12,785, 12,787, 12,788

Finding 4.1.18

Of the 8,570 irrigable acres of the Zuni Indian Reservation, 875 acres are within the area of the Zuni Pueblo established September 25, 1689; the remaining irrigable acres are included within the area described by the Executive Order of March 16, 1877, and redefined by the Executive Order of May 1, 1883.

U.S. Exs. 104, 115–A, 109, 110, Tr. 12,789 and 12,793–4

Finding 4.1.19

Based on historic stream flow and rainfall, the water available for use on the various irrigation units of the Zuni Indian Reservation will be sufficient to serve all the 8,570 irrigable acres during 70 to 75% of the time. Shortages in varying degree are to be expected in some years.

Tr. 13,286; 13,291–2; 13,359–60, U.S. Exs. 160, 161, 162

Finding 4.1.20

The 8,570 irrigable acres of the five irrigation units of the Zuni Indian Reservation have the source of supply, annual consumptive use, and annual diversion requirement set forth below:

Units	Source of water supply	Irrigable area (acres)	Consumptive use (acre-feet)	Diversion requirement (acre-feet)
Zuni	Zuni River	4, 893	6, 361	14, 136
Tekapo	Zuni River	276	359	798
Ojo Caliente	Springs	1, 619	2, 105	4, 678
Nutria	Nutria River	702	913	2, 029
Pescado	Pescado Creek & Springs	1, 080	1, 404	3, 120
Evaporation from Reservoirs			2, 278	2, 278
Total		8, 570	13, 532	27, 288

U.S. Ex. 163

Conclusion 4.1

By reason of the establishment of the Zuni Pueblo and the Zuni Indian Reservation, the United States has the right to divert water of the Zuni River and its tributaries in a total quantity of 27,288 acre-feet per year for the irrigation of 8,570 irrigable acres of the Zuni Indian Reservation with the following priorities:

875 acres ..... September 25, 1689
7,695 acres ..... March 16, 1877

Navajo Indian Reservation

Finding 4.2.1

The Navajo Indian Reservation was established pursuant to the Treaty of June 1, 1868, between the United States and the Navajo Tribe of Indians.

U.S. Ex. 201

Finding 4.2.2

The Navajo Indians have historically engaged in agriculture. Attention was given by agents of the United States to inclusion of lands suitable for irrigation farming within the selected area of the Navajo Indian Reservation.

U.S. Exs. 258 (p. 389), 259

Finding 4.2.3

Additions to the Navajo Indian Reservation were made by the Executive Orders of October 29, 1878, and January 6, 1880, and later Executive Orders, statutes and quit-claim deeds.

U.S. Exs. 202 through 257

Finding 4.2.4

The Navajo Indian Reservation is situated in the States of New Mexico, Utah and Arizona and contains approximately 14,000,000 acres.

Tr. 12,633

Finding 4.2.5

The Navajo Indians have increased in number from about 8,000 at the time of the establishment of the Navajo Indian Reservation to a current population of approximately 82,000.

Tr. 12,635, Calif. Ex. 2600–18

Finding 4.2.6

The trend of population growth for the Navajo Indians is one of a high rate of increase.

Tr. 12,636, U.S. Ex. 500

Finding 4.2.7

The Navajo Indians combine subsistence farming with stock-raising and seasonal labor. The average annual income of the Navajo Indian including the proceeds of his subsistence farming is approximately $450 per year.

Tr. 12,635; 12,669–70

Finding 4.2.8

There are within that portion of the Navajo Indian Reservation situated in the Lower Colorado River Basin 8,490 acres, which are suited for irrigation and which are susceptible of irrigation from existing irrigation systems or extensions thereof or additional systems.

Tr. 12,815–12,855; 13,075–7, U.S. Exs. 302 through 339

Finding 4.2.9

Based upon records of precipitation and run-off of streams and upon estimated run-off, the water available for use on the various irrigation units of the Navajo Indian Reservation will be sufficient to meet fully the irrigation requirements in most cases in some years, but on each of the units there will be years of deficient run-off when there will not be sufficient water supply for the requirements of the fully developed project.

Tr. 13,315, U.S. Exs. 341 through 348

Finding 4.2.10

The 8,490 irrigable acres of the eighteen irrigation units of that portion of the Navajo Indian Reservation situated in the Lower Colorado River Basin are all within the drainage area of the Little Colorado River, and have the source of water supply, annual consumptive use, annual diversion requirement and date of reservation of the particular area, set forth below.

U.S. Ex. 349, Tr. 12,855–8.

Reservation units	Source of water supply	Area (acres)	Date of reservation	Consumptive use (acre-feet)	Diversion requirement (acre-feet)
Arizona					
Willow Springs	Springs	33	Jan. 8, 1900	63	158
Littlefield	Springs	43	Jan. 8, 1900	82	205
Moenave	Springs	65	Jan. 8, 1900	124	310
Vanzee	Springs	33	Jan. 8, 1900	63	158
Shonto	Shonto Wash	90	May 17, 1884	153	382
Reservoir Canyon-Moencopi-Tuba	Pasture Canyon-Moencopi Wash	1, 189	Jan. 8, 1900	2, 259	5, 648
Lower Moencopi	Moencopi Wash	156	Jan. 8, 1900	296	740
Natani's	Dinnebito Wash	183	Nov. 14, 1901	348	870
Kinlichee	Kinlichee Wash	269	Jan. 6, 1880	457	1, 142
Coldfield	Ganado Wash Tributary	565	June 1, 1868 [1] Jan. 6, 1880 [1]	961	2, 402
Ganado and Cornfield	Pueblo Colo. Wash	1, 420	Jan. 6, 1880 [1] Nov. 9, 1907 [1]	2, 414	6, 035
Klagetoh	Unnamed Wash	428	Nov. 9, 1907	728	1, 820
Red Lake	Black Creek	826	June 1, 1868	1, 239	3, 098
Fort Defiance	Bonito Creek and Black Creek	324	Jan. 6, 1880	486	1, 215
Natural Bridge	Black Creek	1, 141	Jan. 6, 1880 [1] Nov. 9, 1907 [1]	1, 711	4, 278
Oak Springs	Oak Springs	26	Nov. 9, 1907	39	98

See footnote at end of table.

Reservation units	Source of water supply	Area (acres)	Date of reservation	Consumptive use (acre-feet)	Diversion requirement (acre-feet)
Houck	Black Creek	453	June 14, 1934	770	1, 925
Evap. from Reservoir				3, 185	3, 185
Non-agricultural uses				122	305
Total		7, 244		15, 500	33, 974
New Mexico					
Todilto Park	Todilto Wash	890	June 1, 1868	1, 335	3, 338
Red Lake	Black Creek	356	June 1, 1868	534	1, 335
Evap. from Reservoir				1, 460	1, 460
Non-agricultural uses				18	47
Total		1, 246		3, 347	6, 180
Grand total		8, 490		18, 847	40, 154

[1] Partly.

U.S. Ex. 349, Tr. 12,855–8

Conclusion 4.2

By reason of the establishment of the Navajo Indian Reservation, the United States has the right to divert water from sources within the drainage area of the Little Colorado River in a total quantity of 40,154 acre-feet per year for irrigation of 8,490 irrigable acres of the Navajo Indian Reservation with the following priorities:

	Acres	
Willow Springs	33	Jan. 8, 1900
Littlefield	43	Jan. 8, 1900
Moenave	65	Jan. 8, 1900
Vanzee	33	Jan. 8, 1900
Shonto	90	May 17, 1884
Reservoir Canyon-Moencopi-Tuba	1, 189	Jan. 8, 1900
Lower Moencopi	156	Jan. 8, 1900
Natani's	183	Nov. 14, 1901
Kinlichee	269	Jan. 6, 1880
Coldfield	565	[1] June 1, 1868
		[1] Jan. 6, 1880
Ganado and Cornfield	1, 420	[1] Jan. 6, 1880
		[1] Nov. 9, 1907
Klagetoh	428	Nov. 9, 1907
Todilto Park	890	June 1, 1868
Red Lake	1, 182	June 1, 1868
Fort Defiance	324	Jan. 6, 1880
Natural Bridge	1, 141	[1] Jan. 6, 1880
		[1] Nov. 9, 1907
Oak Springs	26	Nov. 9, 1907
Houck	453	June 14, 1934

[1] Partly.

Finding 4.2.11

The natural resources of the Navajo Indian Reservation are adequate to support only 35,000 people and the natural resources of the Hopi Indian Reservation are very limited. By the Act of April 19, 1950, Congress authorized the appropriation of $88,570,000 to promote the rehabilitation of the Navajo and Hopi Tribes in a better utilization of the Navajo and Hopi Indian Reservations and for other purposes including the relocation and resettlement of Navajo and Hopi Indians on the Colorado River Indian Reservation.

Tr. 12,656–7, U.S. Ex. 421; 64 Stat. 44

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Finding 4.2.12

Pursuant to the Navajo-Hopi Rehabilitation Act of 1950, the United States has on the Navajo and Hopi Indian Reservations constructed reservoirs and prepared lands for irrigation, constructed and improved educational facilities including vocational instruction in irrigation farming and extension or adult instruction for irrigation farmers, developed domestic and range water supplies, engaged in a soil and moisture conservation program and on the Colorado River Indian Reservation developed lands for irrigation farming on to which Navajo and Hopi Indians have been moved.

Tr. 12,658–63

Finding 4.2.13

In addition to the expenditure of funds by the United States pursuant to the Navajo-Hopi Rehabilitation Act of 1950, the Navajo tribal council has expended substantial tribal funds for range water development and training of irrigation farmers.

Tr. 12,668–9; Tr. 12,731–2

Hopi Indian Reservation

Finding 4.3.1

The Hopi Indian Reservation was set apart by the Executive Order of December 16, 1882, for the use and occupancy of the Moqui (Hopi) and such other Indians as the Secretary of the Interior might see fit to settle thereon.

U.S. Ex. 401

Finding 4.3.2

The Hopi Indians have historically engaged in agriculture. Attention was given by agents of the United States to inclusion of lands suitable for irrigation farming within the selected area of the Hopi Indian Reservation.

U.S. Ex. 258 (p. 388); U.S. Exs. 402 through 405

Finding 4.3.3

The Hopi Indian Reservation is situated in the State of Arizona and consists of approximately 2,500,000 acres. It is entirely surrounded by the Navajo Indian Reservation.

Tr. 12,640

Finding 4.3.4

The Hopi Indians have increased in number from approximately 1,800 at the time of the establishment of the Hopi Indian Reservation to over 5,000 at the present time.

Tr. 12,642, Calif. Ex. 2600–14

Finding 4.3.5

The trend is for increasing population growth of the Hopi Indians.

Tr. 12,642, U.S. Ex. 500

Finding 4.3.6

The Hopi Indians engage in subsistence farming and stock raising, and supplement their main income from agriculture by trading and arts and crafts work.

Tr. 12,643–4

Finding 4.3.7

There are within the Hopi Indian Reservation 731 acres which are suited for irrigation and which are susceptible of irrigation from existing irrigation systems or extensions thereof.

U.S. Exs. 424 through 435, Tr. 12,797–805; 13,077–8

Finding 4.3.8

Based on records of precipitation and on estimates of run-off of streams, the water available for use on the various irrigation units of the Hopi Indian Reservation will be sufficient in some years but insufficient in other years to meet fully the irrigation requirements.

Tr. 13,323, U.S. Exs. 436, 437

Finding 4.3.9

The 731 irrigable acres of the four irrigation units of the Hopi Indian Reservation are all within the drainage area of the Little Colorado River and have the following sources of water supply, annual consumptive uses, and annual diversion requirements.

Reservation units	Source of water supply	Area (acres)	Consumptive use (acre-feet)	Diversion requirement (acre-feet)
Begashibito	Begashibito Wash	249	423	1,058
Jeddito	Jeddito Wash	144	245	612
Lower Dinnebito	Dinnebito Wash	288	490	1,225
Phillips Farm	Polacca Wash	50	85	212
Nonagricultural uses			12	30
Total		731	1,255	3,137

U.S. Ex. 438

Conclusion 4.3

By reason of the establishment of the Hopi Indian Reservation, the United States has the right to divert water from sources within the drainage area of the Little Colorado River in a total quantity of 3,137 acre-feet per year for irrigation of 731 irrigable acres of the Hopi Indian Reservation with a priority of December 16, 1882.

Colorado River Indian Reservation

Finding 4.4.1

The Colorado River Indian Reservation was established by the Act of Congress of March 3, 1865, which set apart in the Territory of Arizona 75,000 acres from Half-Way Bend to Corner Rock on the Colorado River for an Indian reservation for the Indians of said river and its tributaries.

U.S. Ex. 501 (13 Stat. 541, 559)

Finding 4.4.2

Indians inhabiting the area engaged in cultivation of the lands of the Colorado River Valley prior to March 3, 1865.

U.S. Exs. 509, 510, 258 (pp. 387–8), 513 (p. 156)

Finding 4.4.3

Preceding the Act of March 3, 1865, the Superintendent of Indian Affairs, Arizona, pursuant to authorization from the Commissioner of Indian Affairs to select a reservation for In-

dians of the Colorado River, caused to be made an engineering report on the fertility and susceptibility of irrigation from the Colorado River of the lands between Half-Way Bend and Corner Rock. This report, concluding that such lands were most fertile and highly suitable for irrigation from the Colorado River, was transmitted to and considered by Congress.

U.S. Exs. 511, 512, 513 (p. 157), 514, and 502

Finding 4.4.4

Appropriations were made by Congress commencing in 1867 for the construction of a canal to irrigate the Colorado River Indian Reservation and as early as 1870 water was diverted by means of this canal from the Colorado River on to lands of the Colorado River Indian Reservation.

14 Stat. 514, 15 Stat. 222, 17 Stat. 188, U.S. Ex. 523

Finding 4.4.5

By the Executive Order of November 22, 1873, adjoining bottom lands in the Territory of Arizona were added to the Reservation set apart for the Indians of the Colorado River and its tributaries.

U.S. Ex. 503

Finding 4.4.6

By the Executive Order of November 16, 1874, the Reservation for Indians of the Colorado River and its tributaries was enlarged to include lands on the westerly side of the Colorado River in the State of California.

U.S. Ex. 504

Finding 4.4.7

That part of the westerly boundary line provided by the Executive Order of November 16, 1874, extending in a straight line from the top of Riverside Mountain to the point of beginning excluded from the Reservation certain lands on the east side of and adjacent to the Colorado River. Pursuant to a recommendation of the Commissioner of Indian Affairs concurred in by the Secretary of Interior that the boundary of the Colorado River Indian Reservation be changed so as to include these "valuable" lands, the Executive Order of May

15, 1876, declared the western boundary of the Colorado River Indian Reservation to run from the "top of Monument Peak in the State of California; thence southwesterly in a straight line to the top of Riverside Mountain, California; thence in a direct line toward the place of beginning to the west bank of the Colorado River; thence down said west bank to a point opposite the place of beginning; thence to the place of beginning [in Arizona]."

U.S. Exs. 505, 505A, 505B, 505C, 505D

Conclusion 4.4.1

By the Executive Order of May 15, 1876, the then location of the west bank of the Colorado River Indian Reservation was established as the permanent boundary of the Reservation, from the point where a direct line from the top of Riverside Mountain to the place of beginning intersected said bank to the point on this bank opposite the place of beginning.

Finding 4.4.8

The location of the west bank of the Colorado River as of the time of the Executive Order of May 15, 1876, is evidenced by the meander line of the west bank of the Colorado River established by the 1874 and 1879 surveys of the General Land Office of the Department of Interior and confirmed by a dependent resurvey in 1958 by the Bureau of Land Management of the Department of Interior. Such location is further confirmed by the continued and present existence of a high and prominent bank along a considerable portion of the line surveyed as the west bank of the Colorado River in 1874 and 1879.

U.S. Exs. 576 through 580H; U.S. Exs. 593A, 593B, 593C, 593D, 593E, and 593F, Tr. 20,012–20,022, Tr. 20,042–20,068

Conclusion 4.4.2

The meander line along the west bank of the Colorado River as surveyed in 1874 and 1879 and as confirmed by the dependent resurvey of 1958 establishes the location of the west bank of the Colorado River as of May 15, 1876.

Finding 4.4.9

The approximate area of the Colorado River Indian Reservation is 260,000 acres.

Tr. 13,766

Finding 4.4.10

The Colorado River Indian Reservation is presently inhabited by a tribe organized pursuant to the Act of June 18, 1934 (48 Stat. 984) and known as the Colorado River Indian Tribes which has a current population of about 1,300.

Tr. 13,766, Calif. Ex. 4576

Finding 4.4.11

By action of the Colorado River Indian Tribes concurred in by the Secretary of the Interior, the identity of "Indians of the Colorado River tributaries" has been recognized to include Hualapai, Hopi, Navajo, Apache, Zuni, Papago, Supai, Yuma, Chemehuevi, and Fort Mohave Indians.

U.S. Exs. 595, 595A, 595B

Finding 4.4.12

The population of the Indians of the Colorado River Indian Tribes and all Indians of the Lower Colorado River Basin and its tributaries is increasing.

U.S. Ex. 500, Calif. Ex. 2600–7

Finding 4.4.13

A total population of Lower Colorado River Basin Indians of over 130,000 can reasonably be expected by the year 1970.

Tr. 15,237

Finding 4.4.14

The Colorado River Indian Reservation has been utilized for the resettlement thereon of Indians from other reservations within the Colorado River Basin. A number of Navajo and Hopi Indians have been resettled in recent years on the Colorado River Indian Reservation under specific appropriation by Congress, and the Indians of these and other reservations within the Colorado River Basin with inadequate land and water resources to support their populations are being trained for

future resettlement on the Colorado River Indian Reservation.

Tr. 12,664; 12,669; 13,782, U.S. Ex. 582A

Conclusion 4.4.3

By the Navajo-Hopi Rehabilitation Act (Act of April 19, 1950; 64 Stat. 44) Congress has reaffirmed its intent expressed in the Act of March 3, 1865 to maintain the Colorado River Indian Reservation for the use of Indians of the Colorado River and its tributaries.

Finding 4.4.15

Congressional appropriations commencing in 1867 provided for the irrigation from the Colorado River of lands of the Colorado River Indian Reservation by means of various irrigation systems, including the old Grant-Dent canal, pumping plants, and the construction of Headgate Rock diversion dam completed in 1941.

U.S. Ex. 507 for Id.; U.S. Exs. 524 through 555, Tr. 13,988; U.S. Ex. 575

Finding 4.4.16

Headgate Rock Dam, constructed on the Colorado River by the United States for the diversion of water for use on the Colorado River Indian Reservation, and the main canal leading therefrom, is capable of irrigating by gravity approximately 105,000 acres of that part of the Colorado River Indian Reservation situated in Arizona. The total cost to United States to date of the constructed project including distribution system is about $18,000,000.

Agreed Facts, Pre-Trial Order, Appendix I, Tr. 13,988–13,992; U.S. Exs. 560, 571–573

Finding 4.4.17

There are, within the valley lands of that portion of the Colorado River Indian Reservation situated in Arizona, 105,210 acres suited for irrigation and capable of being ir-

rigated from the Colorado River by gravity by Headgate Rock Dam and other constructed works.

U.S. Ex. 561, Tr. 14,268

Finding 4.4.18

There are certain mesa lands of that portion of the Colorado River Indian Reservation situated in Arizona susceptible of irrigation by pumping directly from the Colorado River. There are 7,192 acres of those mesa lands suited for irrigation.

U.S. Exs. 560, 561, Tr. 13,998–14,000; 14,268; Plf. Ex. 45 (pp. 52, 55, 48–49)

Finding 4.4.19

In computing the water requirements with an average reduction in irrigable acreage of 12% for rights-of-way, farmsteads, and the like, the annual consumptive use and the annual diversion requirement for the irrigable acres of the portion of the Colorado River Indian Reservation in Arizona are as follows:

Reservation units	Net area (acres)	Consumptive use (acre-feet)	Diversion requirement (acre-feet)
Valley Lands	92, 585	308, 585	617, 170
Mesa Lands	6, 329	21, 095	42, 190
Total	98, 914	329, 680	659, 360

U.S. Ex. 570

Finding 4.4.20

There are within the portion of the Colorado River Indian Reservation in California including that part bounded on the west by the meander line established by the 1874 and 1879 General Land Office Surveys, 12,875 acres which are suited for irrigation and which are susceptible of being irrigated from the Colorado River.

U.S. Exs. 562A and 563, Tr. 14,053–55; 14,240–1

Finding 4.4.21

The irrigable lands of the Colorado River Indian Reservation in California, divided into three areas and reduced by 12% for rights-of-way, farmsteads, and the like, have an annual consumptive use and diversion requirement as follows:

Reservation units	Net area (acres)	Consumptive use (acre-feet)	Diversion requirement (acre-feet)
North Westside	5, 988	19, 957	39, 914
Central Westside	2, 870	9, 566	19, 132
South Westside	2, 472	8, 240	16, 480
Total	11, 330	37, 763	75, 526

U.S. Ex. 570

Finding 4.4.22

The total net irrigable area of the Colorado River Indian Reservation is 110,244 acres with an annual consumptive use of 367,443 acre-feet and an annual diversion requirement of 734,886 acre-feet.

U.S. Ex. 570

Conclusion 4.4.4

By reason of the establishment of the Colorado River Indian Reservation, the United States has the right to divert water of the Colorado River in a total quantity of 734,886 acre-feet per year for irrigation of 110,244 irrigable acres of the Colorado River Indian Reservation, with priority dates from March 3, 1865 to May 15, 1876.

(The following findings and conclusions are proposed only against the event the United States' contention that the location of the west bank of the Colorado River in 1876, as evidenced by the 1874 and 1879 meander surveys is rejected. In such event they would be substituted for findings 4.4.19, 4.4.20, 4.4.21 and 4.4.22 and conclusions 4.4.1 and 4.4.4.)

Finding 4.4.101

Within that portion of the Colorado River Indian Reservation set aside in California by the Executive Order of November 16, 1874, to the north of the Reservation westerly boundary's intersection of the west bank of the River (Northern Westside Area) there are 5,933 net irrigable acres susceptible of being irrigated from the Colorado River, with an annual consumptive use of 19,774 acre-feet and an annual diversion requirement of 39,548 acre-feet.

U.S. Ex. 570, Calif. Ex. 3546

Conclusion 4.4.101

By reason of the reservation of lands within California as an addition to the Colorado River Indian Reservation, the United States has the right to divert, for irrigation of 5,933 net irrigable acres of the Northern Westside Area of the Colorado River Indian Reservation in California, water from Colorado River in an annual quantity of 39,548 acre-feet, with priority of November 16, 1874.

Finding 4.4.102

Within that portion of the Colorado River Indian Reservation set aside in California by the Executive Order of May 15, 1876, south from where the boundary line southerly from Riverside Mountain intersects the west bank of the Colorado River to the section line between Sections 14 and 23, Township 4 South, Range 23 East, San Bernardino Meridian (within the Central Westside Area), while the channel of the River has at some points changed from time to time, its location has been generally stable and the west bank of the River as it existed in 1876 continues in place today. Included within this area of the Reservation on the California side of the River but to the east of the west bank are more than 1,800 irrigable acres susceptible of irrigation from the Colorado River, with an annual consumptive use of 5,999 acre-feet and an annual diversion requirement of 11,998 acre-feet.

Tr. 20,029; 20,037; 20,133; 20,068; 20,069, U.S. Ex. 570, 588A (page 37 and Plate V(D))

Conclusion 4.4.102

By reason of the reservation of lands within California as an addition to the Colorado River Indian Reservation, the United States has the right to divert, for irrigation of 1,800 irrigable acres of the Central Westside Area of the Colorado River Reservation in California, water from the Colorado River in an annual quantity of 11,998 acre-feet with priority of May 15, 1876.

Finding 4.4.103

To the south of the section line between Sections 14 and 23, Township 4 South, Range 23 East, San Bernardino Meridian, there is no evidence of the continued existence today of the west bank of the Colorado River which was surveyed in 1874 and 1879, and it is apparent that the same has been obliterated by changes in the channel of the River in this area over the years. Within this reach of the River, the present day location of its channel coincides at two points with the location of man-made channels. These two channels are denominated as the Olive Lake Cut-off and the Ninth Avenue Cut-off.

Tr. 20,152, U.S. Ex. 588A (pp. 17–18)

Finding 4.4.104

The Olive Lake Cut-off was constructed by the Palo Verde Mutual Water Company across the neck of a large loop in the existing river channel in 1920. When the water of the Colorado River was turned into this cut-off, the action of the water soon enlarged the constructed channel so that substantially the entire flow of the river followed this course rather than its former natural course. The change in the course of the river channel resulting from this man-made cut-off was avulsive in character and the main channel of the river has since continued in the channel established by this cut-off.

Tr. 20,117–130, U.S. Exs. 589, 589A, 589B, 589C, 589D

Finding 4.4.105

Immediately prior to turning the water of the Colorado River into the Olive Lake Cut-off, there were on the easterly side of the River but to the west of the cut-off, lands of the Colorado

River Indian Reservation which continue in place now. These lands are partially included within the additional lands included within the Reservation by the Executive Orders of November 22, 1873, November 16, 1874, and May 15, 1876, and are partially accretions to such lands. The ownership of those lands was not affected by the avulsive change in the river channel brought about by the Olive Lake Cut-off and they continued to be a part of the Colorado River Indian Reservation. There are included within those lands 2,058 acres which are suited for irrigation and which are susceptible of irrigation from the Colorado River with an annual consumptive use of 6,859 acre-feet and an annual diversion requirement of 13,718 acre-feet.

Tr. 20,211–2, U.S. Exs. 570, 579C, 592

Conclusion 4.4.103

By reason of the reservation of lands as an addition to the Colorado River Indian Reservation by the Executive Orders of November 22, 1873, November 16, 1874, and May 15, 1876, accretions to those lands, and the avulsive change in the Colorado River caused by the Olive Lake Cut-off, the United States has the right to divert, for irrigation of 2,058 irrigable acres of the Colorado River Indian Reservation situated on the west of the Colorado River, waters from the Colorado River in an annual quantity of 13,718 acre-feet, with priority dates from November 22, 1873, to May 15, 1876.

Finding 4.4.106

The Ninth Avenue Cut-off was constructed across the neck of a loop in the existing channel of the Colorado River in 1943. When the water of the River was turned into this cut-off, the action of water soon enlarged the constructed channel so that substantially the entire flow of the River followed this course rather than its former natural course. The change in the course of the river channel resulting from this man-made cut-off was avulsive in character, and the channel of the River has since then continued in substantially the channel established by the cut-off.

Tr. 20,172–181, U.S. Exs. 590, 591

Finding 4.4.107

Immediately prior to turning the water of the Colorado River into the Ninth Avenue Cut-off, there were on the easterly side of the River but to the west of the cut-off, lands of the Colorado River Indian Reservation which continue in place now. These lands are accretions to the additional lands included within the Reservation by the Executive Orders of November 22, 1873, November 16, 1874, and May 15, 1876. The ownership of those lands was not affected by the avulsive change in the river channel brought about by the Ninth Avenue Cut-off and they continue to be a part of the Colorado River Indian Reservation. There are included within those lands 222 acres which are suited for irrigation and which are susceptible of irrigation from the Colorado River with an annual consumptive use of 740 acre-feet and an annual diversion requirement of 1,480 acre-feet

Tr. 20,215, U.S. Exs. 570, 592

Conclusion 4.4.104

By reason of the reservation of lands as an addition to the Colorado River Indian Reservation by the Executive Orders of November 22, 1873, November 16, 1874, and May 15, 1876, accretions to those lands, and the avulsive change in the Colorado River caused by the Ninth Avenue Cut-off, the United States has the right to divert for irrigation of 222 irrigable acres of the Colorado River Indian Reservation situated on the west of the Colorado River, water from the Colorado River in an annual quantity of 1,480 acre-feet, with priority dates from November 22, 1873, to May 15, 1876.

Finding 4.4.108

Abutting those lands in Arizona set aside by the Executive Orders of November 22, 1873, November 16, 1874, and May 15, 1876, as additions to the Colorado River Indian Reservation, there are 461 acres which are west of the meander line of the west bank of the River surveyed in 1874 but east of the present channel of the River. The same constitute accretions to the

Reservation lands and consequently are part of the Reservation. These 461 acres are suited for irrigation and susceptible of irrigation from the Colorado River with an annual consumptive use of 1,536 acre-feet and an annual diversion requirement of 3,072 acre-feet.

Tr. 20,216, U.S. Exs. 570, 592

Conclusion 4.4.105

By reason of the reservation of lands as an addition to the Colorado River Indian Reservation by the Executive Orders of November 22, 1873, November 16, 1874, and May 15, 1876, and accretions to those lands, the United States has the right to divert for irrigation of 461 irrigable acres of the Colorado River Indian Reservation in Arizona water of the Colorado River in an annual quantity of 3,072 acre-feet with priority dates from November 22, 1873, to May 15, 1876.

Finding 4.4.109

The irrigable lands of the Colorado River Indian Reservation in California have an aggregate annual consumptive use and diversion requirement as follows:

Reservation units	Net area (acres)	Consumptive use (acre-feet)	Diversion requirement (acre-feet)
Northern Westside	5, 933	19, 774	39, 548
Central Westside	1, 800	5, 999	11, 998
Olive Lake Cut-off	2, 058	6, 859	13, 718
Ninth Avenue Cut-off	222	740	1, 480
Total	10, 013	33, 372	66, 744

Finding 4.4.110

The aggregate annual consumptive use and annual diversion requirement for the irrigable acres of the portion of the Colorado River Indian Reservation in Arizona are as follows:

Reservation units	Net area (acres)	Consumptive use (acre-feet)	Diversion requirement (acre-feet)
Valley lands	93, 046	310, 121	620, 242
Mesa lands	6, 329	21, 095	42, 190
Totals	99, 375	331, 216	662, 432

Conclusion 4.4.106

The United States has the right to divert for the irrigation of 109,388 irrigable acres of the Colorado River Indian Reservation, water of the Colorado River in a total quantity of 729,176 acre-feet per year with priority dates from March 3, 1865, to May 15, 1876.

Fort Mohave Indian Reservation

Finding 4.5.1

Fort Mohave Indian Reservation was originally established as a military reserve consisting of Camp Mohave, Camp Mohave Hay and Wood Reserve and the intermediate tract lying between the same, by the Executive Order of March 30, 1870. The military reserve was transferred to the Department of Interior for Indian use by the Executive Order of September 19, 1890.

U.S. Ex. 1323 and 1303

Finding 4.5.2

The Mohave Indians have historically cultivated lands of the Colorado River valley.

U.S. Ex. 258 (p. 388), U.S. Ex. 520 (p. 205), U.S. Ex. 1308 (p. 108), U.S. Ex. 1205

Finding 4.5.3

By the Executive Order of December 1, 1910, superseded by the Executive Order of February 2, 1911, designated lands were set apart as an addition to the Fort Mohave Indian Reservation for the use and occupation of the Fort Mohave and such

other Indians as the Secretary of the Interior might see fit to settle thereon.

U.S. Exs. 1304, 1305

Finding 4.5.4

The fertility of the land, the ease by which it could be irrigated from the Colorado River, and the proximity of the railhead of Needles, California, for marketing of crops grown were relied upon by agents of the United States in recommendations preceding this addition to the Fort Mohave Indian Reservation by the Executive Orders of December 1, 1910, and February 2, 1911.

U.S. Ex. 1309 (p. 116)

Finding 4.5.5

Portions of the Fort Mohave Indian Reservation are located within the external boundaries of the states of Arizona, Nevada, and California.

Tr. 13,764, U.S. Ex. 1317

Finding 4.5.6

The Fort Mohave Indian Reservation contains approximately 38,000 acres.

Tr. 13,764

Finding 4.5.7

The Fort Mohave Tribe, the members of which reside on or are entitled to reside on the Fort Mohave Indian Reservation, has a current population of approximately 450. A number of the Fort Mohave Indians live in a colony in Needles, California, about a mile away from the Reservation, and work for the Santa Fe Railroad. This colony was established with Tribal funds received upon sale of certain Reservation lands.

Tr. 13,764–5, Tr. 14,220–2

Finding 4.5.8

There are within the Fort Mohave Indian Reservation 22,792 acres suitable for irrigation and susceptible of being irrigated from the Colorado River.

U.S. Exs. 1317, 1318, 1320, 1321; Tr. 14,072–8, Tr. 14,246–7, Tr. 14,173–4, Calif. Exs. 3515, 3516.

500756—59——6

Finding 4.5.9

The 22,792 irrigable acres are situated within the following areas of the Fort Mohave Indian Reservation:

	Arizona	Nevada	California	Total
Executive Order of Mar. 30, 1870:				
Camp Mohave Military Reserve	593	2, 155	0	2, 748
Hay and Wood Reserve	2, 162	0	4, 064	6, 226
Intermediate Tract between Military Reserve and Hay and Wood Reserve	2, 053	0	0	2, 053
Subtotal				11, 027
Executive Order of Dec. 1, 1910 Arizona Even Numbered Sections	11, 765	0	0	11, 765
Total	16, 573	2, 155	4, 064	22, 792

U.S. Exs. 1318, 1320, 1321; Tr. 14,173–4, Calif. Exs. 3515, 3516.

Finding 4.5.10

With an acreage reduction of 10% for rights-of-way, farmsteads, and the like, the net irrigable acres, the annual consumptive use and diversion requirement for the Fort Mohave Indian Reservation are as follows:

Reservation units	Net area (acres)	Consumptive use (acre-feet)	Diversion requirement (acre-feet)
Arizona	14, 916	48, 208	96, 416
California	3, 658	11, 823	23, 646
Nevada	1, 939	6, 267	12, 534
Total	20, 513	66, 298	132, 596

U.S. Ex. 1322, Calif. Ex. 3517

Conclusion 4.5.1

By reason of the establishment of the Fort Mohave Indian Reservation, the United States has the right to divert, for

irrigation of 20,513 irrigable acres of the Fort Mohave Indian Reservation, waters of the Colorado River in a total quantity of 132,596 acre-feet per year, with the following dates of priority:

4,327 acres in Arizona	March 30, 1870
3,658 acres in California	March 30, 1870
1,939 acres in Nevada	March 30, 1870
10,589 acres in Arizona	December 1, 1910

(If the total area of the Hay and Wood Reserve, specified by the Executive Order of March 30, 1870, as 9,114.81 acres, is reduced by according conclusive effect to the 1928 survey of the General Land Office, as contended by California, then the following findings and conclusion should be substituted for Finding 4.5.8, 4.5.9, and 4.5.10, and Conclusion 4.5.1.)

Finding 4.5.101.

There are within the Fort Mohave Indian Reservation 21,082 acres suitable for irrigation and susceptible of being irrigated from the Colorado River.

Calif. Ex. 3516

Finding 4.5.102

The 21,082 irrigable acres are situated within the following areas of the Fort Mohave Indian Reservation:

	Arizona	Nevada	California	Total
Executive Order of March 30, 1870:				
Camp Mohave Military Reserve	593	2, 155	0	2, 748
Hay and Wood Reserve	2, 162	0	2, 354	4, 516
Intermediate Tract between Military Reserve and Hay and Wood Reserve	2, 053	0	0	2, 053
Subtotal				9, 317
Executive Order of December 1, 1910, Arizona Even Numbered Sections	11, 765	0	0	11, 765
Total	16, 573	2, 155	2, 354	21, 082

Calif. Exs. 3515, 3516

Finding 4.5.103

With an acreage reduction of 10% for rights-of-way, farmsteads, and the like, the net irrigable acres, the annual consumptive use and diversion requirement for the Fort Mohave Indian Reservation are as follows:

Reservation units	Net area (acres)	Consumptive use (acre-feet)	Diversion requirement (acre-feet)
Arizona	14, 916	48, 208	96, 416
California	2, 119	6, 849	13, 698
Nevada	1, 939	6, 267	12, 534
Total	18, 974	61, 324	122, 648

Calif. Ex. 3517

Conclusion 4.5.101

By reason of the establishment of the Fort Mohave Indian Reservation, the United States has the right to divert for the irrigation of 18,974 irrigable acres of the Fort Mohave Indian Reservation, waters of the Colorado River, in a total quantity of 122,648 acre-feet per year, with the following dates of priority:

4,327 acres in Arizona	March 30, 1870
2,119 acres in California	March 30, 1870
1,939 acres in Nevada	March 30, 1870
10,589 acres in Arizona	December 1, 1910

Chemehuevi Indian Reservation

Finding 4.6.1

The Chemehuevi Indian Reservation was established by the order of withdrawal of the Secretary of the Interior of February 2, 1907.

U.S. Ex. 1201

Finding 4.6.2

The Chemehuevi Indian Reservation located on the west bank of the Colorado River in the State of California has an area of approximately 28,000 acres.

Tr. 13,765

Finding 4.6.3

The Chemehuevi Indian Tribe, the members of which reside on or are entitled to reside on the Chemehuevi Indian Reservation, has a current population of approximately 300.

Tr. 13,765; 15,308–9

Finding 4.6.4

The Chemehuevi Indians have historically cultivated lands in the Colorado River valley. The valley lands within the Chemehuevi Indian Reservation have been inundated by Lake Havasu.

U.S. Ex. 258 (p. 387), U.S. Ex. 1206, 1207

Finding 4.6.5

There are within the Chemehuevi Indian Reservation certain mesa lands capable of being irrigated from the Colorado River by means of pumps. 2,057 acres of those lands are suited for irrigation.

U.S. Exs. 1207, 1208, 1209, Tr. 14,029–14,031

Finding 4.6.6

With an acreage reduction of 8% for rights of way and the like, the computed requirement of Colorado River water for the irrigation of the 1,900 net irrigable acres of the Chemehuevi Indian Reservation is an annual consumptive use of 6,237 acre-feet and an annual diversion requirement of 11,340 acre-feet.

U.S. Ex. 1210

Conclusion 4.6

By reason of the establishment of the Chemehuevi Indian Reservation, the United States has the right to divert, for irrigation of 1,900 irrigable acres of the Chemehuevi Indian Reservation, waters of the Colorado River in a total quantity of 11,340 acre-feet per year, with a priority of February 2, 1907.

Cocopah Indian Reservation

Finding 4.7.1

The Cocopah Indian Reservation was established by Executive Order of September 27, 1917.

U.S. Ex. 1001

Finding 4.7.2

The Cocopah Indian Reservation, consisting of two tracts located near the Colorado River southwest of Yuma, Arizona aggregating approximately 500 acres, is inhabited by the Cocopah Tribe which has a present population of approximately 90.

Tr. 13,767–8

Finding 4.7.3

The Cocopah Indians have historically cultivated the lands of the lower Colorado River valley.

U.S. Ex. 510 (p. 301); U.S. Ex. 511 (p. 152); U.S. Ex. 258 (pp. 386–7)

Finding 4.7.4

There are within the two tracts of the Cocopah Indian Reservation 442 acres of lands suited for irrigation. The Reservation is within the area of the Yuma Reclamation Project and the lands thereof are served Colorado River water through the works of that Project.

Tr. 14,020, U.S. Exs. 1004, 1006, 1007

Finding 4.7.5

Reducing the irrigable acreage by 11 acres because of canal right-of-way, the water requirements for the two tracts of the Cocopah Indian Reservation are as follows:

Reservation units	Net area (acres)	Consumptive use (acre-feet)	Diversion requirement (acre-feet)
East	76	242	484
West	355	1, 130	2, 260
Total	431	1, 372	2, 744

U.S. Ex. 1009

Conclusion 4.7

The United States has the right, under the Yuma Reclamation Project and through the works of that Project, to divert waters of the Colorado River in an annual quantity of 2,744 acre-feet for the irrigation of 431 irrigable acres of the Cocopah Indian Reservation.

Yuma Indian Reservation

Finding 4.8.1

The Yuma Indian Reservation in California was established by the Executive Order of January 9, 1884, for the Yuma and such other Indians as the Secretary of the Interior might see fit to settle thereon.

U.S. Ex. 1101

Finding 4.8.2

The Yuma or Quecham (Cuchan) Indians have historically cultivated the valley lands on both sides of the Colorado River near the confluence of the Colorado and Gila Rivers.

U.S. Ex. 258 (p. 387); U.S. Ex. 510 (p. 20); U.S. Ex. 1105; U.S. Ex. 1106 (p. 163)

Finding 4.8.3

On December 4, 1893, an agreement was entered into between the United States and the Yuma Indians by which said Indians surrendered to the United tates all their right, title, claim and interest in the Reservation established by Executive Order of January 9, 1884, for them and such other Indians as the Secretary might see fit to settle thereon. The agreement was subject to the condition that each Yuma Indian was to be allowed to select a five-acre tract on the Reservation, or in the adjoining area, which was to be allotted in severalty. The agreement provided that after allotments were made, the residue of the Reservation which was subject to irrigation should be sold by the Secretary of the Interior with the money to be used for the benefit of the Yuma Indians. This agreement was approved by Act of Congress August 15, 1894 (28 Stat. 332). The area of each allotment was increased to ten acres of irrigable land by the Act of March 3, 1911 (36 Stat. 1063).

U.S. Exs. 1102, 1104

Finding 4.8.4

The Yuma Indian Reservation, located on the Colorado River in California, consists of approximately 9,000 acres.

Tr. 13,766

Finding 4.8.5

The Yuma Indian Reservation is inhabited by the Quecham Tribe numbering approximately 1,200 which has an agricultural and wage economy.

Tr. 13,767

Finding 4.8.6

Within the Yuma Indian Reservation are 7,743 irrigable acres suited for irrigation and capable of irrigation from the Colorado River through the constructed works of the Reservation Division of the Yuma Reclamation Project. The annual consumptive use for these 7,743 irrigable acres is 25,808 acre-feet and the annual diversion requirement is 51,616 acre-feet.

U.S. Ex. 1121, Tr. 14,512–14,515

Conclusion 4.8

By reason of the establishment of Yuma Indian Reservation, the United States has the right to divert, for irrigation of 7,743 irrigable acres of the Yuma Indian Reservation, water of the Colorado River in an annual quantity of 51,616 acre-feet with a priority of January 9, 1884.

Coachella Indian Reservations

Finding 4.9.1

There are within the Coachella Valley of California three Indian reservations, known as the Cabazon, Augustine and Torres-Martinez Indian Reservations. These Reservations are not within the natural drainage area of the Colorado River and some of the lands of the Reservations have been in times past irrigated by pumping from local underground sources.

U.S. Exs. 2504–2508

Finding 4.9.2

The Cabazon, Augustine and Torres-Martinez Indian Reservations are within the Lower Colorado River Basin as defined in Article II(g) of the Colorado River Compact. The Cabazon and Augustine Indian Reservations are within the lands of Improvement District No. 1 of the Coachella Valley County Water District and within the Coachella Service Area as defined in Exhibit B of the contract of October 15, 1934, between the United States and the Coachella Valley County Water District.

Said contract provided for the construction by the United States of the All-America Canal with capacity of 1,500 cubic feet of water per second to be used by the Coachella Valley County Water District for the benefit of the lands then or thereafter within said District and lying within said Coachella Service Area and for the delivery by the United States of Colorado River water for such lands. 7,976 acres of the Torres-Martinez Indian Reservation are within the lands of Improvement District No. 1 of the Coachella Valley County Water District and 1,360 acres of the Torres-Martinez Indian Reservation are within the Coachella Service Area designated the Fish Springs Area defined in Exhibit E of the said contract of October 15, 1934.

U.S. Ex. 2503, Tr. 14,985–8; Plf. Ex. 36

Finding 4.9.3

By the contract of December 22, 1947, between the United States and Coachella Valley County Water District, the United States agreed to construct a distribution system for the lands then or thereafter within the Coachella Valley County Water District and the Coachella Service Area defined in the contract of October 15, 1934, between the United States and said District. In the construction of this distribution system, provision was made for capacity to irrigate 10,500 acres of Indian lands in Coachella Valley.

U.S. Ex. 2511; Calif. Ex. 309, Tr. 8,397, Tr. 14,972

Finding 4.9.4

The Act of August 25, 1950 (64 Stat. 470) directed the Secretary of the Interior to designate the lands of the Cabazon, Augustine and Torres-Martinez Indian Reservations which might be irrigated from the facilities of the Coachella Valley County Water District and to contract with the District for the extension of the system to the Indian lands. However, the District was unwilling to assume the financial obligation involved in extending the system to the Indian lands. Subsequently, an agreement was reached between the District and the Secretary of the Interior, subject to the enactment of the necessary authorizing legislation, for construction by the United States of the extension of the distribution system to

the Indian lands and operation and maintenance by the District of said system. Such agreement further provides that after any major part of such irrigation distribution system and drainage works has been turned over to the District, for operation and maintenance, the District shall deliver water to those lands of the Cabazon, Augustine and Torres-Martinez Reservations within Improvement District No. 1 totaling 10,241 acres that can be irrigated through such part of the system to the same extent as water is delivered by the District to other lands similarly located within the District.

U.S. Exs. 2510A, 2510B, 2510C; Calif. Ex. 254

Finding 4.9.5

The Act of August 28, 1958 (72 Stat. 968) amended the Act of August 25, 1950 and authorized and directed the Secretary of Interior to construct an irrigation distribution system and drainage works within Improvement District No. 1 of the Coachella Valley County Water District for the designated lands of the Cabazon, Augustine and Torres-Martinez Indian Reservations connecting with the distribution system and drainage works of said Water District, and to contract with the District for care, operation and maintenance of the distribution system and drainage works constructed on the Indian lands and for delivery of water to those lands.

Finding 4.9.6

The net irrigable areas of the Cabazon, Augustine and Torres-Martinez Indian Reservations, after deduction for non-irrigable soils and rights of way, are as follows:

Lands within Improvement District No. 1:	*Acres*
Cabazon	1,601
Augustine	571
Torres-Martinez	7,667
Total	9,839

Lands outside Improvement District No. 1:	
Torres-Martinez:	*Acres*
Riverside County (all outside the Service Area)	396
Imperial County	1,327
Total	1,723
Grand total	11,562

U.S. Exs. 2501, 2502, 2503, Tr. 14, 986–7

Finding 4.9.7

The computed water requirements for the irrigable lands of the Cabazon, Augustine and Torres-Martinez Indian Reservations within Improvement District No. 1 are as follows:

	Net area	Farmsteads (acres)	Agricultural area	Consumptive use (acre-feet)	Farm headgate requirement (acre-feet)
Cabazon	1,601	80	1,521	4,992	8,320
Augustine	571	28	543	1,783	2,972
Torres-Martinez	7,667	383	7,284	23,910	39,850
Total	9,839	491	9,348	30,685	51,142

U.S. Ex. 2512

Conclusion 4.9

By reason of the Boulder Canyon Project Act, the Act of August 25, 1950 (64 Stat. 470), the Act of August 28, 1958 (72 Stat. 968), and the contract of October 15, 1934, between the United States and the Coachella Valley County Water District, the United States is entitled to the use of waters of the Colorado River through the All-American and Coachella Canals and the distribution facilities of the Coachella Valley County Water District on the 9,348 net agricultural acres of the Cabazon, Augustine, and Torres-Martinez Indian Reservations located within Improvement District No. 1 of that District and in an annual quantity of 51,142 acre-feet at the farm headgate.

By reason of the Boulder Canyon Project Act, and the contract of October 15, 1934, between the United States and the Coachella Valley County Water District, the United States will be entitled to the use of waters of the Colorado River through the All-American and Coachella Canals and the distribution facilities of the Coachella Valley County Water District on the agricultural acres of the Torres-Martinez Indian Reservation, located outside Improvement District No. 1 but inside the Coachella Service Area, upon the inclusion of such lands within the boundaries of the Water District.

Havasupai Indian Reservation

Finding 4.10.1

The Havasupai Indian Reservation was created by the Executive Orders of June 8, 1880, November 23, 1880, and March 31, 1882, for the use and occupancy of the Suppai (Yavai Suppai) Indians. By the terms of each of such orders waters of Cataract Creek and the existing settlements and improvements of the Suppai Indians were included within the reservation boundaries.

U.S. Exs. 701, 702, and 703

Finding 4.10.2

The Havasupai Indian Reservation is located in the bottom of a side canyon of the Grand Canyon in Arizona and contains approximately 3,000 acres.

Tr. 13,761, U.S. Ex. 721

Finding 4.10.3

The Havasupai Tribe, with a current population of approximately 250, inhabit the Havasupai Indian Reservation and grow subsistence gardens.

Tr. 13,762

Finding 4.10.4

Within the Havasupai Indian Reservation are 204 acres of lands susceptible of irrigation from the existing irrigation system and which are suited for irrigation.

Tr. 14,012, U.S. Exs. 718 and 719

Finding 4.10.5

The source of water supply for the 204 irrigable acres of the Havasupai Indian Reservation is Havasu Creek, sometimes known as Cataract Creek, which is adequate for the irrigation of said lands. Havasu Creek is a tributary which has its confluence with the Colorado River above Lake Mead and a short distance below this Reservation. The annual consumptive use is 505 acre-feet and the annual diversion requirement is 1,120 acre-feet.

U.S. Ex. 722, Tr. 14,461–2

Conclusion 4.10

By reason of the establishment of the Havasupai Indian Reservation, the United States has the right to divert, for irrigation of 204 irrigable acres of the Havasupai Indian Reservation, waters of Havasu Creek in a total quantity of 1,120 acre-feet per year and with a priority of June 8, 1880.

Hualapai Indian Reservation

Finding 4.11.1

The Hualapai Indian Reservation was established by the Executive Order of January 4, 1883, for the use and occupancy of the Hualapai Indians.

U.S. Ex. 801

Finding 4.11.2

The Hualapai Indian Reservation is located in northern Arizona abutting the Colorado River and extending south from it.

Tr. 13,762

Finding 4.11.3

The Hualapai Indian School Reserve created by Executive Order of December 22, 1898, and added to by Executive Order of May 14, 1900, and the Hualapai Indian Reserve consisting of allotments of land to individual Hualapai Indians are located south of the Hualapai Reservation.

U.S. Exs. 803, 804; U.S. Exs. 806 through 810

Finding 4.11.4

The Hualapai Indian Reservation, the Hualapai Indian School Reserve and the Hualapai Indian Reserve have a combined area of approximately 1,000,000 acres and are inhabited by the Hualapai Tribe which has a current population of approximately 700.

Tr. 13,763

Finding 4.11.5

The Hualapai Indians have primarily a livestock economy and have historically utilized the irrigable acres located on the Hualapai Indian Reservation, School Reserve and Allotments.

Tr. 13,763, U.S. Exs. 811 through 815

Finding 4.11.6

There are within the Hualapai Indian Reservation, Hualapai Indian Reserve, and the Hualapai Allotments 83 acres which are susceptible of irrigation from present irrigation systems and which are suited for irrigation.

U.S. Exs. 819 through 822, Tr. 14,015–6

Finding 4.11.7

The source of water supply, annual consumptive use, annual diversion requirement and the priority dates of the four irrigation units comprising the 83 irrigable acres of the Hualapai Indian Reservation, Hualapai Indian School Reserve, and the Hualapai Allotments, are as follows:

Irrigation units	Source of water supply	Net area (acres)	Priority date	Annual	
				Consumptive use (acre-feet)	Diversion requirement (acre-feet)
Hualapai Indian Reservation	Big Sandy River	21	Jan. 4, 1883	49	98
Meriwhitica Unit of the Hualapai Reservation	Spring	11	Jan. 4, 1883	25	50
Hualapai Allotments	Big Sandy River	41	1897	95	190
Indian School Reserve	Well	10	Dec. 22, 1898	24	48
Total		83		193	386

The water supply physically available is adequate for the irrigation of said lands. Meriwhitica Spring is within the drainage area of the Colorado River above Lake Mead. Big Sandy River is a tributary of the Bill Williams River.

U.S. Exs. 801, 803, 804, 824, and 811, Tr. 14,459–61

Conclusion 4.11

By reason of the establishment of the Hualapai Indian Reservation, the Hualapai Indian School Reserve and the Hualapai Allotments, the United States has the right to divert, for irrigation of 83 irrigable acres of the Hualapai Indian Reservation, Hualapai Indian School Reserve and Hualapai Allotments, waters of the sources, and with the dates of priority as set forth below and in a total quantity of 386 acre-feet per year:

Hualapai Indian Reservation.	21 acres from the Big Sandy River.	Jan. 4, 1883
Hualapai Indian Reservation.	11 acres from Meriwhitica Spring.	Jan. 4, 1883
Hualapai Allotments	41 acres from the Big Sandy River.	1897
Hualapai Indian School Reserve.	10 acres from Well	Dec. 22, 1898

Kaibab Indian Reservation

Finding 4.12.1

The Kaibab Indian Reservation was established by the Order of October 16, 1907, promulgated by the Department of the Interior. The Executive Order of July 17, 1917, superseded and took the place of the Order of October 16, 1907, and set apart approximately 125,000 acres in Arizona for the use of the Kaibab and other Indians residing thereon and for such other Indians as the Secretary of the Interior might locate thereon.

U.S. Ex. 602

Finding 4.12.2

The Kaibab Indian Reservation, located adjacent to the northern border of Arizona, is inhabited by the Kaibab Band of Paiute Indians which has a current population of approximately 100.

Tr. 13,760–1

Finding 4.12.3

The Kaibab Indians have historically utilized Moccasin Spring and other springs for garden-type farming.

U.S. Exs. 604, 605, 606, Tr. 13,761

Finding 4.12.4

Within the Kaibab Indian Reservation are 84 acres which are susceptible of irrigation from existing irrigation systems and which are suitable for irrigation. The water supply physically available is adequate for the irrigation of these lands. The sources of supply are within the drainage area of Kanab Creek, a tributary having its confluence with the Colorado River above Lake Mead.

U.S. Exs. 615, 616, 617, 618, 619, 620, 2907, Tr. 14,005–7; 14,457–8

Finding 4.12.5

The 84 irrigable acres of the Kaibab Indian Reservation are situated in three units which have the following sources of water supply, annual consumptive use and annual diversion requirement:

Reservation units	Source of water supply	Irrigable area (acres)	Consumptive use (acre-feet)	Diversion requirements (acre-feet)
Kaibab Village	Moccasin Spring	25	51	102
Pipe Springs	Pipe Springs	11	22	44
Two Mile Wash	Two Mile Wash	48	97	194
Total		84	170	340

U.S. Ex. 622

Conclusion 4.12

By reason of the establishment of the Kaibab Indian Reservation, the United States has the right to divert, for irrigation of 84 irrigable acres of the Kaibab Indian Reservation, water from sources within the drainage area of Kanab Creek in a total quantity of 340 acre-feet per year and with a priority of October 16, 1907.

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Moapa Indian Reservation

Finding 4.13.1

The Moapa Indian Reservation in southeastern Nevada on the Muddy River was first set apart for the use of Indians in that locality by Executive Order of March 12, 1873, enlarged by the Executive Order of February 12, 1874, and reduced to an area of 1,000 acres by Act of Congress of March 13, 1875.

U.S. Exs. 901, 902, and 903 (18 Stat. 420, 445)

Finding 4.13.2

The Paiute Indians were persuaded to come to the Moapa Reservation on the promise that the Government would aid them to become established in agriculture there.

U.S. Ex. 911

Finding 4.13.3

The Moapa Indian Reservation is inhabited by the Moapa band of Paiute Indians, the current population of that band being approximately 100.

Tr. 13,763

Finding 4.13.4

There are within the Moapa Indian Reservation 591 acres which are susceptible of being irrigated from the existing irrigation system and which are suitable for irrigation.

U.S. Exs. 922, 923, Tr. 14,019

Finding 4.13.5

The source of water supply for the 591 irrigable acres of the Moapa Indian Reservation is the Muddy River, sometimes known as the Moapa River, which originally was a tributary of the Virgin River and now flows directly into Lake Mead. The source of supply is adequate for the irrigation of said lands. The annual consumptive use is 1,850 acre-feet and the annual diversion requirement is 3,700 acre-feet.

U.S. Exs. 925, 901

Conclusion 4.13

By reason of the establishment of the Moapa Indian Reservation, the United States has the right to divert, for irrigation of 591 irrigable acres of the Moapa Indian Reservation, waters

of the Muddy River, and in the total quantity of 3,700 acre-feet per year and with a priority of March 12, 1873.

Salt River Indian Reservation

Finding 4.14.1

By the Executive Order of January 10, 1879, as superseded by the Executive Order of June 14, 1879, the Salt River Indian Reservation was established for the use of the Pima and Maricopa Indians in addition to the Gila River Indian Reservation already established. The Executive Order of June 14, 1879, setting apart for the use of the Pima and Maricopa Indians, lands on both sides of the Salt River, included within the described boundaries portions of the Salt and Verde Rivers. The Executive Order of June 14, 1879, was amended by the Executive Order of March 22, 1911, to make the Reservation available for the use of the Pima and Maricopa Indians and such other Indians as the Secretary of the Interior might see fit to settle thereon.

U.S. Ex. 2102; U.S. Ex. 2103; U.S. Ex. 2105

Finding 4.14.2

Because of the insufficiency of water on the Gila River Indian Reservation, many of the Pima and Maricopa Indians had moved to the Salt River Valley where they were able to earn their living by farming prior to the establishment of the Salt River Indian Reservation.

U.S. Ex. 1924 (p. 316); U.S. Ex. 1927 (p. 6)

Finding 4.14.3

The Salt River Indian Reservation contains about 47,000 acres and is inhabited by the Salt River Pima-Maricopa Community which has an approximate current population of 1,500.

Tr. 14,646

Finding 4.14.4

By the decree of March 1, 1910, in *Hurley* v. *Abbott et al.*, in the Third Judicial District for the Territory of Arizona in the County of Maricopa, hereinafter referred to as the Kent Decree, there was decreed a first right to the use of 700 miner's

inches of water from the Salt River for irrigation of 2,333 acres of the Salt River Indian Reservation situated on the north side of the Salt River and a priority of 1878 for irrigation of 1,115 acres of the Salt River Indian Reservation situated on the south side of the Salt River.

Plf. Ex. 101 (pp. 18, 22, 46)

Finding 4.14.5

The Act of Congress of May 18, 1916, authorized and directed the Secretary of the Interior to provide for water rights in perpetuity for the irrigation of six hundred and thirty-one Salt River Indian allotments of ten acres each by water from works constructed under the Reclamation Act. Pursuant to said Act and in order to provide an additional surface water supply for the irrigation of 6,310 acres of land exclusive of the irrigated lands of the Salt River Indian Reservation provided with a water supply under the Kent Decree, the United States of America on June 3, 1935, contracted with the Salt River Valley Water Users' Association, by which contract the United States has the right to use on the Salt River Indian Reservation 20% of the waters of the Verde River stored by Bartlett Dam.

U.S. Ex. 2108 (39 Stat. 130); Plf. Ex. 30

Finding 4.14.6

There are within the Salt River Indian Reservation 13,134 acres suited for irrigation and susceptible of irrigation from the existing irrigation system. For the purpose of calculation of water requirements, the irrigable acreage of the Salt River Indian Reservation including lands irrigated by pumped waters within the Salt River drainage area in addition to those irrigated by water provided under the Kent Decree and Bartlett Dam storage, has been limited to 12,625 acres. The supply of water from the mentioned sources is adequate for the irrigation of these 12,625 acres.

U.S. Exs. 2120, 2121, 2126, Tr. 14,770, Tr. 15,087

Finding 4.14.7

The water requirements for the 12,625 irrigable acres of the Salt River Indian Reservation, from surface and under-

ground sources within the drainage area of the Verde and Salt Rivers, are 33,154 acre-feet per year of consumptive use and 53,464 acre-feet per year diversion requirement.

U.S. Ex. 2127

Conclusion 4.14

By reason of the Kent decree and as against parties to that cause, the United States has a first right to the use of 700 miner's inches of water from the Salt River for the irrigation of 2,333 acres of the Salt River Indian Reservation and a priority of 1878 to the use of waters of the Salt River for the irrigation of 1,115 acres of the Salt River Indian Reservation.

By reason of the establishment of the Salt River Indian Reservation, the United States has the right to divert, for irrigation of 12,625 irrigable acres of the Salt River Indian Reservation, including those mentioned in the preceding paragraph, water from sources within the drainage area of the Verde and Salt Rivers in a total quantity of 53,464 acre-feet per year with a priority of January 10, 1879.

Fort McDowell Indian Reservation

Finding 4.15.1

Fort McDowell Indian Reservation was originally established as a military reserve encompassing lands of the Verde Valley on both sides of the Verde River by the Executive Orders of April 12, 1867, and March 30, 1870, and was transferred to the Interior Department as an abandoned military reservation under the Act of July 5, 1884.

U.S. Ex. 2201 (23 Stat. 103), U.S. Exs. 1323, 1324

Finding 4.15.2

By 1900, certain of the Mohave-Apache Indians had settled on the Camp McDowell abandoned military reservation. It was the request of the Indians and the recommendation of the President's personal representative that the irrigable lands of the reservation, much of it already under ditch, be set aside for the use of the Indians. Consequently, by the Executive Order of September 15, 1903, certain of the lands of the abandoned military reservation including specifically the tracts con-

taining the irrigation ditch were set aside for the use and occupancy of such Mohave-Apache Indians then living thereon or in the vicinity and such other Indians as the Secretary of the Interior might thereafter deem necessary to place thereon.

U.S. Exs. 2203, 2205

Finding 4.15.3

The Fort McDowell Indian Reservation contains some 25,000 acres and is inhabited by the Fort McDowell-Mohave-Apache Tribe which numbers approximately 300.

Tr. 14,647

Finding 4.15.4

There are within the Fort McDowell Indian Reservation in excess of 1,300 acres suited for irrigation and capable of being irrigated from the Verde River by the existing irrigation system.

Tr. 14,778, U.S. Exs. 2211, 2212

Finding 4.15.5

The supply of water from the Verde River is adequate to irrigate 1,300 acres of the Fort McDowell Indian Reservation.

Tr. 15,095

Finding 4.15.6

There was decreed to the United States by the Kent Decree the right to divert 390 miner's inches constant flow from the Verde River for use on 1,300 acres of the Fort McDowell Indian Reservation.

Plf. Ex. 101 (pp. 18–19)

Finding 4.15.7

The annual consumptive use has been computed as 3,151 acre-feet and the annual diversion requirement as 6,302 acre-feet for the irrigation from the Verde River of 1,300 acres of the Fort McDowell Indian Reservation.

U.S. Ex. 2214

Conclusion 4.15

By reason of the establishment of the Fort McDowell Indian Reservation, the United States has the right for the irrigation of 1,300 irrigable acres of the Fort McDowell Indian Reservation, to divert waters of the Verde River in a quantity of 6,302 acre-feet per year and with a priority of April 12, 1867.

Camp Verde Indian Reservation

Finding 4.16.1

The present Camp Verde Indian Reservation was acquired by purchase pursuant to the Act of August 1, 1914.

U.S. Exs. 2302 (38 Stat. 588), 2303A, 2303B, 2306, 2307

Finding 4.16.2

The Camp Verde Indian Reservation located in the Verde River Valley consists of two tracts, known as the Middle Verde and the Lower Verde Areas, totaling about 500 acres. The Reservation is inhabited by the Yavapai-Apache Indian Community which has an approximate population of 650.

Tr. 14,647–8

Finding 4.16.3

The Middle Verde Area contains 187 acres suited for irrigation and the Lower Verde area 29 acres suited for irrigation. The total 216 acres can be irrigated from the Verde River by the existing irrigation systems. The water supply is adequate.

U.S. Exs. 2309, 2310, 2311, 2312, Tr. 14,780–1; 15,095–6

Finding 4.16.4

The annual consumptive use and annual diversion requirement for the irrigation areas of the Camp Verde Indian Reservation are as follows:

Reservation units	Net area (acres)	Consumptive use (acre-feet)	Diversion requirement (acre-feet)
Middle Verde	187	401	802
Lower Verde	29	62	124
Total	216	463	926

U.S. Ex. 2314

Finding 4.16.5

The water rights for the Middle Verde Area of the Camp Verde Indian Reservation were acquired by the United States

by purchase of shares of the O.K. Ditch Company and the rights so acquired have a priority of June 20, 1876.

U.S. Exs. 2303, 2303A, 2303B, 2304, 2305

Conclusion 4.16.1

By reason of acquisition of shares of the O.K. Ditch Company, the United States has the right for the irrigation of 187 irrigable acres of the Camp Verde Indian Reservation, to divert waters of the Verde River in the quantity of 802 acre-feet per year and with a priority of June 20, 1876.

Finding 4.16.6

The Lower Verde Area of the Camp Verde Indian Reservation was acquired by the United States by purchase of the land and appurtenances on November 1, 1909, and the waters of the Verde River have been applied to use thereon by the Indians of said Reservation.

U.S. Exs. 2301, 2308, Tr. 14,780

Conclusion 4.16.2

By reason of the purchase of land and appurtenances and the diversion and use of Verde River water thereon, the United States has the right for the irrigation of 29 irrigable acres of the Camp Verde Indian Reservation to divert waters of the Verde River in the quantity of 124 acre-feet per year.

Fort Apache Indian Reservation

Finding 4.17.1

A reservation for the use of the Apache Indians was established by the Executive Order of November 9, 1871. By the Act of June 7, 1897, a separate agency was created to cover and have jurisdiction over that portion of what was known then as the White Mountain or San Carlos Reservation, lying north of the Salt or Black River, said portion to be known as the Fort Apache Reservation.

U.S. Exs. 2401, 2402, 2403, 2404, 2409 (30 Stat. 64)

Finding 4.17.2

In the year 1869, Army scouts reported irrigation by the Apaches of lands subsequently included within the Reservation established for the use of the Apache Indians.

U.S. Ex. 2412

Finding 4.17.3

Upon establishment of the Reservation for the Apache Indians, the Indians enlarged the existing irrigation system by the use of tools and under supervision furnished by agents of the United States.

U.S. Exs. 2413, 2414, 2415

Finding 4.17.4

The Fort Apache Indian Reservation contains about 1,660,000 acres of land and is inhabited by the White Mountain-Apache Tribe. The White Mountain-Apache Indians engage in lumbering, stock-raising and subsistence agriculture.

Tr. 14,648–50

Finding 4.17.5

The White Mountain-Apaches have increased in number from approximately 1,500 at the time of the establishment of the Reservation for the Apache Indians to over 4,000 at the present time.

U.S. Ex. 500, Tr. 14,649; Calif. Ex. 2600–8

Finding 4.17.6

There are within the Fort Apache Indian Reservation 7,197 acres in 24 tracts suited for irrigation and capable of being irrigated from the Salt River and its tributaries with the existing irrigation systems, extensions thereof or additional systems. The annual consumptive use and diversion requirement for these areas have been computed as follows:

Reservation units	Net area (acres)	Consumptive use (acre-feet)	Diversion requirement (acre-feet)
North Fork and Diamond Creek	601	915	2, 033
Bear Flat	3, 550	5, 410	12, 022
East Fork	1, 087	1, 655	3, 678
Canyon Day	134	204	453
Cibeque Creek	662	1, 008	2, 240
Cedar Creek	142	216	480
Pacheta Creek	25	38	85
Bonita Creek	16	24	53
Turkey Creek	49	75	167
10 of Diamonds Ranch	13	20	44
Corduroy Creek:			
Amos Sawmill	12	18	40
Amos Ranch	9	14	31
Corduroy Area	19	28	62
Upper Carrizo	123	186	413
Carrizo-Blue Spring	112	170	378
Lower Carrizo-Limestone	74	112	249
Limestone-Bill Gatewood	16	25	56
Canyon Creek-Oak Creek	58	88	196
Canyon Creek	4	6	13
Canyon Creek-Chadiski	43	65	145
K–L Ranch	9	14	31
Upper Cibeque-White Spring	53	80	178
Spring Creek	4	6	13
Gleason Flat	382	774	1, 720
Total	7, 197	11, 151	24, 780

U.S. Exs. 2434 through 2481, Tr. 14,-783–14, 800; U.S. Ex. 2497

Finding 4.17.7

The water supply for the irrigation areas of the Fort Apache Indian Reservation is generally adequate. Some shortages may be experienced at times on some of the irrigation areas, but even in the years of shortage, crops can be raised by application of the water available.

Tr. 15,098–9

Conclusion 4.17.1

By reason of the establishment of the Fort Apache Indian Reservation, the United States has the right, for the irriga-

tion of 7,197 irrigable acres of the Fort Apache Indian Reservation, to divert water from the Salt River and its tributaries in a total quantity of 24,780 acre-feet per year and with a priority of November 9, 1871.

Finding 4.17.8

The Fort Apache Indian Reservation is well suited for hunting, fishing and recreation activities. The White Mountain-Apache Tribe has organized the White Mountain Recreation Enterprise to develop the recreation potential of the Reservation, carry on game protection, and in the process provide employment and revenue to members of the Tribe. Such development by the Tribe has included the construction of several small ponds and, in 1957, Smith Park Dam. Smith Park Dam on Trout Creek, a tributary of Salt River, will impound 4,445 acre-feet. The consumptive use of water by that reservoir, once it is filled, will be approximately 150 acre-feet per year.

Tr. 15,125–32; 15,144, Tr. 15,134–5, Tr. 15,180, U.S. Ex. 100; U.S. Exs. 2483, 2485 through 2496

Conclusion 4.17.2

By reason of the establishment of the Fort Apache Indian Reservation, the United States has the right for the useful purpose of commercial recreation to impound waters of Trout Creek, a tributary of the Salt River, in Smith Park Dam in the total quantity of 4,445 acre-feet and with a priority of November 9, 1871.

Papago Indian Reservation

Finding 4.18.1

The Papago Indian Reservation was created by the Executive Orders of May 28, 1912, January 14, 1916, and February 1, 1917, for the use of the Papago Indians settled thereon and such other Indians as the Secretary of the Interior might see fit to settle thereon.

U.S. Exs. 1501, 1502, and 1503

Finding 4.18.2

The Papago Indian Reservation, located in southern Arizona and abutting on the Mexican boundary, contains approximately

2,800,000 acres and is inhabited by some 6,700 members of the Papago Tribe.

Tr. 14,642

Finding 4.18.3

The Papagos have historically engaged in flood-type irrigation, and their farming operations were reported on by Indian agents as early as 1885.

U.S. Ex. 1504; U.S. Ex. 1515 (p. 4)

Finding 4.18.4

The so-called "Old Chuichu" area of the Papago Indian Reservation was irrigated by the Papago Indians with surface water from Santa Cruz Wash long before the establishment of the Reservation.

Tr. 14,717–8, Tr. 15,010; U.S. Exs. 1505, 1515 (pp. 4, 5)

Finding 4.18.5

Within that portion of the Papago Indian Reservation situated within the Lower Colorado River Basin, there are 1,885 acres which are suited for irrigation and which are susceptible of being irrigated from the existing irrigation systems.

Tr. 14,718, U.S. Exs. 1518, 1519

Finding 4.18.6

The 1,885 irrigable acres of the Papago Indian Reservation are presently irrigated from wells from an adequate underground supply with an annual consumptive use of 5,141 acre-feet and an annual diversion requirement of 8,568 acre-feet. Such lands and the sources of water supply are within the drainage area of the Santa Cruz River, a tributary of the Gila.

U.S. Ex. 1521; Plf. Ex. 112, Tr. 15,011

Conclusion 4.18

By reason of the history of use by the Papago Indians and by reason of the establishment of the Papago Indian Reservation, the United States has the right to divert, for irrigation of not less than 1,885 irrigable acres of the Papago Indian Reservation, water from sources within the drainage area of the Santa Cruz River in the total quantity of not less than 8,568 acre-feet per year and with a priority not later than 1885.

Ak Chin Indian Reservation

Finding 4.19.1

The Ak Chin Reservation was established by the Executive Order of May 28, 1912, for the Maricopa Band of Papago Indians settled thereon and such other Indians as the Secretary of the Interior might see fit to settle thereon.

U.S. Ex. 1501

Finding 4.19.2

The Ak Chin-Maricopa Reservation, located in southern Arizona, is comprised of about 21,000 acres of land and is inhabited by the Maricopa-Ak Chin Tribe which numbers approximately 140.

Tr. 14,644

Finding 4.19.3

The Maricopa Band of Papago Indians settled at Ak Chin Village before 1885 to irrigate from surface flow of washes in the Santa Cruz River Basin, but soon after the establishment of the Ak Chin Reservation it proved necessary to supplement the water supply for their irrigation by the installation of irrigation wells.

U.S. Exs. 1604, 1605, 1612 (p. 1)

Finding 4.19.4

There are within the Ak Chin-Maricopa Indian Reservation 12,998 acres which are suited for irrigation and which are susceptible of irrigation from the existing irrigation system.

U.S. Exs. 1615, 1616

Finding 4.19.5

The 12,998 irrigable acres of the Ak Chin-Maricopa Indian Reservation have an adequate underground water supply from sources within the drainage area of the Santa Cruz River, an annual consumptive use of 34,133 acre-feet and an annual diversion requirement of 48,760 acre-feet.

U.S. Ex. 1618, Tr. 15,023

Conclusion 4.19

By reason of the history of use by the Maricopa Band of the Papago Indians and establishment of the Ak Chin-Mari-

copa Indian Reservation, the United States has the right to divert, for irrigation of 12,998 irrigable acres of the Ak Chin-Maricopa Indian Reservation, water from sources within the drainage area of the Santa Cruz River in the total quantity of 48,760 acre-feet per year and with a priority not later than 1885.

San Xavier Indian Reservation

Finding 4.20.1

The San Xavier Indian Reservation was established by the Executive Order of July 1, 1874, around the San Xavier del Bac and for the use of the Papago and such other Indians as it might be desirable to place thereon.

U.S. Ex. 1701

Finding 4.20.2

The mission San Xavier del Bac was the situs of Indian irrigation from the time of the first Spanish settlement of the area and the continuation of that irrigation was the basis of recommendation by Indian Agents of the inclusion of the irrigated lands and water necessary for its irrigation within the San Xavier Indian Reservation.

U.S. Exs. 1702, 258 (pp. 384–5), 512 (p. 21), 1703, 1704

Finding 4.20.3

The San Xavier Indian Reservation, located on the Santa Cruz River near the City of Tucson, Arizona, consists of about 71,000 acres and is inhabited by over 500 Papago Indians.

Tr. 14,643

Finding 4.20.4

There are within the San Xavier Indian Reservation 3,967 acres classified as suited for irrigation. The irrigation system constructed for surface diversion from Santa Cruz River was supplemented by different arrangements for utilization of underground water, and wells within the drainage area of the Santa Cruz River are presently the exclusive source of supply used.

U.S. Ex. 1726; U.S. Exs. 1725, 1728, Tr. 14,723–5; 15,027; 15,037–40

Finding 4.20.5

The sources presently utilized provide an adequate water supply for the irrigable lands of the San Xavier Indian Reservation.

Tr. 15,040–1

Finding 4.20.6

With an average reduction of 6% for rights-of-way, and the like, the net irrigable area of 3,825 acres of the San Xavier Indian Reservation to be irrigated from wells has an annual consumptive use of 9,272 acre-feet and an annual diversion requirement of 13,840 acre-feet.

U.S. Ex. 1729

Conclusion 4.20

By reason of the establishment of the San Xavier Indian Reservation, the United States has the right to divert, for irrigation of 3,825 irrigable acres of the San Xavier Indian Reservation, water from sources within the drainage area of the Santa Cruz River in the total quantity of 13,840 acre-feet per year and with a priority not later than July 1, 1874.

Gila Bend Indian Reservation

Finding 4.21.1

The Gila Bend Indian Reservation was established by the Executive Order of December 12, 1882, for the use and occupancy of the Papago and other Indians then settled there and such other Indians as the Secretary of the Interior might see fit to settle thereon.

U.S. Ex. 1401

Finding 4.21.2

The Gila Bend Indian Reservation located on the Gila River contains approximately 10,000 acres and is inhabited by some 250 members of the Papago Tribe.

Tr. 14,640–1

Finding 4.21.3

There are within the Gila Bend Indian Reservation 954 acres which are susceptible of being irrigated by the present irriga-

tion systems and extensions thereof and which are suited for irrigation.

Tr. 14,713–5, U.S. Exs. 1408, 1409, 1410

Finding 4.21.4

Certain of the irrigable lands of the Gila Bend Indian Reservation have historically been irrigated by the Papago Indians by canals diverting the surface flow of the Gila River.

U.S. Ex. 1403 (p. 213), Tr. 14,713

Finding 4.21.5

The decreasing surface flow of the Gila River has made it impractical to continue use of the canals. Irrigation wells have been substituted and an adequate water supply, primarily from underground sources within the drainage area of and adjacent to the Gila River, is presently available for the irrigation of lands of the Gila Bend Indian Reservation.

Tr. 14,713; Tr. 15,007–9

Finding 4.21.6

The water requirements for the irrigation from wells of 621 of the irrigable acres of the Gila Bend Indian Reservation have been computed to be an annual consumptive use of 1,819 acre-feet and an annual diversion requirement of 3,638 acre-feet. The water requirements for the irrigation from wells for the additional 333 irrigable acres of said Reservation are an annual consumptive use of 966 acre-feet and an annual diversion requirement of 1,932 acre-feet.

Tr. 15,150, U.S. Ex. 1411

Conclusion 4.21

By reason of the establishment of the Gila Bend Indian Reservation, the United States has the right to divert, for irrigation of 954 irrigable acres of the Gila Bend Indian Reservation, water from sources within the drainage area of the Gila River in the total quantity of 5,570 acre-feet per year with a priority of December 12, 1882.

San Carlos Indian Reservation

Finding 4.22.1

A Reservation for the use of the Apache Indians was established by the Executive Order of November 9, 1871. Such Reservation was added to by the Executive Order of December 14, 1872, which designated part of the Reservation as the San Carlos division.

U.S. Exs. 2001, 2002, 2003, 2004, and 2006

Finding 4.22.2

Irrigation of the valley lands of the Gila River within the Reservation occurred before and immediately after the establishment of the Reservation for the use of the Apache Indians.

U.S. Ex. 2018; Plf. Ex. 103

Finding 4.22.3

The San Carlos Indian Reservation is located in eastern Arizona south of the Salt River and is traversed by the Gila River. The San Carlos River rises on and remains on the Reservation to its confluence with the Gila. This Reservation consists of about 1,600,000 acres, and is inhabited by the San Carlos-Apache Tribe which numbers approximately 4,500.

Plf. Ex. 112, Tr. 14,645–6

Finding 4.22.4

There are three irrigated areas within the San Carlos Indian Reservation—the Gila River Area, the San Carlos River Area, and the Oliver Talgo Farm. The water supply physically available for use on said lands is adequate for their irrigation.

U.S. Ex. 2061, Tr. 15,079–15,081

Finding 4.22.5

There are within the Gila River Area of the San Carlos Indian Reservation 1,572 acres suited for irrigation and capable of irrigation from the existing irrigation system. The Gila River Area of the San Carlos Indian Reservation is within that part added to the Reservation by the Executive Order of December 14, 1872.

U.S. Exs. 2052, 2053, Tr. 14,764; U.S. Ex. 2063

500756—59——8

Finding 4.22.6

By the decree entered on June 29, 1935, in the United States Court for Arizona in the case of *United States* v. *Gila Valley Irrigation District et al.*, hereinafter referred to as the Gila Decree, there was decreed to the United States a diversion right from the Gila River of 6,000 acre-feet per irrigation season for the irrigation of 1,000 acres of the San Carlos Indian Reservation with a priority date of 1846. The annual consumptive use of 1,000 acres of the Gila River Area has been computed as 2,424 acre-feet.

Plf. Ex. 103 (p. 14); U.S. Ex. 2062

Conclusion 4.22.1

By reason of the addition to the San Carlos Indian Reservation by the Executive Order of December 14, 1872, the United States has the right to divert for the irrigation of 1,572 irrigable acres of the Gila River area of said Reservation water from sources within the drainage area of the Gila River in a total quantity of 9,432 acre-feet per year with a priority of December 14, 1872.

As against the parties to the Gila Decree the right of the United States to the use of waters of the Gila River is limited to 6,000 acre-feet per year for the irrigation of 1,000 acres of the Gila River area of the San Carlos Indian Reservation with a priority of 1846.

Finding 4.22.7

The San Carlos River area of the San Carlos Indian Reservation contains 1,760 acres suited for irrigation and capable of irrigation from the San Carlos River by the existing irrigation system and the extension thereof. The annual consumptive use of this area has been computed as 4,266 acre-feet and the annual diversion requirement, 8,532 acre-feet.

U.S. Exs. 2048, 2049, Tr. 14,758–60;
U.S. Ex. 2062

Finding 4.22.8

The Oliver Talgo Farm area of the San Carlos Indian Reservation contains 143 acres suited for irrigation and capable of irrigation from wells within the drainage area of the Gila River. Using a consumptive irrigation water use of 2.40 acre-feet per

acre and a project efficiency of 50%, as in the computation of water requirements for the Gila River and San Carlos Units, the annual consumptive use of the 143 irrigable acres of the Oliver Talgo Farm area is 343 acre-feet per year with a diversion requirement of 686 acre-feet per year.

U.S. Exs. 2055, 2056, 2062; Plf. Ex. 112, Tr. 14,764–5

Finding 4.22.9

The San Carlos River area and Oliver Talgo Farm area are within the following areas of the San Carlos Indian Reservation according to the dates of creation of and addition to the Reservation:

	Acres
Within Reservation Created by Executive Order of Nov. 9, 1871:	
San Carlos River area	1,128
Within area added by Executive Order of Dec. 14, 1872:	
San Carlos River area	634
Oliver Talgo Farm	143

U.S. Exs. 2048B, 2063

Conclusion 4.22.2

By reason of the creation of the San Carlos Indian Reservation, the United States has the right, for irrigation of 1,903 irrigable acres of the San Carlos River, and Oliver Talgo Farm areas of the San Carlos Reservation, to divert water from sources within the drainage area of the Gila River, in total quantity of 9,218 acre-feet per year with priority dates as follows:

	Acres
Nov. 9, 1871	1,128
Dec. 14, 1872	777

Gila River Indian Reservation and San Carlos Project

Finding 4.23.1

By Act of February 28, 1859 (11 Stat. 401), Congress set apart the tracts of land along the Gila River occupied by the confederated band of Pima and Maricopa Indians as a reservation for those Indians. The Reservation, now known as the Gila River Indian Reservation, covered one hundred (100) square miles.

U.S. Ex. 1801

Finding 4.23.2

The lands so set apart as a reservation for the confederated band of Pima and Maricopa Indians were located so as to include gardens and farming ground of the Indians in the Gila Valley and to give them a great extent of water for their acequias.

U.S. Ex. 1921 (p. 358)

Finding 4.23.3

Lands were added to the Gila River Indian Reservation for the use and occupancy of the Pima and Maricopa Indians by Executive Order of August 31, 1876. Preceding such addition were reports by agents of the United States on the need for more land and water for the Indians.

U.S. Exs. 1802, 1923 (p. 127); U.S. Exs. 1924, 1925, 1926

Finding 4.23.4

More lands were added to the Gila River Indian Reservation for the use of the Pima and Maricopa Indians by Executive Order of January 10, 1879. This order was cancelled by the Executive Order of June 14, 1879. The latter order set apart lands in lieu of those covered by the Executive Order of January 10, 1879. Preceding this addition to the Reservation it was reported to the Commissioner of Indian Affairs that the continued scarcity of water on the Reservation for irrigation had caused many Pima and Maricopa Indians to migrate to the Salt River Valley to earn their living.

U.S. Exs. 1803, 1804, 1927

Finding 4.23.5

The Gila River Indian Reservation was further enlarged by Executive Order of May 5, 1882.

U.S. Ex. 1805

Finding 4.23.6

The Executive Order of November 15, 1883, defined the boundaries of the Gila River Indian Reservation as established by the Act of Congress of February 28, 1859, and as enlarged by the Executive Orders of August 31, 1876, June 14, 1879, and

May 5, 1882, and made additions thereto, all for the use and occupancy of the Pima and Maricopa Indians.

U.S. Ex. 1806

Finding 4.23.7

The Executive Orders of March 22, 1911, and May 8, 1911, amended the Executive Orders of June 14, 1879, and November 15, 1883, respectively, to make the lands withdrawn for the use of the Pima and Maricopa Indians available for the use of the Pima and Maricopa Indians and such other Indians as the Secretary of the Interior might see fit to settle thereon.

U.S. Exs. 1807, 1808

Finding 4.23.8

Still more lands were added to the Gila River Indian Reservation by Executive Orders of July 31, 1911, June 2, 1913, and July 19, 1915.

U.S. Exs. 1809, 1811, 1813, 1810

Finding 4.23.9

The Gila River Indian Reservation is located near Phoenix, Arizona, in desert country along and on both sides of the Gila River and extends to the confluence with the Gila and Salt Rivers. It includes about 370,000 acres.

Tr. 14,643, U.S. Ex. 100

Finding 4.23.10

Members of the Gila River-Pima-Maricopa Indian Community inhabit this Reservation. The membership of the community is approximately 5,700. These Indians obtain their livelihood by irrigated farming and employment in adjacent communities.

Tr. 14,643–14,644

Finding 4.23.11

Within the area of the Gila River Indian Reservation added by the Executive Order of June 14, 1879, is the Maricopa District, adjacent to the Salt River. The Maricopa District contains in excess of 1,080 acres which are suited for irrigation and which are susceptible of irrigation from the existing irrigation system.

U.S. Exs. 1820, 1820B, 1821, 1824, Tr. 14,731–3

Finding 4.23.12

By Decree No. 19 in District Court, Third Judicial District, Territory of Arizona, *United States* v. *Haggard et al.*, June 11, 1903, the United States was decreed the right to divert the waters of the Salt River for use on 1,080 acres within the Gila River Indian Reservation with dates of priority as follows:

Priority	*Acres*
Prior to the year 1894	480
1894	75
1895	75
1896	75
1897	75
1898	75
1899	75
1900	75
1901	75

Plf. Ex. 100

Finding 4.23.13

Because of use upstream from the Maricopa District of the Gila River Indian Reservation, the surface flow of the Salt River at the heading of the canal serving said lands became inadequate for their irrigation. In settlement of a dispute which arose with the Salt River Valley Water Users' Association concerning its claimed interference with the rights to use water on the lands of the Indian Reservation, a contract was entered into on May 5, 1936, between the Association and the United States whereby the Association agreed to equip a well drilled by the United States and to operate and maintain the same, and to supply water on demand for the irrigation of said lands. In recent years, well water has been utilized for the irrigation of the lands of the Maricopa District of the Gila River Indian Reservation.

Tr. 14,732–3; Plf. Ex. 31, Tr. 15,042

Finding 4.23.14

The annual consumptive use for the 1,080 irrigable acres of the Maricopa District of the Gila River Indian Reservation is 2,945 acre-feet and the annual diversion requirement is 5,890 acre-feet.

U.S. Ex. 1823

Conclusion 4.23.1

By reason of the addition to the Gila River Indian Reservation by the Executive Order of June 14, 1879, the United States has the right to divert for the irrigation of 1,080 irrigable acres of the Maricopa District of the Gila River Indian Reservation water from sources within the drainage area of the Salt River in a total quantity of 5,890 acre-feet per year with a priority of June 14, 1879.

As against the parties to the case of *United States* v. *Haggard et al.*, this right is limited by the priorities specified in the decree of that case as follows:

Prior to 1894 for 480 acres.
1894 for 75 acres.
1895 for 75 acres.
1896 for 75 acres.
1897 for 75 acres.
1898 for 75 acres.
1899 for 75 acres.
1900 for 75 acres.
1901 for 75 acres.

Finding 4.23.15

The Gila Crossing District is within those parts of the Gila River Indian Reservation added by the Executive Orders of June 14, 1879, and May 5, 1882.

U.S. Exs. 1824, 1818B

Finding 4.23.16

The Gila Crossing District is adjacent to the Gila River and contains 3,330 acres which are suited for irrigation and which are capable of being irrigated by surface diversion or wells.

U.S. Exs. 1818, 1819, Tr. 14,727–30

Finding 4.23.17

By the Gila Decree the United States was decreed the right to divert, from the Gila River, for irrigation of 2,992.5 acres of land within the Gila Crossing District of the Gila River Indian Reservation, 17,950 acre-feet of water each irrigation season at a rate not exceeding 37.4 cubic feet per second with the following dates of priority for the specified acreages:

	Acres
Jan. 1, 1873	954
Jan. 1, 1876	587
Jan. 1, 1877	660
Jan. 1, 1900	139
Jan. 1, 1903	58.5

Plf. Ex. 103 (p. 105)

Finding 4.23.18

Because of inadequate flow in the Gila River reaching the diversion points for the irrigation of these lands, well water has been utilized in recent years for the irrigation of lands of the Gila Crossing District of the Gila River Indian Reservation.

Tr. 14,728; 15,041

Finding 4.23.19

The annual consumptive use for 2,992.5 irrigable acres of the Gila Crossing District of the Gila River Indian Reservation is 8,161 acre-feet. The annual diversion requirement per the Gila Decree is 17,950 acre-feet for said 2,992.5 acres, or six acre-feet per acre. The annual diversion requirement for the irrigation of 3,330 irrigable acres would be 19,980 acre-feet.

U.S. Ex. 1823

Conclusion 4.23.2

By reason of the additions to the Gila River Indian Reservation by the Executive Orders of June 14, 1879, and May 5, 1882, the United States has the right to divert for the irrigation of 3,330 irrigable acres of the Gila Crossing District of the Gila River Indian Reservation, water from sources within the drainage area of the Gila River in a total quantity of 19,980 acre-feet per year with priorities from June 14, 1879, to May 5, 1882.

As against the parties to the Gila Decree, the right of the United States to the use of waters of the Gila River is limited to 17,950 acre-feet per year for the irrigation of 2,992.5 acres of the Gila Crossing District of the Gila River Indian Reservation with priorities by acreages as follows:

	Acres
Jan. 1, 1873	954
Jan. 1, 1876	587
Jan. 1, 1877	660
Jan. 1, 1900	139
Jan. 1, 1903	58.5

Finding 4.23.20

The San Carlos Federal Irrigation Project is located on both sides of and adjacent to the Gila River in Pinal County, Arizona. It includes 50,546 acres of land within the Gila River Indian Reservation and 50,000 acres of non-Indian land adjacent to the Reservation. It was constructed by the United States Department of the Interior, Bureau of Indian Affairs.

Tr. 1,485; 1,486; 14,756

Finding 4.23.21

The San Carlos Federal Irrigation Project was reported on by the Chief Engineer of the Indian Irrigation Service in 1915 and construction of Coolidge Dam, the principal storage structure for the Project, was authorized by Act of June 7, 1924. Coolidge Dam was authorized for the purpose of: (1) furnishing an adequate supply of water for irrigation of lands on the Gila River Indian Reservation; and (2) providing a water supply for irrigation of such other lands in public or private ownership as the Secretary of the Interior should determine could be supplied from water stored by the dam without diminishing the supply necessary for lands in the Indian Reservation. The authorization was on the condition that no money would be expended on the Project until a repayment contract was entered into between the United States and an organization of the non-Indian landowners.

U.S. Ex. 1915 (43 Stat. 475)

Finding 4.23.22

Pursuant to the Act of July 17, 1924, non-Indian landowners in the area to be served by the San Carlos Project entered into agreements with the Secretary of the Interior to have their lands included in the Project. They agreed that, if their lands were included in the Project, the water rights held by them would become the property of the United States for the Project. They further agreed, among other things, that their lands and water rights would be subject to a lien to secure repayment to the United States of a pro rata share of the cost of the Project; that the lands in the Florence-Casa Grande Project, hereinafter referred to, would not be deprived of their right to water under that Project if they did not

agree to become a part of the San Carlos Project; and that they would organize themselves into a District under State law, in form satisfactory to the Secretary of the Interior, to enter into an appropriate repayment contract. The San Carlos Irrigation and Drainage District is an organization of the non-Indian landowners in the San Carlos Project formed July 14, 1928, for this purpose, and it operates and maintains those facilities of the Project distribution system which serve only the non-Indian lands. A repayment contract between the United States and the District was entered into on June 8, 1931, and that contract has been modified by contracts of November 12, 1935, and May 29, 1947.

U.S. Exs. 1961, 1962, 1963, 1964; Tr. 1,488

Finding 4.23.23

The Act of March 7, 1928 (45 Stat. 200, 210), authorized additional funds for construction of the San Carlos Irrigation Project and authorized the Secretary of the Interior in his discretion to merge the Florence-Casa Grande Project with the San Carlos Project.

U.S. Exs. 1914, 1952, 1959, 1960, Tr. 14,737; 14,738

The Florence-Casa Grande Project, a principal feature of which was the Ashurst-Hayden diversion dam on the Gila River about 10 miles east of Florence, Arizona, had been constructed by the United States under authority of the Act of May 18, 1916 (39 Stat. 123–130). The Project was designed to irrigate, from the natural flow of the Gila River, land on the Gila River Indian Reservation and private and public lands in Arizona outside the Reservation. The authorizing Act provided that the water diverted by Ashurst-Hayden dam was to be distributed by the Secretary of the Interior according to rights and priorities of the lands served, as determined by agreement of the owners with the Secretary, or by judicial decree. The Secretary was to undertake the Project only if he was able to make a satisfactory adjustment of the rights to use the water to be diverted, and if he determined that the Project was feasible. The Project, to include 35,000 acres of

lands of the Gila Indian Reservation and 27,000 acres of privately owned lands, was declared feasible on April 22, 1920.

All but 1,544.5 acres of the non-Indian lands in the Florence-Casa Grande Project became part of the San Carlos Project. These 1,544.5 acres receive natural flow water of the Gila River through the facilities of the San Carlos Project.

Finding 4.23.24

On April 25, 1928, the Secretary of the Interior designated non-Indian lands to be part of the San Carlos Project. Additional lands were designated, on August 9, 1934, to bring the total designated to fifty thousand (50,000) acres. On May 12, 1936, and again on November 1, 1937, the Secretary ordered certain lands previously designated as part of the Project excluded and designated other lands in lieu thereof keeping the total designated fifty thousand (50,000) acres.

U.S. Exs. 1965, 1966, 1967, 1968

Finding 4.23.25

The 50,546 acres of the Gila River Indian Reservation within the San Carlos Project were made part of the Reservation as follows:

Act or Executive Order	*Acres*
By Act of Congress Feb. 28, 1859	21,356
By Executive Order Aug. 31, 1876	4,238
By Executive Order Nov. 15, 1883	22,794
By Executive Order July 31, 1911	1,730
By Executive Order June 2, 1913	428
	50,546

U.S. Ex. 1824, Tr. 20,480

Finding 4.23.26

Coolidge Dam is located on the Gila River 65 miles upstream from Ashurst-Hayden diversion dam and 26 miles southeast of Globe, Arizona. It is a reinforced concrete multiple dome structure rising 250 feet above the stream bed. Its reservoir, known as San Carlos Reservoir, has a capacity of about 1,285,000 acre-feet.

Tr. 14,740; 1362; 1493; 3389, Agreed Facts, Pre-Trial Order, Appendix I, p. I–17

Water was first impounded in San Carlos Reservoir in 1928. The capacity of the Reservoir is sufficient completely to control the flow of the Gila River less the tributaries downstream, except for periods of extreme flood which have not occurred since it was constructed in 1928 and 1929. The most nearly full it has been was about two-thirds full in 1942.

Water stored by Coolidge Dam which is used for irrigation downstream is used for generation of power as it is released. No releases are made for power production alone.

Finding 4.23.27

Ashurst-Hayden Dam, authorized by the Act of May 18, 1916 (39 Stat. 123–130), was completed in 1922. It is now the principal diversion structure of the San Carlos Project. It is solely a diversion dam, raising the elevation of the water in the Gila River so that it can be diverted into canals serving lands of the San Carlos Project as well as those lands of the Florence-Casa Grande Project which have not become a part of the San Carlos Project.

U.S. Ex. 1952; Agreed Facts, Pre-Trial Order, Appendix I, p. I–17, Tr. 1,493; 1,494; 14,737–14,738

Finding 4.23.28

The water supply for the San Carlos Project comes from storage in Coolidge Dam, inflow into the Gila River from the San Pedro River below Coolidge Dam, inflow into Picacho Reservoir from McClellan Wash, and from approximately 100 Project wells.

Tr. 15,042–15,043; Tr. 1,498–1,500

Finding 4.23.29

The surface water supply for the San Carlos Project is diverted from the Gila River by the Ashurst-Hayden Dam and the Sacaton Dam. Sacaton Dam was constructed by the Bureau of Indian Affairs and is located downstream from Ashurst-Hayden Dam near the center of the Project.

The water available for diversion at Ashurst-Hayden and Sacaton Dams includes inflow from the San Pedro River, which enters the Gila River below Coolidge Dam and above Ashurst-Hayden Dam. Since the diversion dams have no storage ca-

pacity, use by the Project of the flood flows of the San Pedro is limited to the capacity of the Project canals.

Tr. 14,740; Tr. 1,493; 1,496; 1,498; U.S. Exs. 1951, 1955

Finding 4.23.30

Picacho Reservoir is an off-channel storage reservoir, located at the end of the Florence-Casa Grande Canal in the southeastern corner of the Project. Its capacity is 18,000 acre-feet. It intercepts and stores flows from the desert in McClellan Wash. It also stores for later use water arriving at Ashurst-Hayden Dam in excess of the immediate requirements of the San Carlos Project.

Tr. 1,495; 14,749, U.S. Ex. 1955

Finding 4.23.31

The facilities of the San Carlos Project are classified as joint works, Indian works and non-Indian works. The Indian works include the distribution facilities starting at the Reservation boundary and going downstream from that point to the Indian irrigated lands. The non-Indian works are those facilities of the Project which serve only the non-Indian lands.

There are 69 miles of main canals and laterals serving both Indian and non-Indian lands.

Tr. 3,381; 3,382; Tr. 1,494

Finding 4.23.32

The joint works of the San Carlos Project serve water to both Indian and non-Indian lands in the Project and are operated and maintained by the Bureau of Indian Affairs. They include Coolidge Dam, Ashurst-Hayden Dam, main canals to Picacho Reservoir, the Picacho Reservoir, sub-canals serving both Indian and non-Indian lands, the pumping system, the electric generating system, the electrical distribution system, and Sacaton Dam.

Tr. 1,489; 3,380; 3,388

Finding 4.23.33

The Indian and non-Indian lands of the San Carlos Project, and the Florence-Casa Grande Project lands served by San Carlos Project facilities, are suited for irrigation.

U.S. Exs. 1954, 1956, Tr. 14,808

Finding 4.23.34

The existing irrigation facilities of the San Carlos Project are adequate for the irrigation of the lands of the Project, as well as the 1,544.5 acres of Florence-Casa Grande lands served by the Project.

Tr. 14,755

Finding 4.23.35

Inflow into the San Carlos Reservoir behind Coolidge Dam during the period 1930 to 1955 averaged 184,360 acre-feet per year from the Gila River and 34,820 acre-feet per year from the San Carlos River, with a total annual average inflow into the San Carlos Reservoir of 219,180 acre-feet. The San Pedro River has an erratic flow and its floods are of short duration. Comparison of United States Exhibit 1972 with United States Exhibits 1973 and 1974 shows that the water from that source usable on the Project has been relatively slight during the period 1934–1955. Contribution to the Project water supply from McClellan Wash is insignificant.

U.S. Ex. 1971, Tr. 1,495; 1,496; 1,498

Finding 4.23.36

The average annual virgin flow of the Gila River at Kelvin, Arizona, for the period 1914–1945 was only 546,800 acre-feet. Kelvin is below the confluence of the San Pedro with the Gila, and upstream from Ashurst-Hayden Dam. The flow at Kelvin therefore includes the flood flows of the San Pedro which are largely unusable by the San Carlos Project.

Plf. Ex. 77 (p. 15), Tr. 1,600

Finding 4.23.37

Of the water passing into and through San Carlos Reservoir, plus inflow from the San Pedro River, there was available for diversion at Ashurst-Hayden and Sacaton Dams during the period 1934 through 1955 an average quantity of only approximately 187,500 acre-feet annually.

During that period the San Carlos Project diverted an average of about 99,000 acre-feet of water per year by pumping from underground sources. When the San Carlos Project was planned, it was anticipated that only 20 per cent of its total supply would come from pumping.

Tr. 1,526; 1,537; Tr. 15,058, Plf. Ex. 139; U.S. Exs. 1973, 1974, 1976

Finding 4.23.38

The ground water table in the basin underlying the San Carlos Project has been dropping rapidly. Most of the Project wells have been deepened or rehabilitated at least once since they were drilled to keep up with the declining water table. The ability of the Project to follow the declining ground water table is limited because either it will become physically impossible to pump when the ground water supply is exhausted or it will become economically infeasible to pump.

Tr. 1,538; 1,539; 1,540

Finding 4.23.39

An average of 63,000 acres of the 100,546 acre San Carlos Project was irrigated from 1934 to 1955. Most of the difference between the 63,000 acres and the 100,546 acres would have been irrigated if the water available had not been inadequate.

Plf. Ex. 139, Tr. 1,561–1,562

Finding 4.23.40

A full water supply for the San Carlos Project would be six acre-feet per acre at the diversion point, with approximately four acre-feet per acre available at the farm headgates for use on the farms in the Project. During the period 1936 to 1955, the water supply available for each acre actually irrigated in the San Carlos Project averaged only 3.2 acre-feet on the Indian lands and only 2.8 acre-feet on the non-Indian lands. Under the Gila Decree the aggregate diversion requirement for irrigation of all the lands of the San Carlos Project and the Florence-Casa Grande lands served by the facilities of that Project is 612,543 acre-feet per year.

U.S. Ex. 1978, Tr. 15,104–15,105; Plf. Ex. 103, Tr. 15,157–15,159

Finding 4.23.41

By the Gila Decree, the United States was decreed the right to divert waters of the natural flow of the Gila River each irrigation season in the following quantities and with the following priorities:

Acre-feet	Acres	Lands	Date of priority
210, 000	35, 000	Gila River Indian Reservation	Immemorial.
6, 000	1, 000	San Carlos Indian Reservation	1846.
5, 742	957	Pinal County, Ariz	1868.
5, 145. 96	857. 66	do	1869.
3, 612	602	do	1872.
960	160	do	1873.
102	17	do	1874.
1, 854	309	do	1875.
2, 730	455	do	1876.
959. 94	159. 99	do	1877.
180	30	do	1878.
1, 260	210	do	1879.
222	37	do	1880.
159. 96	26. 66	do	1884.
660	110	do	1885.
144	24	do	1886.
1, 230	205	do	1889.
858	143	do	1890.
5, 844	974	do	1891.
2, 400	400	do	1892.
1, 956	326	do	1893.
1, 152	192	do	1894.
4, 441. 80	740. 30	do	1895.
1, 860	310	do	1896.
229. 32	38. 22	do	1898.
30	5	do	1899.
240	40	do	1901.
270	45	do	1904.
2, 580	430	do	1908.
1, 620	270	do	1909.
792	132	do	1910.
960	160	do	1911.
840	140	do	1912.
7, 260	1, 210	do	1913.
4, 962	827	do	1914.
372, 000	62, 000 acres of the Florence-Casa Grande Project or its equivalent consisting of 50,546 acres of the Gila River Indian Reservation and 27,000 acres in private ownership of white persons.		1916.
603, 276	100, 546 acres of the San Carlos Project consisting of 50,546 acres of the Gila River Indian Reservation and 50,000 acres in private ownership of white persons.		June 7, 1924.

By the Gila Decree, the United States was decreed the right as of a date of priority not later than June 7, 1924, to store waters of the Gila River in the San Carlos Reservoir to the extent of its 1,285,000 acre-feet capacity and to release said waters for diversion for use on the 100,546 acres of the San Carlos Project for the supplementation of the natural flow water.

Conclusion 4.23.3

The United States has the right to divert waters of the Gila River in a total quantity of 612,543 acre-feet per year for the irrigation of 50,546 acres of lands of the Gila River Indian Reservation within the San Carlos Project and 50,000 acres of non-Indian lands within the San Carlos Project and 1,544.5 acres of Florence-Casa Grande lands served by the San Carlos Project with the priorities specified in the Gila Decree, including an immemorial priority for the irrigation of 35,000 acres of the Gila River Indian Reservation.

The United States also has the right with a priority not later than June 7, 1924, to store water of the Gila River in the San Carlos Reservoir to the extent of its 1,285,000 acre-feet capacity and to release the stored water for diversion for use on the 100,546 acres of the San Carlos Project for supplementation of the natural flow water.

Conclusion 4.23.4

By reason of the establishment of the Gila River Indian Reservation, the United States has the right, for the irrigation of the 50,546 acres of lands of the San Carlos Project situated within the Gila River Indian Reservation, to divert waters of sources within the drainage area of the Gila River in a total quantity of 303,276 acre-feet per year and with the following priorities:

	Acres
Feb. 28, 1859	21,356
Aug. 31, 1876	4,238
Nov. 15, 1883	22,794
July 31, 1911	1,730
June 2, 1913	428

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V. MEXICAN TREATY

Finding 5.1

In anticipation of the possibility that as a matter of international comity the United States might recognize rights of Mexico to the use of waters of the Colorado River System, the Colorado River Compact made provision for the supplying of such waters. Article III(c) provides as follows:

> (c) If, as a matter of international comity, the United States of America shall hereafter recognize in the United States of Mexico any right to the use of any waters of the Colorado River system, such waters shall be supplied first from the waters which are surplus over and above the aggregate of the quantities specified in paragraphs (a) and (b); and if such surplus shall prove insufficient for this purpose, then the burden of such deficiency shall be equally borne by the upper basin and the lower basin, and whenever necessary the States of the upper division shall deliver at Lee Ferry water to supply one-half of the deficiency so recognized in addition to that provided in paragraph (d).
>
> Plf. Ex. 1, Article III(c)

Finding 5.2

On February 3, 1944, there was signed a treaty by representatives of the United States of America and Mexico relating to the utilization of waters of the Colorado, Tijuana and Rio Grande Rivers. A protocol supplementary to the said treaty was signed on November 14, 1944. The treaty and protocol were consented to, subject to certain understandings, by the Senate of the United States on April 18, 1945, and proclaimed by the President on November 27, 1945.

Plf. Ex. 4

Finding 5.3

By the Treaty of February 3, 1944, between the United States and Mexico, there was allotted to Mexico waters of the

Colorado River in a guaranteed annual quantity of 1,500,000 acre-feet. Subsection (a) of Article 11 further provides:

> (a) The United States shall deliver all waters allotted to Mexico wherever these waters may arrive in the bed of the limitrophe section of the Colorado River, with the exceptions hereinafter provided. Such waters shall be made up of the waters of the said river, whatever their origin, subject to the provisions of the following paragraphs of this Article.

Article 15 provides for certain delivery schedules.

By Article 10(b) the guaranteed annual quantity is subject to reduction in the event of extraordinary drought or serious accident to the irrigation system in the United States, thereby making it difficult for the United States to deliver the guaranteed quantity.

Plf. Ex. 4, Articles 10, 11, 15

Finding 5.4

Indeterminate additional quantities of water are required for the transportation from Lee Ferry and delivery in the limitrophe section of the river of the treaty water. The obligation of the United States under the treaty includes the obligation and the right to use so much additional water for service of the treaty as may from time to time be necessary to make deliveries to Mexico as the treaty provides.

Tr. 915–919

Finding 5.5

By the Treaty of February 3, 1944, the United States agreed to build and thereafter operate and maintain Davis storage dam and reservoir and to use a part of the capacity thereof to make possible the regulation at the boundary of the waters to be delivered to Mexico in accordance with the provisions of Article 15 of the Treaty.

Plf. Ex. 4, Art. 12(b)

The Davis (Bullshead) Dam project had been found feasible by the Secretary of the Interior and authorized for construction under the provisions of Section 9 of the Reclamation Project Act of 1939. Control of waters passed downstream

for use beyond the international boundary was one of the purposes of the Project referred to in the determination of feasibility.

H. Doc. 186, 77th Cong., 1st Sess., Sp. Master's Ex. 4 (p. A745)

Construction of Davis Dam, located 67 miles downstream from Hoover Dam, was initiated on July 29, 1942, water was first impounded on January 17, 1950, and the first power generated on January 12, 1951. Its reservoir known as Lake Mohave has a total capacity of 1,820,000 acre-feet. The generating facilities of Davis Dam are composed of five units with a total installed capacity of 225,000 kw. Title to Davis Dam is in the United States.

Agreed Facts, Pre-trial Order, Stipulation I, pp. I–12, I–13

Conclusion 5.1

By reason of its treaty with Mexico, the United States has the obligation and the right to deliver to Mexico in the bed of the limitrophe section of the Colorado River, 1,500,000 acre-feet per year of waters of the Colorado River, and the further obligation and right to use so much additional water of the Colorado River for service of the treaty as may from time to time be necessary to make deliveries to Mexico in accord with treaty provisions.

The entitlement of each of the States of the Colorado River basin to the use of waters of and from the Colorado River and its tributaries is subject to this right and obligation. As between the Upper and Lower Basins, the burden is to be borne by the States as provided in Article III(c) of the Colorado River Compact. The manner in which the Lower Basin share of the burden is to be borne by the States of that basin is dealt with in a subsequent section of these proposed findings and conclusions.

VI. FISH AND WILDLIFE

Finding 6.1

The United States of America, in connection with the waters of the Colorado River, has international obligations stemming from conventions concluded between it and Great Britain, and between it and Mexico, having as their objective the conservation of wildlife.

U.S. Ex. 2601, 2605

Finding 6.2

The Convention between the United States and Great Britain for the protection of migratory birds in the United States and Canada was concluded and signed on August 16, 1916; ratification advised by the Senate, August 29, 1916; ratified by the President, September 1, 1916; ratified by Great Britain, October 20, 1916; ratifications exchanged at Washington, December 7, 1916; proclaimed, December 8, 1916.

U.S. Ex. 2601 (39 Stat. 1702)

Finding 6.3

According to the provisions of the Convention of August 16, 1916, between United States and Great Britain, the contracting parties agreed that special protection shall be given the wood duck and eider duck either by close season, or by the establishment of refuges, or by such other regulations as may be deemed appropriate.

Article IV, U.S. Ex. 2601, p. 4

Finding 6.4

On July 3, 1918, there was enacted by the Congress of the United States an Act to give effect to the Convention between the United States and Great Britain for the protection of migratory birds, concluded August 16, 1916.

U.S. Ex. 2602 (40 Stat. 755)

Finding 6.5

The Convention of August 16, 1916, and the Act of July 3, 1918, giving effect to the convention were upheld as within the

powers of the United States in the case of *Missouri* v. *Holland*, 252 U.S. 416 (1920).

Finding 6.6

On February 18, 1929, there was enacted by the Congress of the United States an Act to more effectively meet the obligations of the United States under the migratory bird convention with Great Britain by lessening the dangers threatening migratory game birds from drainage and other causes, by the acquisition of areas of land and of water to furnish in perpetuity reservations for the adequate protection of such birds, and authorizing appropriations for the establishment of such areas, their maintenance and improvement, and for other purposes.

U.S. Ex. 2603 (45 Stat. 1222)

Finding 6.7

The Convention between the United States and Mexico for the protection of migratory birds and game mammals was concluded and signed on February 7, 1936; ratification advised by the Senate, April 30, 1936; ratified by the President, October 8, 1936; ratified by Mexico, February 12, 1937; ratifications exchanged at Washington, March 15, 1937; proclaimed, March 15, 1937.

U.S. Ex. 2605 (50 Stat. 1311)

Finding 6.8

According to the provisions of the Convention of February 7, 1936, between United States and Mexico, the contracting parties agreed to the establishment of refuge zones in which the taking of designated birds would be prohibited.

Article II(B), U.S. Ex. 2605, p. 2

Finding 6.9

On June 20, 1936, there was enacted by the Congress of the United States an Act to amend the Migratory Bird Treaty Act of July 3, 1918, to extend and adapt its provisions to the Convention between the United States and Mexico for the protection of migratory birds and game mammals concluded February 7, 1936.

U.S. Ex. 2606 (49 Stat. 1555)

Finding 6.10

The United States, pursuant to its international conventions with Great Britain and Mexico, has the duty to preserve, develop and replace natural wildlife habitat through the establishment and maintenance of wildlife refuges and management areas.

U.S. Ex. 2601, 2605

Finding 6.11

By Executive Order No. 8647 of January 22, 1941, the President of the United States established the Havasu Lake National Wildlife Refuge and set apart approximately 37,370 acres of lands owned by the United States in Mohave and Yuma Counties, Arizona, and San Bernardino County, California as a refuge and breeding ground for migratory birds and other wildlife.

U.S. Ex. 2607

Finding 6.12

By Public Land Order 559 of February 11, 1949, the Assistant Secretary of the Interior pursuant to authority vested in the President added to the Havasu Lake National Wildlife Refuge certain described lands in Arizona and California aggregating approximately 1,677 acres in Arizona and approximately 1,080 acres in California.

U.S. Ex. 2610

Finding 6.13

The area of the Havasu Lake National Wildlife Refuge includes both sides of the Colorado River extending from Parker Dam northward to and including the Topock Marsh opposite Needles, California.

Tr. 15,656; U.S. Ex. 2613

Finding 6.14

By Executive Order No. 8685 of February 14, 1941, the President of the United States established the Imperial National Wildlife Refuge, and set apart 51,090 acres, more or less, of lands owned by the United States in Yuma County, Arizona and Imperial County, California, as a refuge and breeding ground for migratory birds and other wildlife.

U.S. Ex. 2608

Finding 6.15

The Imperial National Wildlife Refuge includes both sides of the Colorado River extending from Imperial Dam northward to the Taylor Ferry area.

Tr. 15,657; U.S. Ex. 2613

Finding 6.16

By Executive Order No. 5498 of November 25, 1930, the President of the United States established the Salton Sea National Wildlife Refuge setting apart designated lands in Imperial County, California, as a refuge and breeding ground for birds and wild animals.

U.S. Ex. 2604

Finding 6.17

By the Act of May 18, 1948, Congress made special provision for the acquisition and maintenance by the Secretary of the Interior of wildlife management and control areas in the State of California.

U.S. Ex. 2609 (62 Stat. 238)

Finding 6.18

By leases between the Secretary of Interior and the Imperial Irrigation District, the United States has leased from the Imperial Irrigation District designated tracts of land situated in Imperial County, California, for addition to the Salton Sea National Wildlife Refuge.

U.S. Ex. 2611, 2612

Finding 6.19

The Salton Sea National Wildlife Refuge is an area imposed on and adjacent to the Salton Sea and is within the Lower Colorado River Basin as defined by Article II(g) of the Colorado River Compact.

Tr. 15,657; U.S. Ex. 2613

Finding 6.20

The National Wildlife Refuges within the Lower Colorado River Basin are used for the protection and management of the migratory waterfowl, for the protection of adjacent farmlands from crop depredation, and incidentally for recreation.

Tr. 15,657

Finding 6.21

The Pacific Flyway, one of the main routes of travel for migratory waterfowl, extends from Alaska to Mexico and traverses the Lower Colorado River; the National Wildlife Refuges of the Lower Colorado River are used extensively by migratory waterfowl.

Tr. 15,658–9; U.S. Ex. 2614

Finding 6.22

The Lower Colorado River is the only wintering habitat for the Great Basin goose, a separate specie of the Canadian goose, and the survival of that specie is dependent upon maintenance of a suitable habitat in the Lower Colorado River region.

Tr. 15,659; U.S. Ex. 2614

Finding 6.23

Operation of the National Wildlife Refuges involves not only the maintenance of the natural habitat of the wildlife but also the irrigation of food plots within the Refuge areas on which grain and grain forage are grown and even the importation of additional grain to augment the food available to the migratory waterfowl and to prevent crop depredations to nearby farm areas.

Tr. 15,660–2

Finding 6.24

Within the Havasu Lake National Wildlife Refuge and along the Colorado River are numerous swamps, including the Topock Marsh which is located north of Topock, Arizona and opposite Needles, California.

Tr. 15,656; U.S. Ex. 2616, 2617

Finding 6.25

The present water consumption due to natural causes of the swamp areas within Havasu Lake National Wildlife Refuge north of Topock is substantially the same as the water consumption for such areas prior to the construction of any permanent dam on the Colorado River.

Tr. 15,664–5; U.S. Ex. 2615, 2616, 2617

Finding 6.26

The channelization of the Colorado River by the Bureau of Reclamation has cut off the usual overflow of surface water from the Colorado River into the Topock Marsh resulting in stagnation of the water in the Topock Marsh and its depreciation as habitat and source of food supply for migratory waterfowl.

Tr. 15,666–7

Finding 6.27

In order to remedy the condition of stagnation of the Topock Marsh and in accordance with recommendations and technical data submitted to him, the Secretary of Interior directed the installation of an inlet through the east bank of Colorado River to permit freshening of the water supply for the Topock Marsh. The rate of diversion prescribed was 30 cubic feet per second to be circulated through Topock Marsh and back to the Colorado River with no increase in consumptive use.

Tr. 15,667–9; U.S. Ex. 2624

Finding 6.28

The ultimate effect of the channelization of the Colorado River will be to depreciate the value of the Topock Marsh area as a wildlife habitat.

Tr. 15,670

Finding 6.29

The Fish and Wildlife Service of the United States Department of Interior has formulated a development plan to offset the depreciated value of the Topock Marsh area for wildlife purposes.

Tr. 15,671; U.S. Ex. 2618

Finding 6.30

The development plan for the Havasu Lake National Wildlife Refuge has received necessary executive approval and its construction is contingent only upon decree to the United States of the right to use the necessary amount of Colorado River water for this purpose.

Tr. 15,673–7

Finding 6.31

The development plan for Havasu Lake National Wildlife Refuge provides as substitute for the present waterfowl habitat the development of an area of 7,100 acres of the following components:

1,800 acres of irrigated crop land
4,300 acres of controlled marsh
1,000 acres of uncontrolled marsh

U.S. Exs. 2618 and 2619; Tr. 15,671–2

Finding 6.32

The Havasu Lake National Wildlife Refuge Development Plan provides for the diversion of water from the east bank of the Colorado River through a pipe take-out structure into distribution ditches for application on to the cropped land and for circulation through the controlled marshes, confined by dikes, and to the uncontrolled marsh.

Tr. 15,671–2; U.S. Ex. 2618

Finding 6.33

The estimated water requirement of the development plan for the Havasu Lake National Wildlife Refuge will be 41,839 acre feet per annum to be diverted from the Colorado River with the estimated return flow to the Colorado River of 4,500 and resultant net annual diversion requirement from the Colorado River of 37,339 acre feet.

U.S. Ex. 2619; Tr. 15,679–15,683

Finding 6.34

The quantity of Colorado River water presently consumed on the 7,100 acres of the Topock Marsh to be developed under the Havasu Lake National Wildlife Refuge Development Plan is approximately 55,000 acre feet per annum.

Tr. 15,691

Finding 6.35

The net saving of approximately 18,000 acre feet per annum of Colorado River water in the Topock Marsh area which would result from the Havasu Lake National Wildlife Refuge Development Plan is due to the change in and control of

vegetation provided by operation of that Plan and such salvage is in addition to salvage resulting from channelization.

Tr. 15,753; 15,793

Finding 6.36

Within the Imperial National Wildlife Refuge and along the Colorado River are numerous swamps and lakes.

Tr. 15,715; U.S. Ex. 2620

Finding 6.37

The present water consumption due to natural causes of the swamp areas within the Imperial National Wildlife Refuge is substantially the same in quantity as the water consumption for such areas prior to the construction of any permanent dam on the Colorado River.

Tr. 15,692; U.S. Ex. 2620

Finding 6.38

The Fish and Wildlife Service has formulated plans for development within the Imperial National Wildlife Refuge of some 35 land plots located adjacent to the Colorado River, ranging from 20 to 300 acres each and aggregating 1,800 acres on the California side and 2,200 acres on the Arizona side to be irrigated by pumping directly from the Colorado River.

Tr. 15,693; U.S. Ex. 2621

Finding 6.39

The estimated water requirement of the development plan for Imperial National Wildlife Refuge will be 28,000 acre-feet per annum to be diverted from the Colorado River.

U.S. Ex. 2621

Finding 6.40

The quantity of Colorado River water presently consumed on the 4,000 acres in the Imperial National Wildlife Refuge on which development is proposed is greater than 28,000 acre-feet per year.

Tr. 15,694

Finding 6.41

In order to fulfill international obligations for the conservation of wildlife, waterfowl habitat areas in addition to presently existing national refuges are needed on the Colorado

River in the vicinity of Palo Verde Valley in California and Cibola Valley in Arizona to replace natural habitat lost as a result of drainage along the River and increase in the water level of the Salton Sea.

U.S. Ex. 2625

Finding 6.42

There is a considerable area along the Colorado River, north of the Imperial National Wildlife Refuge, in the Cibola Valley which is presently used as a migratory waterfowl habitat.

Tr. 15,694–5

Finding 6.43

Channelization of the Colorado River in the Cibola Valley will further impair the suitability of the area for migratory waterfowl.

Tr. 15,698; U.S. Ex. 2625

Finding 6.44

It is proposed by the Fish and Wildlife Service and concurred in by the Secretary of Interior to establish a waterfowl management area in Cibola Valley on federally owned lands of this area.

Tr. 15,698; U.S. Exs. 2625, 2613, 2623

Finding 6.45

The land requirement for the proposed Cibola Valley Waterfowl Management Area is 6,000 acres situated on the east side of the Colorado River of which 3,000 acres would be irrigated and devoted to growing agricultural crops.

Tr. 15,702; U.S. Ex. 2625

Finding 6.46

The estimated water requirement for the proposed Cibola Valley Waterfowl Management Area is the diversion of 23,000 acre-feet per annum from the Colorado River.

U.S. Ex. 2622

Finding 6.47

The quantity of Colorado River water presently consumed on 3,000 acres of existing natural waterfowl habitat in the proposed Cibola Valley Waterfowl Management Area is in excess of 23,000 acre feet per annum.

Tr. 15,702

Finding 6.48

Approximately 4,000 acres of cropped land within the Salton Sea National Wildlife Refuge are irrigated each year by water purchased from the Imperial Irrigation District.

Tr. 15,796–7

Conclusion 6.1

The United States, pursuant to its international obligations with Great Britain and Mexico, has the duty to preserve, develop and replace natural wildlife habitat through the establishment and maintenance of wildlife refuges and management areas in the Lower Colorado River Basin.

Conclusion 6.2

By reason of its international obligations with Great Britain and Mexico, the United States has the right to divert annually from the Colorado River quantities of water for use on National Wildlife Refuges and Management Areas as follows:

	Acre-feet
Havasu Lake National Wildlife Refuge	41,839
Imperial National Wildlife Refuge	28,000
Cibola Valley Waterfowl Management Area	23,000
Total	92,839

Conclusion 6.3

By reason of the salvage of Colorado River water resulting from the development of National Wildlife Refuges and Management Areas, the United States has the right to divert annually from the Colorado River quantities of water for use on National Wildlife Refuges and Management Areas as follows:

	Acre-feet
Havasu Lake National Wildlife Refuge	41,839
Imperial National Wildlife Refuge	28,000
Cibola Valley Waterfowl Management Area	23,000
Total	92,839

Conclusion 6.4

The entitlement of the several States of the Lower Basin to the use of the waters of the Colorado River System is subject to the use by the United States of the quantities of water necessary for satisfaction by the United States of its interna-

tional obligations respecting the establishment and maintenance of wildlife refuges and management areas. However, the further development of the Havasu Lake and Imperial National Wildlife Refuges and the Cibola Valley Waterfowl Management Area will result in the consumptive use of less water than is presently consumed by natural causes in those areas.

VII. RECLAMATION

Finding 7.0.1

Apart from Hoover Dam, Parker Dam, and Davis Dam and their appurtenant power systems, there are presently within the Lower Basin of the Colorado River five projects of the United States constructed under the Reclamation Act of 1902 (32 Stat. 388) and acts amendatory thereof and supplemental thereto. These are the Salt River Project, utilizing the waters of the Salt River for the reclamation of arid lands near Phoenix, Arizona, and the following projects utilizing main stream waters for reclamation purposes: Yuma Project, Yuma Auxiliary Project, All-American Canal System, including Imperial Dam and the distribution system and appurtenant flood control works for the Coachella Division thereof, and the Gila Project.

Yuma Reclamation Project

Finding 7.1.1

The Yuma Reclamation Project as it exists today comprises two divisions, the Valley Division in Arizona and the Reservation Division in California. The Valley Division includes the valley lands on the Arizona side of the Colorado River downstream from Yuma and north of the International Border. The Reservation Division includes lands of the Yuma Indian Reservation and other valley lands on the California side of the river upstream from the International Boundary which were originally within the Indian Reservation and opened for settlement under Section 25 of the Act of April 21, 1904 (33 Stat. 224).

As originally constructed, water for these Divisions of the Project (and also for the Yuma Auxiliary Reclamation Project after it was constructed) was diverted in California at Laguna Dam into the California Main Canal. That Canal followed a generally southwesterly direction from Laguna Dam along the northerly edge of the Reservation Division for about

10½ miles to a point designated as Siphon Spillway, which is now generally referred to as Siphon Drop. There the Canal turned to the south, southeast and continued across the Project lands to the right bank of the Colorado River opposite the City of Yuma, at which point water for the Valley Division is carried under the river through an inverted siphon into the canals of that Division. The main turn-out from the California Main Canal for the service of lands in the Reservation Division was called Indian Heading, and was located about 1½ miles below Laguna Dam. Since the completion of Imperial Dam and the All-American Canal water for the Valley and Reservation Divisions of the Yuma Project has been diverted at Imperial Dam and carried through the All-American Canal, as related *supra* in Finding 1.35, to Siphon Drop, at which point all water for the Valley Division, and a portion of that for the Reservation Division, is turned into the California Main Canal, now called the Yuma Main Canal, and thence carried to the Valley Division as before.

Calif. Exs. 372, 374, Tr. 2,257–58

Finding 7.1.2

Construction of the Yuma Reclamation Project was recommended by a Board of Engineers of the Reclamation Service, United States Geological Survey, on April 8, 1904. The Director of the Geological Survey recommended in a communication to the Secretary of the Interior dated May 9, 1904, that the Project be constructed and on May 10, 1904, the Secretary of the Interior approved construction.

Plf. Ex. 164

Finding 7.1.3

The Yuma Reclamation Project was examined by a Board of Army Engineers designated by the President, and reported on to the Secretary of the Interior on November 28, 1910. The Board of Engineers concluded that the Project was feasible, both from an economic and engineering standpoint; that its water supply was sufficient; that the cost of construction could be borne by the Project lands; and that the Project was worthy of early completion. The Report of the Board of Engineers

was approved by the President on January 5, 1911, and communicated to the Congress.

House Document No. 1262, 61st Congress, 3d Session, Calif. Ex. 373

Conclusion 7.1

The Yuma Reclamation Project was found feasible by the Secretary of the Interior according to the requirements of the Reclamation Act of 1902 (32 Stat. 388). It was examined and reported on by a Board of Army Engineers and reapproved by the President according to the requirements of the Act of June 25, 1910 (36 Stat. 835). The Yuma Project is a lawfully authorized Reclamation Project.

Finding 7.1.4

The Yuma Project as reported by the President to Congress under date of January 5, 1911, was to include 16,000 acres of lands of the Yuma Indian Reservation in California, and, in Arizona, 55,000 acres of bottom lands between Yuma and the Mexican boundary, 20,000 acres in the lower Gila Valley above Yuma, and 40,000 acres of Mesa lands south and east of Yuma.

Calif. Ex. 373

Finding 7.1.5

In the recommendation of April 18, 1904, of the Board of Engineers of the Reclamation Service it was stated that "The legality of the diversion of the Colorado River is essential to the feasibility of the project." In his recommendation of May 9, 1904, to the Secretary that the Yuma Project be constructed, and in the Secretary's letter of May 10, 1904, approving construction, reference was made to Section 25 of the Act of April 21, 1904 (33 Stat. 224), as authorizing the Secretary of the Interior to divert the waters of the Colorado River for the Project.

Plf. Ex. 164

Conclusion 7.2

Section 25 of the Act of April 21, 1904, provides in part as follows:

> That in carrying out any irrigation enterprise which may be undertaken under the provisions of the reclamation Act of June seventeenth, nineteen hundred and

> two, and which may make possible and provide for, in connection with the reclamation of other lands, the reclamation of all or any portion of the irrigable lands on the Yuma and Colorado River Indian Reservations in California and Arizona, the Secretary of the Interior is hereby authorized to divert the waters of the Colorado River and to reclaim, utilize, and dispose of any lands in said reservations which may be irrigable by such works in like manner as though the same were a part of the public domain: *Provided,* That there shall be reserved for and allotted to each of the Indians belonging on the said reservations five acres of the irrigable lands * * *.

By that Act Congress authorized the Secretary of the Interior to divert the waters of the Colorado River for the reclamation of lands within the Yuma Reclamation Project, which included lands in the Yuma Indian Reservation.

Finding 7.1.6

On July 8, 1905, J. B. Lippincott, Supervising Engineer, United States Geological Survey, for and on behalf of the United States of America, posted a notice of appropriation on the left bank of the Colorado River claiming three thousand cubic feet per second of the water of the Colorado River for irrigation, domestic, power, mechanical, and other beneficial uses in and upon lands in Yuma County, Arizona Territory which were to be served by the construction of Laguna Dam and a canal system extending from the Dam. On the same day a similar notice was posted on the right bank of the Colorado River claiming six thousand cubic feet per second of the water of the Colorado River for irrigation, domestic, power, mechanical, and other beneficial uses in and upon lands in "the Yuma Valley adjacent to the Colorado River, below the point of diversion, and in the Imperial Valley, all situated in San Diego County, State of California," which were to be served by the construction of Laguna Dam and a canal system extending from the Dam.

Calif. Exs. 12, 13; U.S. Ex. 5, Tr. 15,366–15,369

The lands described in these notices included the lands of the Reservation Division and almost all of the lands of the Valley Division of the Yuma Project. They also included all of the lands included within the Yuma Auxiliary Reclamation Project, a substantial part of the lands now included in the Yuma Mesa Division of the Gila Project and a small part of the lands now included in the Wellton-Mohawk Division of the latter project.

Finding 7.1.7

Construction of Laguna Dam, the original diversion structure of the Yuma Project, began on July 19, 1905, and was completed on March 20, 1909. Water was first diverted by means of it for use on the Reservation Division on March 14, 1910. Diversions at the east end of Laguna Dam for use on lands in the North Gila Valley began in 1911.

Pre-Trial Order, Agreed Facts, Appendix I, pp. I–16, I–17, Tr. 8833–8834; 2293; Plf. Ex. 166, 186

Finding 7.1.8

The valley lands of the Yuma Project were practically all subject to overflow in extreme high water and it was necessary to construct levees for their protection. This work was initiated by the Reclamation Service in 1905 soon after the Project was authorized as a reclamation project.

Plf. Ex. 45 (p. 63), Tr. 2248

Finding 7.1.9

On March 15, 1907, the United States acquired from the Colorado Valley Pumping and Irrigating Company the irrigation canal belonging to it together with all related structures and facilities, rights-of-way, and water rights. The United States on February 3, 1908, purchased all the canal system of the Yuma Valley Union Land and Water Company located in Yuma County, Arizona Territory and all its rights and claims to divert water from the Colorado River. By deed dated July 23, 1908, the Greene Land and Cattle Company conveyed to the United States its rights-of-way, irrigation ditch and canal, and related structures, and the right to use all easements, rights, property and premises appurtenant to or belonging to the property conveyed. After the facilities of

these companies were purchased, the United States overhauled the works acquired, and increased the acres that had previously been served by these works. These acquisitions were made for the benefit of the Yuma Project. The several grantors claimed rights to use for irrigation of lands in the Yuma Valley the waters of the Colorado River under notices of appropriation dated October 23, 1890, June 7, 1897, and January 18, 1902.

Tr. 2248, Plf. Ex. 45 (pp. 63–64); U.S. Exs. 17–M, 16–R, 16–S, 18–Y, 16, 16–A, 16–D, 16–I, 17–A, 18, 18–B.

Finding 7.1.10

Construction of the California Main Canal of the Yuma Project began in the fall of 1909. By 1910 construction of the system had reached the point called Indian Heading, and water was first diverted into the distribution system for the Reservation Division in March 1910. By 1912 construction of the distribution system in the non-Indian portion of the Reservation Division was largely completed. By the end of 1915, construction of the distribution system on the entire Reservation Division, both Indian and non-Indian sections, was substantially complete.

Tr. 8819; 8833–8837, Calif. Exs. 372, 374

Finding 7.1.11

The gross area in the Reservation Division which can be served by the constructed distribution system is 15,700 acres. Of this, 8,200 acres are Indian lands and 7,500 acres are non-Indian lands. The irrigable acreage under the distribution system in the Reservation Division is 14,610 acres. Of this, 7,743 acres are Indian lands and 6,867 acres are non-Indian lands.

Tr. 8824; 8838–8840

Finding 7.1.12

Water users in the non-Indian portion of the Reservation Division have entered into water right application contracts with the United States under which they agree to repay the

cost of constructing the Project and providing for delivery of water by the United States for the irrigation of the lands specified in the contracts. Water right application contracts exist for substantially all the non-Indian lands in the Reservation Division of the Yuma Project. The Indian lands of the Project are under the jurisdiction of the Secretary of the Interior.

Tr. 8853–8855, Calif. Exs. 377, 378, 379, 380, 381; Finding 1.35, *supra*

Finding 7.1.13

It is estimated that the future average annual consumptive use by crops of irrigation water on lands of the Reservation Division will be 3.30 acre-feet per acre. Allowing a reasonable quantity for domestic use incidental to the non-Indian irrigated lands in the same proportion as that testified to with respect to the Indian lands of the Division, the aggregate future average annual consumptive use requirement for the 14,610 net irrigable acres of the Division is estimated to be 48,695 acre-feet. The quantity of Colorado River water which must be diverted at Imperial Dam to satisfy such consumptive requirement is estimated to be 97,390 acre-feet per year.

U.S. Ex. 1121, Tr. 14,512–14,513

Conclusion 7.3

The United States is entitled to release from Lake Mead and to divert from the Colorado River into the All-American Canal at Imperial Dam water in sufficient quantity for the irrigation of 14,610 irrigable acres within the Reservation Division of the Yuma Project. The quantity of water necessary to be diverted for this purpose is estimated to be 97,390 acre-feet per year.

Conclusion 7.4

The right of the United States to divert the waters of the Colorado River for use on the Reservation Division of the Yuma Project is subject to and controlled by the provisions of the Colorado River Compact, paragraph (a) of Section 4 of the Boulder Canyon Project Act, the California Limitation Act, and the several water-delivery contracts between the United States and the California agencies, except that the right of the United States to divert the waters of the Colorado River for use

on the Indian lands of the Reservation Division is not limited or otherwise affected thereby.

Finding 7.1.14

The California, or Yuma, Main Canal was extended to the right bank of the Colorado River opposite Yuma, as described in Finding 7.1.1, and in June 1912, the Colorado River Siphon by which water is delivered to the Valley Division of the Yuma Project was completed.

Tr. 2,257–2,258

By 1912 extensive canals and laterals had been constructed to serve lands in the Valley Division of the Project, and by 1913 these canals and laterals aggregated two hundred miles in length.

Plf. Ex. 166, Tr. 2,258

Construction of the distribution system for the Valley Division of the Yuma Project is complete. After water is delivered through the Colorado River Siphon, it flows into two main canals; one flows along the west edge of the Project and the other along its east edge. Laterals and turn-outs issue from these two main canals to serve the lands of the Division. The distribution system as constructed serves approximately fifty thousand acres.

Tr. 2,198–2,199, U.S. Ex. 15

Finding 7.1.15

For several years prior to the time when Colorado River water became available through the Colorado River Siphon, approximately seven or eight thousand acres were irrigated in the Valley Division by pumping.

Plf. Exs. 186, 45 (pp. 63–64)

After completion of the siphon under the Colorado River in 1912, the acreage irrigated in the Valley Division increased from the seven or eight thousand previously irrigated by pumping to approximately twenty thousand acres in 1913. Between 1913 and 1917 the acreage irrigated increased from approximately twenty thousand acres to approximately twenty-seven thousand acres. By 1921 the acreage irrigated had increased to approximately forty-one thousand acres. Between 1921

and 1955 over forty thousand acres were irrigated each year but one. In each of four years approximately forty-seven thousand acres were irrigated.

Plf. Ex. 186

Finding 7.1.16

Plans for the Yuma Project as reported by the President to Congress under date of January 5, 1911, contemplated the generation of electricity at Siphon Drop on the California (Yuma) Main Canal for use on the Project. The United States constructed an electrical power generating plant at Siphon Drop as one of the components of the Yuma Project. Water diverted from the All-American canal at Siphon Drop into the Yuma Main Canal passes through the power plant and to the extent the waters so diverted exceed the requirements for delivery to the Valley Division of the Project through the Colorado River Siphon, the same are returned to the river through the California Wasteway just before reaching the siphon.

Calif. Ex. 373 (p. 2); Plf. Ex. 34 (Art. 15), 92, Tr. 2523–26; 2529–2530

Finding 7.1.17

Beginning in 1917, the owners of land in the Valley Division of the Yuma Project made water right application contracts with the United States under which they agreed to repay the cost of constructing the Project and to pay annual charges for operation and maintenance, and providing for delivery of water by the United States for the irrigation of the lands specified in the contracts. Water right application contracts are currently in effect for practically all the land in the Valley Division of the Project.

Tr. 2259; 15,378, Plf. Ex. 168; U.S. Ex. 14

Finding 7.1.18

The Yuma County Water Users' Association is a corporation created and existing under the laws of Arizona, and authorized to do business in California. By contract dated May 31, 1906, with the United States, the Association, *inter alia,* guaranteed payment of that part of the cost of the irrigation

works of the Yuma Project, comprising the Valley Division, apportioned by the Secretary of the Interior to its shareholders.

On June 15, 1951, the United States entered into a contract with the Association providing for transfer to the Association of the care, maintenance, and operation of specified works and property of the Yuma Project used or useful for operative purposes of the Valley Division. By the terms of this contract the United States agreed, among other things, as far as reasonable diligence will permit, to deliver from storage in Lake Mead, to or for the Association through the Yuma Main Canal, "such quantities of water, including all other water diverted for use within the Division from the Colorado River System, as may be ordered by the Association and as may be reasonably required and beneficially used for the irrigation of the irrigable lands situate within the division * * *." The agreement to deliver water is subject to the availability of such water for use in Arizona under the provisions of the Colorado River Compact and the Boulder Canyon Project Act (45 Stat. 1057). It is also subject to other conditions and agreements specified in article 12 of the contract. This contract is for permanent service.

U.S. Ex. 19; Plf. Ex. 92

Finding 7.1.19

It is estimated that the future average annual consumptive use by crops of irrigation water on the lands in the Valley Division of the Yuma Project will be 158,600 acre-feet, and that the quantity of Colorado River water which must be diverted at Imperial Dam to satisfy such consumptive requirement will be 325,830 acre-feet per year.

U.S. Ex. 15

Conclusion 7.5

The United States is entitled to release from Lake Mead and to divert from the Colorado River into the All-American Canal at Imperial Dam such quantities of water, including all other water diverted for use within the Valley Division of the Yuma Reclamation Project from the Colorado River System, as may be ordered by the Yuma County Water Users' Association and as may be reasonably required and beneficially

used for the irrigation of the irrigable lands situated within the Valley Division. The quantity of water necessary to be diverted for this purpose is estimated to be 325,830 acre-feet per year.

Conclusion 7.6

The waters of the Colorado River to be diverted at Imperial Dam for the irrigation of lands within the Valley Division of the Yuma Project are within the entitlement of Arizona under its 1944 water delivery contract with the United States, and the right of the United States to divert such waters for such purpose is subject to and controlled by the Colorado River Compact, the Boulder Canyon Project Act, the 1944 Arizona water delivery contract, and the contract of July 1, 1951, between the United States and the Yuma County Water Users' Association.

Yuma Auxiliary Reclamation Project

Finding 7.2.1

The Yuma Auxiliary Reclamation Project is located on mesa lands south of the City of Yuma, Arizona, and east of the Valley Division of the Yuma Project. The original plan for the Yuma Project included a proposal for pumping water from the Yuma Valley to serve land in the area which is now the Yuma Auxiliary Reclamation Project. Such lands are included within those described in the notice of appropriation posted on July 8, 1905, by J. B. Lippincott on the left bank of the Colorado River for the Yuma Project. Capacity for the service of such lands was included in the Yuma Project Main Canal from Laguna Dam to and in the siphon under the Colorado River.

U.S. Ex. 5; Calif. Ex. 373, 12; Plf. Ex. 45 (p. 64), Tr. 2263; 15,366–69; Finding 7.1.6, *supra*

Finding 7.2.2

All of the lands in the area which now comprises the Yuma Auxiliary Project were owned by the United States in 1917. By the Act of January 25, 1917 (39 Stat. 868), the Secretary of the Interior was authorized to set apart lands in the State of

Arizona, previously or thereafter withdrawn in connection with the Yuma Reclamation Project, as an auxiliary reclamation project.

Tr. 2265

Conclusion 7.7

The Yuma Auxiliary Reclamation Project, upon lands within the Yuma Project, was reauthorized by the Act of January 25, 1917 (39 Stat. 868), as an auxiliary reclamation project.

Finding 7.2.3

The lands within the Yuma Auxiliary Project were surveyed and plans made for their development under the Project in 1917, 1918, and 1919. In 1919 the lands in the Project were opened to public sale and the purchasers were required to enter water-right application contracts with the United States. Substantially all the lands in the Project are now covered by water-right application contracts with the United States.

Tr. 2265, U.S. Ex. 6

Finding 7.2.4

Construction of distribution facilities for the Yuma Auxiliary Project began in 1920. Delivery of Colorado River water to the Project, through the distribution facilities of the Valley Division of the Yuma Project and by pump lift from the East Main Canal of the Yuma Project to the Auxiliary Project Canal, began in 1922 when 320 acres were irrigated. Thereafter, the acreage irrigated under the Project increased from year to year and in 1955 was 2,484 acres.

Tr. 2206–2207; 2269–2270; Plf. Ex. 186; U.S. Ex. 13

Finding 7.2.5

The main canal of the Yuma Auxiliary Project distribution system has a capacity of 100 cubic feet per second. Part of the main canal is lined and the pipelines and laterals in the distribution system are concrete or concrete lined. The distribution system serves 3,305 acres and it has been operated

and maintained by the United States since the Project began operation in 1922.

Tr. 2,206–2,208; 2,288; 2,289, U.S. Ex. 13

Finding 7.2.6

Investigations in 1947 and 1948 disclosed that the pumping plant delivering water to the Yuma Auxiliary Project from the Valley Division of the Yuma Project was becoming inefficient and uneconomical to operate. As a result of these investigations, it became apparent that, rather than to deliver water to the Auxiliary Project through the Valley Division of the Yuma Project, it would be more economical to deliver it through the Gila Gravity Main Canal, the Yuma Mesa Pumping Plant, and the Yuma Mesa Unit of the Gila Project, hereinafter described. The Act of June 13, 1949 (63 Stat. 172), authorized the Secretary of the Interior to contract with the Unit B Irrigation and Drainage District, an organization of the water users within the Yuma Auxiliary Project, for (1) the repayment of the cost of changing the point of delivery; (2) for the delivery of the water through the works of the Gila Reclamation Project; and (3) for the extension and improvement of the existing distribution facilities of the Yuma Auxiliary Project. The works necessary for the delivery of Colorado River water to the Yuma Auxiliary Project through the works of the Gila Reclamation Project were constructed and delivery of water to the Yuma Auxiliary Project through the Gila Gravity Main Canal, the Yuma Mesa Pumping Plant, and the Yuma Mesa Unit of the Gila Project began in July 1953.

Tr. 2206–2207; 2277, Act of June 13, 1949 (63 Stat. 172), Plf. Ex. 186

Finding 7.2.7

The Unit B Irrigation and Drainage District is an irrigation and drainage district created and existing under the laws of Arizona, comprising the lands within the Yuma Auxiliary Project. On December 22, 1955, the United States

entered into a repayment contract with that District. By that contract the United States, among other things, agreed, as far as reasonable diligence will permit, to deliver from storage available in Lake Mead "such quantities of water, including all other waters diverted for use within the District from the Colorado River System, as may be reasonably required and beneficially used for the irrigation of those irrigable lands which are situate within the District and are also situate within the limited auxiliary project * * * deliveries to be made to said lands to the extent that the same are covered by then currently valid land and water-right, or water-right, applications heretofore or hereafter made * * * and to the extent that water deliveries are requested for such lands by the persons in possession thereof or their authorized representatives." The agreement to deliver water is subject to the availability of such water for use in Arizona under the provisions of the Colorado River Compact and the Boulder Canyon Project Act (45 Stat. 1057). It is also subject to other conditions and agreements specified in article 5 of the contract.

This contract is for permanent service and its execution by the District has been confirmed by a court of competent jurisdiction.

Plf. Exs. 94, 172

Finding 7.2.8

When the United States surveyed and investigated the improvement of the distribution system of the Unit B Irrigation and Drainage District, pursuant to its contract with the District dated December 22, 1952, it was determined that 285 acres of land outside the District could easily be served and that 285 acres within the District should be eliminated from the District. This exchange of lands was authorized by Act of Congress February 15, 1956 (63 Stat. 172). By contract dated July 18, 1956, between the United States and the Unit B Irrigation and Drainage District, this exchange of land was consummated.

Tr. 2,283–2,285, U.S. Ex. 7, Act of February 15, 1956 (63 Stat. 172)

Finding 7.2.9

It is estimated that the future average annual consumptive use by crops of irrigation water on the lands in the Yuma Auxiliary Reclamation Project will be 12,600 acre-feet, and that the quantity of Colorado River water which must be diverted at Imperial Dam to satisfy such consumptive requirement will be 38,280 acre-feet per year.

U.S. Ex. 13

Conclusion 7.8

The United States is entitled to release from Lake Mead and to divert from the Colorado River into the Gila Gravity Main Canal at Imperial Dam such quantities of water, including all other water diverted for use within the Yuma Auxiliary Reclamation Project from the Colorado River System, as may be reasonably required and beneficially used for the irrigation of the irrigable lands situated within the Unit B Irrigation and Drainage District. The quantity of water necessary to be diverted for this purpose is estimated to be 38,280 acre-feet per year.

Conclusion 7.9

The waters of the Colorado River to be diverted at Imperial Dam for the irrigation of lands within the Yuma Auxiliary Reclamation Project are within the entitlement of Arizona under its 1944 water delivery contract with the United States, and the right of the United States to divert such waters for such purpose is subject to and controlled by the Colorado River Compact, the Boulder Canyon Project Act, the 1944 Arizona water delivery contract, and the contract of December 22, 1952, between the United States and the Unit B Irrigation and Drainage District.

Gila Reclamation Project

Finding 7.3.1

By Section 11 of the Boulder Canyon Project Act, the Secretary of the Interior was authorized to make such investigations and to do such engineering as might be necessary to determine the lands in Arizona that should be embraced within a reclamation project theretofore and thereafter to be

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known as the Parker-Gila Valley Reclamation Project and to recommend the most feasible method of irrigating lands within such project. The appropriation of such sums of money as might be necessary for such purposes was authorized and the Secretary was directed to report his findings, conclusions, and recommendations not later than December 10, 1931.

The so-called Preston report relating to the first unit of the Gila Valley Project was made in 1934 under that authorization. The Gila Valley Project therein described is referred to as the Gila Project in the finding of feasibility of the first division thereof.

Plf. Exs. 58, 178, Tr. 2,306; Finding 7.3.2, *infra*

Finding 7.3.2

The Gila Reclamation Project was initiated by an allotment of $75,000 under Title II of the National Industrial Recovery Act of June 16, 1933 (48 Stat. 195). Surveys of the Project began in January 1934. An additional amount of $2,000,000 was allotted to the Project, under the Emergency Relief Appropriation Act of April 8, 1935 (49 Stat. 115), in September 1935. By Act of June 22, 1936 (49 Stat. 1757, 1784), Congress appropriated $1,250,000 for construction of the Gila Project.

Plf. Exs. 60, 180; Plf. Ex. 8 (61 Stat. 628)

Finding 7.3.3

In accordance with subsection B, Section 4, of the Act of December 5, 1924 (43 Stat. 702), the Secretary of the Interior secured information regarding the water supply, engineering features, cost of construction, land prices and probable cost of development, and on June 8, 1937, made a finding in writing that the first division of the Gila Project was feasible, that it was adaptable for actual settlement and farm homes, and that it would probably return the cost thereof to the United States. In his letter of June 8, 1937, addressed to the President, the Secretary recommended that the Project, then in the process of construction, be approved. On June 21, 1937, the

President approved the first division of the Project, as required by Section 4 of the Act of June 25, 1910 (36 Stat. 836).

Plf. Ex. 60

Finding 7.3.4

The Gila Project, as described in the Secretary's determination in 1937 of feasibility of the first division, comprised the irrigable lands on both sides of the Gila River in southwest Arizona, susceptible of irrigation from the Colorado River within feasible pumping lifts. It was reported there were a total of 585,000 acres of land agriculturally suitable for irrigation below elevation 600.

The first division of the Project as therein described comprised 150,000 acres in the immediate vicinity of Yuma, 11,000 acres of valley lands north and south of the Gila River and 139,000 acres on the Yuma Mesa lying between the Yuma Project and the Fortuna Mountains.

Plf. Ex. 60

Finding 7.3.5

By the Act of July 30, 1947 (61 Stat. 628), Congress relocated the boundaries of the Gila Reclamation Project, reduced its area, and reauthorized it. The Project as reauthorized comprises two divisions. The Yuma Mesa Division consists of approximately forty thousand irrigable acres of land, with twenty-five thousand acres thereof located on the Yuma Mesa and fifteen thousand acres located in the north and south Gila Valleys. The Wellton-Mohawk Division consists of approximately 75,000 irrigable acres of land situate within the Wellton, Dome, Roll, Texas Hill, and Mohawk areas. The Wellton-Mohawk Division was substituted by the terms of the Act for the previously authorized lands eliminated from the Yuma Mesa Division.

Plf. Ex. 8

Conclusion 7.10

The first division of the Gila Reclamation Project was found feasible by the Secretary of the Interior on June 8, 1937, and approved by the President on June 21, 1937, according to the requirements of Section 4 of the Act of June 25, 1910 (36 Stat. 836), and subsection B of Section 4 of the Act of December 5,

1924 (43 Stat. 702). The Project was reauthorized by Act of July 30, 1947 (61 Stat. 628), its area was reduced, and the Wellton-Mohawk Division was substituted for land eliminated from the Yuma Mesa Division and authorized.

Finding 7.3.6

Within the Gila Project area there are four irrigation districts organized under the law of Arizona. The North Gila Valley Irrigation District encompasses the Project lands in the North Gila Valley. The Yuma Irrigation District encompasses the Project lands in the South Gila Valley. The Yuma Mesa Irrigation and Drainage District encompasses the Project lands on the Yuma Mesa, and the Wellton-Mohawk Irrigation and Drainage District includes all the lands of the Wellton-Mohawk Division.

Plf. Ex. 110A; Findings 7.3.13; 7.3.16; 7.3.21; 7.3.27, *infra*

Finding 7.3.7

Water for all Units and Divisions of the Gila Project is diverted from the Colorado River at the eastern end of Imperial Dam into the Gila Gravity Main Canal. That Canal flows in a southerly direction from the Imperial Dam for 20.7 miles. Construction of the facilities at the eastern end of the Imperial Dam necessary to deliver water to the Project began in 1936 and was completed in 1938. The headgates of the Canal were constructed for a capacity of 6,000 cubic feet per second, but the desilting basin and the Canal were constructed for a capacity of 2,200 cubic feet per second. The Canal is of sufficient capacity to serve all the lands within the Yuma Mesa and Wellton-Mohawk Divisions of the Project.

Pre-Trial Order, Agreed Facts, Appendix I, pp. I–15, I–16, Tr. 2,199–2,200; 2,327; 15,386

Finding 7.3.8

The Gila Gravity Main Canal crosses the Gila River through an inverted siphon, construction of which was completed in 1938. It terminates at the Yuma Mesa Pumping Plant, by which water is lifted 52 feet from the Gila Gravity Main Canal to the Yuma Mesa Unit of the Yuma Mesa Division of the Gila

Project. Construction of that pumping plant began in 1940.
Tr. 2,327; 2,328; 2,199–2,200

North Gila Valley

Finding 7.3.9

The Yuma Reclamation Project, approved by the President January 5, 1911, included twenty thousand acres of land in the lower Gila Valley above Yuma, Arizona. The North Gila Valley Unit of the Gila Project is located entirely within the area described in the notice of appropriation posted by J. B. Lippincott on July 8, 1905, on the left bank of the Colorado River for the Yuma Project.

House Document No. 1262, 61st Cong., 3d Sess., Calif. Ex. 373; Calif. Ex. 12; U.S. Ex. 5, Tr. 15,369

Finding 7.3.10

Between 1909 and 1913 the United States constructed facilities at the east end of Laguna Dam which served to deliver water to the North Gila Valley area. Deliveries began in 1911. In 1913 eighteen miles of canals in the North Gila Valley were capable of serving 4,000 acres. A pumping plant at the end of the Arizona Main Canal in the North Gila Valley served approximately 1,800 acres.

Tr. 2,293, Calif. Ex. 374; Plf. Ex. 166, 186

Finding 7.3.11

The canal and distribution system for the North Gila Valley area was operated and maintained by the United States as part of the Yuma Reclamation Project until 1918. By contract of September 24, 1918, with the North Gila Valley Irrigation District, the United States transferred to the District the possession of the canal and distribution system so that the District could supply water to the lands being irrigated, and to those to be added to the District, subject to the condition that the United States might terminate the agreement upon compliance with certain conditions. Water was diverted at

Laguna Dam by the District pursuant to this contract until deliveries through the Gila Project facilities began in 1954.

Tr. 2,293, Plf. Exs. 91, 186

Finding 7.3.12

Water for the North Gila Valley Unit of the Gila Project is now taken from the Gila Gravity Main Canal into the distribution system serving the Unit by a turn-out having a capacity of one hundred fifty cubic feet per second and located eight miles below Imperial Dam. Construction of the distribution system for this Unit of the Project is complete. It is designed to serve approximately seven thousand acres.

Tr. 2,200–2,201; 2,294

Finding 7.3.13

A repayment contract entered into on May 12, 1953, between the North Gila Valley Irrigation District and the United States provides, among other things, that:

Plf. Exs. 95, 175

1. The contract of September 24, 1918, between the United States and the District is terminated.

2. The United States will, as far as reasonable diligence will permit, deliver from storage in Lake Mead "such quantities of water, including all other waters diverted for use within the District from the Colorado River, as may be ordered by the District and as may be reasonably required and beneficially used for the irrigation of the irrigable lands situate within the district * * *." The agreement to deliver water is subject to the availability of such water for use in Arizona under the provisions of the Colorado River Compact, the Boulder Canyon Project Act (45 Stat. 1057), and the Gila Project Reauthorization Act (61 Stat. 628). It is also subject to other conditions and agreements specified in Article 5 of the contract, and specifically provides "That the quantities of water which the District shall be entitled to receive under this contract shall not, in any event, exceed an appropriate and equitable share of the quantity of water available for [the Yuma Mesa Division of the Gila Project], all as determined by the Secretary."

The execution of this contract by the District was confirmed by decree dated November 1, 1954, of the Superior Court of the

State of Arizona in and for the County of Yuma. The contract is for permanent service.

Finding 7.3.14

Water was first delivered to the North Gila Valley Irrigation District by diversion at Imperial Dam December 16, 1954. The acreage irrigated in the District in 1955 was 6,879 acres.

Tr. 2,300–2,301, Plf. Exs. 176, 186

Finding 7.3.15

It is estimated that the future average annual consumptive use by crops of irrigation water on the lands in the North Gila Valley Unit of the Yuma Mesa Division of the Gila Project (North Gila Valley Irrigation District) will be 23,540 acre-feet, and that the quantity of Colorado River water which must be diverted at Imperial Dam to satisfy such consumptive requirement will be 42,920 acre-feet per year.

U.S. Ex. 8

Conclusion 7.11

The United States is entitled to release from Lake Mead and to divert from the Colorado River into the Gila Gravity Main Canal at Imperial Dam such quantities of water, including all other water diverted for use within the North Gila Valley Irrigation District from the Colorado River, as may be ordered by the District and as may be reasonably required and beneficially used for the irrigation of the irrigable lands situate within the District, but the water delivered to the District shall in no event exceed an appropriate and equitable share of the quantity of water available for the Yuma Mesa Division of the Gila Project as determined by the Secretary of the Interior. The quantity of water necessary to be diverted for this purpose is estimated to be 42,920 acre-feet per year.

Conclusion 7.12

The waters of the Colorado River to be diverted at Imperial Dam for the irrigation of lands within the North Gila Valley Irrigation District are within the entitlement of Arizona under its 1944 water delivery contract with the United States and the right of the United States to divert such waters for such

purpose is subject to and controlled by the Colorado River Compact, the Boulder Canyon Project Act, the 1944 Arizona water delivery contract, the Gila Project Reauthorization Act of 1947, and the contract of May 12, 1953, between the United States and the said District.

South Gila Valley

Finding 7.3.16

The Yuma Irrigation District, comprising ten thousand gross acres in the South Gila Valley, was organized in 1919. Irrigation in the District has been by pumping from privately owned wells. By 1936 the acreage irrigated was 3,200 acres. Since World War II, the acreage irrigated has been approximately eight to ten thousand acres. The District does not have a contract with the United States for delivery of water from the Colorado River, but capacity for the service of the lands within the District was constructed in the Gila Gravity Main Canal and they are susceptible of irrigation from that canal. Almost all of the lands within the District are located within the area described in the notice of appropriation posted by J. B. Lippincott on July 8, 1905, on the left bank of the Colorado River for the Yuma Reclamation Project, and they were included within that Project as approved by the President on January 5, 1911. A portion of those lands were included within the first division of the Gila Project as authorized by the President on June 21, 1937, and such part of them as will not bring the total lands of the Yuma Mesa Division of the Gila Project in excess of the limitation of that Division provided by the reauthorization act of 1947 are included within the Gila Project as reauthorized.

Tr. 2209; 2396; 15,386, Plf. Exs. 178, 60; Calif. Ex. 373; U.S. Ex. 5, Tr. 15,369

Finding 7.3.17

It is estimated that the future average annual consumptive use by crops of irrigation water on 8,285 acres of lands within the Yuma Irrigation District, that being the difference between 15,000 irrigable acres of north and south Gila Valley lands authorized for inclusion within the Yuma Mesa Division of

the Gila Project and the number of acres it is estimated will be irrigated annually in the North Gila Valley Irrigation District, will be 34,500 acre-feet, and that the quantity of Colorado River water which must be diverted at Imperial Dam to satisfy such consumptive requirement will be 62,910 acre-feet per year.

U.S. Ex. 9

Conclusion 7.13

The United States is entitled to release from Lake Mead and to divert from the Colorado River into the Gila Gravity Main Canal at Imperial Dam such quantity of water as may be reasonably required and beneficially used for the irrigation of such quantity of the irrigable lands in the South Gila Valley near Yuma, Arizona, as will not bring the total irrigable lands of the Yuma Mesa Division of the Gila Project in excess of the limitation of that Division by the Act of July 30, 1947 (61 Stat. 628). The exercise of such right depends upon an appropriate contract being made by the United States with the Yuma Irrigation District or with such other irrigation district, corporation, political subdivision or individuals within the State of Arizona as may qualify under Reclamation Law or other statutes of the United States, and the quantity of water to be delivered for use on such lands shall not exceed an appropriate and equitable share of the quantity of water available for the Yuma Mesa Division of the Gila Project as determined by the Secretary of the Interior. The quantity of water necessary to be diverted for the irrigation of such lands in the South Gila Valley is estimated to be 62,910 acre-feet per year.

Conclusion 7.14

The waters of the Colorado River to be diverted at Imperial Dam for the irrigation of lands within the South Gila Valley area of the Yuma Mesa Division of the Gila Project are within the entitlement of Arizona under its 1944 water delivery contract with the United States, and the right of the United States to divert such waters for such purpose is subject to and controlled by the Colorado River Compact, the Boulder Canyon Project Act, the 1944 Arizona water delivery contract, and the

Gila Project Reauthorization Act of July 30, 1947 (61 Stat. 628).

Yuma Mesa

Finding 7.3.18

The Yuma Reclamation Project, as approved by the President January 5, 1911, included 40,000 acres of land on the Yuma Mesa. A substantial part of the lands included within the Yuma Mesa Unit of the Yuma Mesa Division of the Gila Reclamation Project (Yuma Mesa Irrigation and Drainage District) is located within the area described in the notice of appropriation posted by J. B. Lippincott on July 8, 1905, on the left bank of the Colorado River for the Yuma Project. All of such lands are included within the boundaries of the first division of the Gila Project as authorized by the President on June 21, 1937, and of the Yuma Mesa Division of the Gila Project as reauthorized by the Act of July 30, 1947 (61 Stat. 628).

Calif. Ex. 373; U.S. Ex. 5, Tr. 15,369; Plf. Exs. 60, 8

Finding 7.3.19

Water for the Yuma Mesa Unit of the Gila Project is pumped from the Gila Gravity Main Canal at the Yuma Mesa Pumping Plant, which has a capacity of 700 cubic feet per second, into a canal with a capacity of 620 cubic feet per second. Water is distributed from this canal by laterals serving the lands in the District. Distribution facilities, completely concrete lined, have been constructed to serve 19,970 acres of the Unit.

Plf. Ex. 8, Tr. 2,205–2,206

Finding 7.3.20

When water from the Colorado River became available to the Yuma Mesa Unit of the Gila Project in 1943, the United States owned about fifty per cent of the land in the Unit. It undertook the development of this land by constructing the necessary ditches, leveling the land and then actually planted and fertilized crops. By 1945 approximately five thousand acres had been developed by the United States. After this land was developed, it was opened to homesteading

by veterans. The acreage irrigated gradually increased until in 1955 approximately 14,500 acres were irrigated.

Tr. 2,330–2,332, Plf. Exs. 182, 186

Finding 7.3.21

The Yuma Mesa Irrigation and Drainage District is an irrigation and drainage district organized and existing under the laws of Arizona. The District encompasses the 25,000 acres of irrigable lands of the Yuma Mesa Division of the Gila Project situated on the Yuma Mesa. On May 26, 1956, the United States entered into a repayment contract with that District. By that contract, the United States agreed, among other things, as far as reasonable diligence will permit, from storage in Lake Mead, to divert at Imperial Dam into the Gila Gravity Main Canal and deliver to or for the District, "such quantities of water, including all other waters diverted for use within the District from the Colorado River, as may be ordered by the District * * * and as may be reasonably required and beneficially used for the irrigation of not to exceed 25,000 irrigable acres situate" in the District. The agreement to deliver water is subject to the availability of such water for use in Arizona under the provisions of the Colorado River Compact, the Boulder Canyon Project Act (45 Stat. 1057), and the Gila Project Reauthorization Act (61 Stat. 628). It is also subject to other conditions and agreements specified in Article 4 of the contract, and specifically provides "that the quantities of water which the District shall be entitled to receive under this contract shall not, in any event, exceed an appropriate and equitable share of the quantities of water available for the [Yuma Mesa Division of the Gila Project], all as determined by the Secretary."

The contract is for permanent service and its execution by the District has been confirmed by a court of competent jurisdiction.

Tr. 2,335–2,336, Plf. Ex. 96; U.S. Ex. 3

Finding 7.3.22

It is estimated that the future average annual consumptive use by crops of irrigation water on 25,000 irrigable acres within

the Yuma Mesa Irrigation and Drainage District will be 100,590 acre-feet, and that the quantity of Colorado River water which must be diverted at Imperial Dam to satisfy such consumptive requirement will be 321,480 acre-feet per year.

U.S. Ex. 11

Conclusion 7.15

The United States is entitled to release from Lake Mead and to divert from the Colorado River into the Gila Gravity Main Canal at Imperial Dam such quantities of water, including all other waters diverted for use within the Yuma Mesa Irrigation and Drainage District from the Colorado River, as may be ordered by the District and as may be reasonably required and beneficially used for the irrigation of not to exceed 25,000 acres of the irrigable lands situate within the District, but the water delivered to the District shall in no event exceed an appropriate and equitable share of the quantity of water available for the Yuma Mesa Division of the Gila Project as determined by the Secretary of the Interior. The quantity of water necessary to be diverted for this purpose is estimated to be 321,480 acre-feet per year.

Conclusion 7.16

The waters of the Colorado River to be diverted at Imperial Dam for the irrigation of lands within the Yuma Mesa Irrigation and Drainage District are within the entitlement of Arizona under its 1944 water delivery contract with the United States, and the right of the United States to divert such waters for such purpose is subject to and controlled by the Colorado River Compact, the Boulder Canyon Project Act, the 1944 Arizona water delivery contract, the Gila Project Reauthorization Act of 1947, and the contract of May 26, 1956, between the United States and the said District.

Wellton-Mohawk

Finding 7.3.23

The Yuma Reclamation Project, as approved by the President January 5, 1911, included 20,000 acres of land in the north and south Gila Valleys. A small part of the lands included within the Wellton-Mohawk Division of the Gila Project is located within the area described in the notice of appro-

priation posted by J. B. Lippincott on July 8, 1905, on the left bank of the Colorado River for the Yuma Project. They are all included within the area of the Gila Project as described in the Secretary's determination of feasibility of the first division thereof, approved by the President on June 21, 1937.

Plf. Exs. 60, 8; Calif. Ex. 373; U.S. Ex. 5, Tr. 15,369; Finding 7.3.3, *supra*

Finding 7.3.24

Construction of the distribution system for the Wellton-Mohawk Division of the Gila Project began in 1949. The turn-out from the Gila Gravity Main Canal to the Wellton-Mohawk Canal, located immediately below the siphon under the Gila River, has a capacity of 1,300 cubic feet per second. The Wellton-Mohawk Canal flows easterly for eight and one-half miles where the water is raised 31 feet by pump lift. It then continues five or six miles to a second pumping plant where it is raised 84 feet and then to a third pumping plant where it is lifted another 55 feet. The Canal has a capacity of 900 cubic feet per second and is about 47 miles long. The distribution system is concrete lined except for the first eight miles of the Wellton-Mohawk Canal which has a heavy compacted clay lining. About 290 miles of the system are concrete lined. Water from the Colorado River was first delivered to the Wellton-Mohawk area in 1952. As of July 1956, only two small units of the distribution system remained to be completed and the system was entirely completed before January 1958.

Tr. 2,199–2,203; 2,344; 2,346; 2,355; 15,388; 15,408–10, U.S. Ex. 1

Finding 7.3.25

When the Wellton-Mohawk distribution facilities were constructed, the United States owned approximately seventeen thousand acres of land which could be served by those facilities. As of July 1956, part of this land had been opened for settlement by veterans and about eight thousand acres had been sold.

Tr. 2,349–2,350

Finding 7.3.26

Water from the Colorado River was first delivered to the Wellton-Mohawk Division of the Gila Project in 1952. In that year 9,480 acres were irrigated. Thereafter, the acreage irrigated increased from year to year to 30,499 acres in 1955. As of January 1958, the acreage which had been developed for irrigation was approximately 45,000.

Plf. Ex. 186, Tr. 15,388

Finding 7.3.27

The Wellton-Mohawk Irrigation and Drainage District is an irrigation and drainage district organized and existing under the laws of Arizona. The District encompasses 75,000 irrigable acres of the Wellton-Mohawk Division of the Gila Reclamation Project. On March 4, 1952, the United States entered into a repayment contract with that District. By that contract the United States agreed, among other things, as far as reasonable diligence will permit, to deliver, from storage in Lake Mead, at Imperial Dam "such quantities of water, including all other water diverted for use within the District from the Colorado River, as may be ordered by the district * * * and as may be reasonably required and beneficially used for irrigation of not to exceed 75,000 irrigable acres situate within * * * the District * * *." The agreement to deliver water is subject to the availability of such water for use in Arizona under the provisions of the Colorado River Compact, the Boulder Canyon Project Act (45 Stat. 1057), and the Gila Project Reauthorization Act (61 Stat. 628). It is also subject to other conditions and agreements specified in Article 4 of the contract.

This contract is for permanent service and its execution by the District was confirmed by decree dated January 8, 1953, of the Superior Court of the State of Arizona in and for the County of Yuma.

Plf. Exs. 93, 183

Finding 7.3.28

It is estimated that the future average annual consumptive use by crops of irrigation water on 75,000 irrigable acres within the Wellton-Mohawk Irrigation and Drainage District will be 268,640 acre-feet, and that the quantity of Colorado River

water which must be diverted at Imperial Dam to satisfy such consumptive requirement will be 599,300 acre-feet per year.

U.S. Ex. 10

Conclusion 7.17

The United States is entitled to release from Lake Mead and to divert from the Colorado River into the Gila Gravity Main Canal at Imperial Dam such quantities of water, including all other water diverted for use within the Wellton-Mohawk Irrigation and Drainage District from the Colorado River, as may be ordered by the District and as may be reasonably required and beneficially used for irrigation of not to exceed 75,000 irrigable acres within the District. The quantity of water necessary to be diverted for this purpose is estimated to be 599,300 acre-feet per year.

Conclusion 7.18

The waters of the Colorado River to be diverted at Imperial Dam for the irrigation of lands within the Wellton-Mohawk Irrigation and Drainage District are within the entitlement of Arizona under its 1944 water delivery contract with the United States, and the right of the United States to divert such waters for such purpose is subject to and controlled by the Colorado River Compact, the Boulder Canyon Project Act, the 1944 Arizona water delivery contract, the Gila Project Reauthorization Act of 1947, and the contract of March 4, 1952, between the United States and said District.

Finding 7.3.29

With reference to its specifications of the number of irrigable acres of land to be included in both the Yuma Mesa and Wellton-Mohawk Divisions, the Gila Project Reauthorization Act of 1947 (61 Stat. 628) provided "or such number of acres as can be adequately irrigated by the beneficial consumptive use of not more than three hundred thousand acre-feet of water per annum diverted from the Colorado River." In designing the Wellton-Mohawk Division of the Project for 75,000 irrigable acres of land, the Bureau of Reclamation estimated that the consumptive use, defined as "the quantity of water * * * absorbed by the crop and transpired or used directly in

the building of plant tissue, together with that evaporated from the crop producing land," would be 4 acre-feet per acre. This definition of consumptive use corresponds to that employed in arriving at the estimated consumptive use of irrigation water by crops set forth in the preceding findings respecting the different units of the Gila Project. Consumptive use so defined was equated with the term "beneficial consumptive use" in the Reauthorization Act, and it was estimated that the maximum diversion requirement at Imperial Dam to permit such consumptive use on the Division lands would be 585,000 acre-feet per year at Imperial Dam and that the diversion requirement for most years would be about 507,000 acre-feet. The Definite Plan Report for the Wellton-Mohawk Division, in which such determinations were made, was submitted to the landowners of the Wellton-Mohawk Irrigation and Drainage District prior to execution of the repayment contract dated March 4, 1952, between the District and the United States.

Plf. Ex. 8; U.S. Exs. 1 (pp. 60, 61), 2,. Tr. 2,600–01, Tr. 15,389; 13,406

Finding 7.3.30

The future estimated annual consumptive use by crops of irrigation water on 15,000 irrigable acres in the North and South Gila Valley Units of the Yuma Mesa Division of the Gila Project and on 25,000 irrigable acres in the Yuma Mesa Unit of said Division aggregates 158,630 acre-feet per year, and the estimated diversion requirement at Imperial Dam to make possible such consumptive use on the Yuma Mesa Division lands aggregates 427,310 acre-feet per year.

U.S. Ex. 12

Conclusion 7.19

The Act of July 30, 1947 (61 Stat. 628), authorizes, and administrative construction of the Act confirms, the diversion of water from the Colorado River for delivery to the Yuma Mesa Division and the Wellton-Mohawk Division of the Gila Project in quantities sufficient to provide for consumptive use by crops and by evaporation from the crop-producing land of three hundred thousand (300,000) acre-feet per annum within each Division. The estimated future consumptive use by crops

of irrigation water (1) on lands within the Yuma Mesa Division in the aggregate amount of 158,630 acre-feet per year, with an estimated aggregate diversion requirement at Imperial Dam of 427,310 acre-feet per year, and (2) on lands within the Wellton-Mohawk Division in the amount of 268,640 acre-feet per year, with an estimated diversion requirement at Imperial Dam of 599,300 acre-feet per year, are well within the limitations of the Gila Project Reauthorization Act of 1947.

Special Use and Warren Act Contracts, Yuma Area

Finding 7.4.1

The United States has entered into numerous special contracts in the Yuma, Arizona, area for delivery of water from the facilities of the Yuma, Yuma Auxiliary, and Gila Reclamation Projects. The contractors take their water from the Project canals into facilities constructed by them to deliver the water to their places of use. Deliveries by the United States are measured at the points where the water is taken from the Project canals. The irrigable acres under such of these contracts as provide for delivery of water for irrigation purposes, the limit on the quantity which is to be delivered under each contract, and the quantity which was actually delivered under each contract in 1955 are specified in the following table. All but three of these contracts recite that they are for permanent service.

Tr. 2,212; 2,213, Plf. Exs. 163, 165

500756—59——12

Special Water Delivery Contracts in the Yuma, Arizona, Area

GILA PROJECT

Warren Act Contracts

Contract No.	Date of contract	Contractor	Irrigable acres under contract	Contract limit on delivery for irrigation (acre-feet per annum)	Water use in acre-feet in 1955
176r–688	Jan. 1, 1951	Franeva Farms, Incorporated	152. 2	761	981. 00
176r–689	do	Neva Struve and Frank J. Hartman	313. 5	1, 567	1, 962. 00
176r–690	do	Autumn E. Struve	160. 0	800	888. 00
176r–691	do	E. P. Roy	160. 0	800	1, 685. 00
176r–728	Jan. 1, 1952	Merle and Neva Thomas	293. 2	1, 466	1, 315. 00
176r–729	do	Delmar and Jane Lewis	298. 7	1, 683	723. 00
176r–730	do	Vesta Thomas	133. 5	668	673. 00
176r–731	do	Ethel Madden	131. 3	657	580. 00
176r–732	do	Ruth B. Thomas	156. 4	782	725. 00
176r–733	do	Harold Sturges	45. 0	335	251. 00
176r–734	do	Roscoe K. Sturges	70. 6	390	166. 00
176r–735	do	Irma B. Sturges	77. 0	385	----------
176r–736	do	Virginia B. Landon	159. 7	1, 278	218. 00
14–06–300–294	Jan. 1, 1955	Clarence E. and Lorraine Jones	97. 5	780	383. 00

Contract No.	Date of contract	Contractor	Purpose	Contract limit on delivery	Water use in acre-feet in 1955
14–06–303–1078 [1]	May 1, 1956	City of Yuma	Watering 40-acre cemetery.	60 acre-feet per year	[4] 39. 33
14–06–303–1079 [2]	do	Desert Lawn Memorial Park Association.	Watering lawns, trees and shrubs on 40-acre tract.	200 acre-feet per year	[5] 117. 97
176r–696	June 12, 1951	U.S. Department of the Army (Test Station).	Water supply for Army Test Station.		266. 91
14–06–303–504 [3]	Feb. 10, 1953	Southern Pacific Company.	Water supply for stock corral.	Quantity required for the purpose as determined by Project Manager.	8. 3
14–06–300–330 [3]	Nov. 1, 1953	U.S. Department of the Air Force.	Water and sewage supply, Yuma Air Force Base, Yuma, Arizona.	Water required up to maximum flow of 8 c.f.s.	1, 120. 48
14–06–303–505	Nov. 27, 1953	Housing Authority of the County of Yuma.	Watering lawns, trees and shrubs on housing development tract.	Quantity required for purpose as determined by Project Manager.	48. 4
14–06–303–506	Jan. 1, 1954	Ritz Distributing Company.	Industrial use—packing plant.	Quantity required for purpose as determined by Project Manager.	11. 0

See footnotes at end of table.

Special Water Use Contracts

Contract No.	Date of contract	Contractor	Purpose	Contract limit on delivery	Water use in acre-feet in 1955
14-06-303-507	----do----	L. T. Malone	Industrial use—packing plant.	Quantity required for purpose as determined by Project Manager.	51.95
14-06-303-1196	Oct. 1, 1956	Yuma Mesa Fruit Growers' Association.	Industrial use—packing plant.	Quantity required for purpose as determined by Project Manager but not to exceed 15 acre-feet.	----------

[1] Replacing contract 158r-303 dated June 16, 1948, with Desert Lawn Memorial Park Association.
[2] Replacing contract 158r-304 dated June 16, 1948, with City of Yuma, Arizona.
[3] Does not recite that is for permanent service.
[4] Quantity used under replaced contract.
[5] Quantity used under replaced contract.

YUMA PROJECT—VALLEY DIVISION

Special Water Use Contracts

Contract No.	Date of contract	Contractor	Purpose	Contract limit on delivery	Water use in acre-feet in 1955
176r-40 [1]	June 12, 1945	Arizona Edison Company, Incorporated.	Municipal supply, City of Yuma, Ariz.	Maximum rate of 10 c.f.s. from excess determined by Project Manager.	299. 84
14-06-303-179	Jan. 1, 1953	Yuma Union High School District.	Watering lawns, trees and shrubs on school grounds.	80 acre-feet per annum and at maximum rate of delivery of 10 c.f.s.	80. 00

[1] Does not recite that is for permanent service.

YUMA AUXILIARY PROJECT

Warren Act Contracts

Contract No.	Date of contract	Contractor	Irrigable acres under contract	Contract limit on delivery (acre-feet per annum)	Water use in acre-feet in 1955
14-06-303-528	Dec. 23, 1953	Yuma Mesa Grapefruit Company	10. 0	120	55. 6
14-06-303-144	Jan. 1, 1954	Board of Regents of the University of Arizona and State Colleges of Arizona.	90. 7	1, 088. 4	971. 2

Plf. Exs. 163, 165

Finding 7.4.2

Most of those special contracts state a maximum limit on the annual quantity of water to be delivered thereunder. As to those which do not, the annual requirements thereunder can be estimated on the basis of 1955 deliveries. On these bases, the estimated annual quantities of water necessary to be delivered at the various delivery points on the project canals aggregate 15,677 acre-feet per year.

Conclusion 7.20

The United States is entitled to release from Lake Mead and to divert from the Colorado River into the Yuma Main Canal and the Gila Gravity Main Canal at Imperial Dam such quantities of water as may be reasonably required and beneficially used under the several Warren Act and Special Use contracts listed in plaintiff's exhibit 163.

Conclusion 7.21

The waters of the Colorado River to be diverted at Imperial Dam for delivery by the United States under the several Warren Act and Special Use contracts listed in plaintiff's exhibit 163 are within the entitlement of Arizona under its 1944 water delivery contract with the United States, and the right of the United States to divert such waters for such purpose is subject to and controlled by the Colorado River Compact, the Boulder Canyon Project Act, the 1944 Arizona water delivery contract, and the several contracts listed in said exhibit.

All-American Canal System and Coachella Distribution System

Finding 7.5.1

Much of the history leading up to authorization of the All-American Canal System as a project of the United States is reviewed in Findings 1.9 through 1.17, *supra*. In addition to lands in the Yuma Valley adjacent to the Colorado River, the appropriation notice posted by J. B. Lippincott on the right bank of the Colorado River on July 8, 1905, referred to lands in the Imperial Valley in California. Finding 7.1.6, *supra*.

Finding 7.5.2

The Secretary of the Interior was authorized and directed by the Act of May 29, 1928 (45 Stat. 1011), to appoint a Board of Engineers to examine the proposed site of the dam to be constructed under the provisions of H.R. 5773, Seventieth Congress, First Session, and to review the plans and estimates made therefor, and to advise him as to matters affecting the safety, the economic and engineering feasibility, and adequacy of the proposed structure and incidental works.

Act of May 29, 1928 (45 Stat. 1011)

Finding 7.5.3

The structures proposed to be constructed in H.R. 5773, Seventieth Congress, First Session, were:

> a dam and incidental works in the main stream of the Colorado River at Black Canyon or Boulder Canyon adequate to create a storage reservoir of a capacity of not less than twenty million acre-feet of water and a main canal and appurtenant structures located entirely within the United States connecting the Laguna Dam with Imperial and Coachella Valleys in California.
>
> H.R. 5773, 70th Cong., 1st Sess., Calif. Ex. 202

Finding 7.5.4

The Board of Engineers appointed by the Secretary under authority of the Act of May 29, 1928 (45 Stat. 1011), examined the proposed site of the dam to be constructed under the provisions of H.R. 5773, Seventieth Congress, First Session, and the appurtenant structures connecting the Laguna Dam with the Imperial and Coachella Valleys in California and concluded that they were feasible from an engineering standpoint.

Calif. Ex. 202

Finding 7.5.5

The Act of December 21, 1928 (45 Stat. 1057), authorized the Secretary of the Interior to construct

> a main canal and appurtenant structures located entirely within the United States connecting the Laguna Dam, or other suitable diversion dam * * * with the

> Imperial and Coachella Valleys in California, the expenditures for said Main Canal and appurtenant structures to be reimbursable as provided in the reclamation law, * * *.

Section 14 of the Project Act provides that "This Act shall be deemed a supplement to the reclamation law, which said reclamation law shall govern the construction, operation, and management of the works herein authorized, except as otherwise herein provided."

Plf. Ex. 7

Conclusion 7.22

By the Act of December 21, 1928 (45 Stat. 1057), the All-American Canal System of the Boulder Canyon Project was authorized as a reclamation project of the United States.

Finding 7.5.6

The Imperial Irrigation District, organized July 25, 1911, was organized and exists under the laws of California. By contract of December 1, 1932, between the United States and the Imperial Irrigation District, the United States agreed (article 7) to construct the Imperial Dam and the All-American Canal to the Imperial and Coachella Valleys, the Canal to be constructed to

> a designed capacity of fifteen thousand (15,000) cubic feet of water per second from and including the diversion and desilting works at said dam to Syphon Drop; thirteen thousand (13,000) cubic feet of water per second from Syphon Drop to Pilot Knob, and ten thousand (10,000) cubic feet of water per second westerly from Pilot Knob to Engineer Station nineteen hundred and seven * * *. Other portions of said canal shall be constructed with such capacities as the Secretary may conclusively determine to be necessary or advisable upon engineering or economic considerations to accomplish the ends contemplated by this contract; * * *.

The District agreed (article 10(a)) to repay to the United States the actual cost, not exceeding thirty-eight million five

hundred thousand dollars ($38,500,000.00), incurred by the United States in constructing the Imperial Dam and All-American Canal.

The water delivery provisions of this contract are referred to in Finding 1.29, *supra.*

Tr. 7, 474, Plf. Ex. 34

Finding 7.5.7

The construction of Imperial Dam and the All-American Canal are referred to in Finding 1.31, *supra.* The Canal originates at Imperial Dam, flows more or less parallel to the Colorado River, but outside the Reservation Division of the Yuma Project, to a point just north of the International Boundary. There it turns west and continues closely parallel to the International Boundary across the Imperial Valley. That part of the system known as the Coachella Main Canal is described in Finding 7.5.10, *infra.*

Tr. 627

Finding 7.5.8

The Coachella Valley County Water District, organized in 1918, and existing under the laws of the State of California, by contract of December 14, 1920, with the United States, agreed to pay a portion of the cost of an examination by the United States Reclamation Service of, among other things, the feasibility of irrigation in Coachella Valley with water from the Colorado River to be obtained by means of a diversion from the proposed All-American Canal.

Calif. Ex. 303, Tr. 6,480

By contract of November 17, 1921, between the United States and the Coachella Valley County Water District, the District agreed to pay a portion of the cost of carrying on an investigation, begun in 1920, of the best site for a large storage dam in the Boulder Canyon on the Colorado River.

Calif. Ex. 304

On March 26, 1929, the Coachella Valley County Water District, together with the Imperial Irrigation District, agreed by contract with the United States, to pay a portion of the cost of an investigation by the Bureau of Reclamation of the character and cost of an All-American Canal connecting La-

guna Dam, or other suitable diversion dam, with the Imperial and Coachella Valleys in California.

Calif. Ex. 204

Finding 7.5.9

By contract of October 15, 1934, between the United States and the District, the United States agreed (article 7) to construct the Imperial Dam and the All-American Canal to the Imperial and Coachella Valleys, the Canal to be constructed so

> as to provide a designed capacity of one thousand five hundred (1,500) cubic feet of water per second to be used by the District for the benefit of the lands now or hereafter within the District and lying within said Coachella Service Area from and including the diversion and desilting works at said dam to the southerly end of that portion of the All-American Canal designated * * * as * * * "Coachella Main Canal." Said Coachella Main Canal shall be constructed with such capacities as the Secretary may conclusively determine to be necessary or advisable upon engineering or economic considerations to accomplish the ends contemplated by this contract; * * *.

The District agreed (article 10(a)) to repay to the United States its share, as defined in Article 10(b), of the actual cost, not exceeding thirty-eight million five hundred thousand dollars ($38,500,000.00), incurred by the United States in constructing the Imperial Dam and All-American Canal.

The water delivery provisions of this contract also are referred to in Finding 1.29, *supra*.

Plf. Ex. 36

Finding 7.5.10

The Coachella Main Canal begins at Drop No. 1 on the All-American Canal. Its designed capacity at this point is 2,500 cubic feet per second. It flows along the edge of the East Mesa in the east portion of Imperial Valley for 49 miles to Check 6–A. At that point the common interest of the Imperial Irrigation District in the Canal ends and thereafter the Canal is solely for benefit of the Coachella Valley. At this

point the designed capacity is 1,500 cubic feet per second. The Canal is unlined between Drop No. 1 turnout and Check 6–A and for an additional 37 miles beyond Check 6–A. From that point on the Canal is concrete lined; the length of this section is 37 miles. The capacity of the Canal at the point where the lining begins is 1,300 cubic feet per second. The capacity at its end is 425 cubic feet per second. The entire length of the Canal is 123 miles.

Tr. 8,421–8,426; 8,443

Construction of the Coachella Main Canal began in October 1938 but completion was delayed during World War II. Water was first turned into the Canal for priming in 1943 and 1944. Some water was delivered to the Coachella Valley County Water District through the Canal in 1947 but full delivery did not begin until 1949.

Tr. 7,788–7,789; 8,387

Finding 7.5.11

On July 21, 1947, the Commissioner of Reclamation recommended to the Secretary of the Interior that the construction of a distribution system and appurtenant flood control works for the Coachella Division, All-American Canal System, Boulder Canyon Project be authorized as the facilities were feasible engineering-wise and financially. The recommendation was approved by the Secretary on July 21, 1947. On July 22, 1947, a report on the proposed construction was submitted to the President. Thereafter, on July 24, 1947, a similar report was transmitted to the Senate and House of Representatives.

House Doc. No. 415, 80th Cong., 1st Sess.

Finding 7.5.12

By contract of December 22, 1947, between the United States and the Coachella Valley County Water District, the United States agreed, among other things, to construct a distribution system for the lands in the area of the Coachella Valley County Water District and to construct a system of protective works designed to protect the Coachella Main Canal, the distribution system to be constructed and lands and other properties below the Canal from overflow or other damage by storm waters or surface waters. The District agreed, *inter alia,* "to construct

such drainage works as may be necessary for the drainage of lands now or hereafter within the District and the Coachella Service Area," and to repay the United States for the cost of the construction but not to exceed Thirteen Million Five Hundred Thousand Dollars ($13,500,000.00).

All rights under the contract are subject to and controlled by the Colorado River Compact and, except as provided in the Boulder Canyon Project Act, the Reclamation Law governs the construction, operation, and maintenance of the works to be constructed thereunder.

Execution of the contract by the District was confirmed by decree of the Superior Court of the State of California in and for the County of Riverside dated December 14, 1948.

Calif. Exs. 309, 310

Conclusion 7.23

Construction of a distribution system and appurtenant flood control works for the Coachella Division, All-American Canal System, Boulder Canyon Project, was authorized pursuant to and in compliance with the provisions of the Reclamation Act of 1902 (32 Stat. 388), as amended, and especially the Reclamation Project Act of 1939 (55 Stat. 1187).

Finding 7.5.13

The distribution system constructed by the United States for the lands in the Coachella Valley takes water from the Coachella Main Canal into underground pipeline laterals and delivers it through meters to the individual farmers. There are approximately 470 miles of underground closed distribution system pipeline in the Coachella Valley. As construction of portions of the distribution system for lands in the Coachella Valley was completed by the United States, the care, operation, and maintenance of the respective portions was transferred to the Coachella Valley County Water District. The first portion was so transferred in 1951 and the last completed portion in June 1954.

Tr. 8,451–8,452; 8,395; 8,453

Finding 7.5.14

Protective dikes and detention basins have been constructed by the United States east of the Coachella Main Canal to

capture flood waters entering the Coachella Valley from the east. Construction of these facilities was completed in 1949. They are designed to handle floods from hundred-year storms.

Tr. 8,386–8,387

Finding 7.5.15

Lands in the Coachella Valley included within the Coachella Service Area as defined in the contract of October 15, 1934, between the United States and the Coachella Valley County Water District include:

	Gross acres
Improvement District No. 1	135,275
Salton Area	7,980
Dos Palmas Area	9,067
Fish Springs Area	8,831
Total gross acres	161,153

The net acres within the service area for irrigation from the Colorado River are approximately 137,900.

Tr. 8,378–8,379, Calif. Ex. 318 (Table A1)

Finding 7.5.16

The acreage in the Coachella Service Area for which water is available through distribution facilities presently constructed by the United States is approximately 74,500 acres. The Coachella Valley County Water District has extended the distribution facilities to serve approximately 2,700 additional acres.

Tr. 8,452; 8,455

There is capacity in the Coachella Main Canal and the constructed distribution system to serve an additional 60,000 acres of land in the area.

Tr. 8,456–8,457

A portion of the lands in the Coachella Service Area for which distribution facilities have not yet been constructed are lands of the Coachella Indian Reservations. Approximately 10,500 acres of land are in this category; there is capacity in the constructed distribution facilities to serve these lands.

Tr. 8,388; 8,397, Finding 4.9.3, *supra*.

Finding 7.5.17

The rate of consumptive use of irrigation water by crops on lands within the Coachella Valley Service Area is in the range of 3.25 to 3.9 acre-feet per year. The annual aggregate farm headgate requirement for (1) irrigation of the net irrigable acres under the presently constructed distribution system is estimated to be 360,275 acre-feet, and (2) for irrigation of the net irrigable acres for which capacity has been constructed in the Coachella Main Canal and the presently constructed distribution system is estimated to be 689,500 acre-feet.

U.S. Ex. 2512; Calif. Ex. 318 (Table 3), Tr. 8,452; 8,455

Conclusion 7.24

The United States is entitled to release from Lake Mead and to deliver from the Colorado River into the All-American Canal at Imperial Dam so much water as may be necessary to supply the Imperial Irrigation District and the Coachella Valley County Water District total quantities, including all other waters diverted for use within said Districts, in the amounts, and subject to the priorities, provided for under Article 17 of each of the water-delivery contracts with said Districts. The waters of the Colorado River to be delivered for use within the Imperial Irrigation District and the Coachella Valley County Water District are included within the entitlement of the State of California to the use of such waters and the right of the United States to deliver such waters, and the quantities which may be delivered, are subject to and controlled by the matters referred to in Conclusion 1.4, *supra.*

Salt River Reclamation Project

Finding 7.6.1

Construction of the Salt River Reclamation Project was recommended by the Director of the Geological Survey in a communication to the Secretary of the Interior dated March 7, 1903. On March 14, 1903, the Secretary approved the recommendation of the Director of the Geological Survey and authorized construction of the Salt River Reclamation Project.

U.S. Ex. 24

Finding 7.6.2

The Salt River Project was examined by a Board of Army Engineers, designated by the President, and reported on to the Secretary of the Interior on November 28, 1910. The Board of Engineers concluded that the Project was feasible from both an economic and engineering standpoint and recommended that the Project be completed as rapidly as economically possible. The Report of the Board of Engineers was approved by the President on January 5, 1911, and communicated to the Congress.

House Document No. 1262, 61st Congress, 3d Session, Calif. Ex. 373

Conclusion 7.25

The Salt River Reclamation Project was found feasible by the Secretary of the Interior according to the requirements of the Reclamation Act of 1902 (32 Stat. 388). It was examined and reported on by a Board of Army Engineers and approved by the President according to the requirements of the Act of June 25, 1910 (36 Stat. 835). The Salt River Reclamation Project is a lawfully authorized Reclamation Project.

Finding 7.6.3

Preliminary investigations of the Salt River Project were conducted in 1901 and 1902. The irrigable land in the Salt River Valley was surveyed in 1903.

U.S. Ex. 25

Finding 7.6.4

An organization of the water users in the Salt River Valley known as the Salt River Valley Water Users' Association was formed in 1903. The water users pledged two hundred thousand acres of their lands for the return to the Government of the cost of the reservoir and other works to be constructed as part of the Salt River Reclamation Project.

U.S. Exs. 23, 25

Finding 7.6.5

Roosevelt Dam was the first structure built by the Reclamation Service as part of the Salt River Reclamation Project.

Construction was initiated on Roosevelt Dam in March 1904 and water was first impounded in May 1909. Power was first generated on August 1, 1909. Construction of the Dam was completed in 1911. It is used for storage, power production, river regulation, and recreation. Roosevelt Reservoir impounds nearly 1,400,000 acre-feet of water.

Pre-Trial Order, Agreed Facts, Appendix I, p. I–18, U.S. Ex. 26, Tr. 594

Finding 7.6.6

Granite Reef Dam, located in the Salt River twenty-two miles east of Phoenix, Arizona, is a diversion structure for the Salt River Project to divert water into the Arizona Canal on the north and into the Southside Canal on the south side of the Salt River. Construction of the Granite Reef Dam was authorized by the Secretary of the Interior on January 13, 1906, began in 1906, and was completed in 1908.

Pre-Trial Order, Agreed Facts, Appendix I, p. I–21, U.S. Ex. 26, Tr. 598–599

Finding 7.6.7

In 1906 the United States, in developing the Salt River Reclamation Project, acquired the canals located in that portion of the Project north of the Salt River which had been constructed prior to authorization of the Project. One other such canal was acquired in 1909. These canals were constructed between 1867 and 1889. Those acquired in 1906 were put into operation by the United States in May 1907. All these facilities were rehabilitated and improved by the United States after their acquisition.

U.S. Ex. 26

Finding 7.6.8

Construction of the main supply canal to the canals in that portion of the Salt River Reclamation Project south of the Salt River which were constructed prior to the authorization of the Project was completed in 1909 and operation of the Project south of the river began in that year. The canals in this area existing when the Project was authorized, or contructed thereafter, were acquired in 1909, 1910, and 1913. These canals were constructed between 1871 and 1909 with

the exception of the one acquired in 1913 which was constructed in 1912.

U.S. Ex. 26

Finding 7.6.9

Drilling of wells by the Reclamation Service to augment the supply of surface water available to the Salt River Project began in 1908 and was completed in 1909. Installation of the pumping equipment was not completed until 1913, however, because of insufficient funds. Some private wells were purchased by the Reclamation Service between 1910 and 1913.

U.S. Ex. 26

Finding 7.6.10

Though irrigation in the Salt River Reclamation Project by the Reclamation Service began on May 15, 1907, construction of the initial Project facilities continued thereafter and was completed on June 30, 1917.

U.S. Ex. 27

Finding 7.6.11

By contract of September 6, 1917, between the United States and the Salt River Valley Water Users' Association, the United States transferred to the Association the care, operation and maintenance of the works of the Salt River Project.

Calif. Ex. 4

Finding 7.6.12

Cave Creek Dam, which was constructed by the Salt River Valley Water Users' Association, and the title to which is in the United States, is situated on Cave Creek, a tributary of the Salt River, twenty miles north of Phoenix, Arizona. Construction of this Dam was initiated on February 16, 1922, and water was first impounded on March 4, 1923. The waters impounded by this Dam, primarily for flood control, are utilized to irrigate the lands in the Salt River Reclamation Project.

Pre-Trial Order, Agreed Facts, Appendix I, p. I–20

Finding 7.6.13

Morman Flat Dam, constructed by the Salt River Valley Water Users' Association, and the title to which is in the

United States, is situated on the Salt River thirty-seven miles northeast of Phoenix, Arizona. Construction of this Dam was initiated in February 1923; water was first impounded on January 13, 1925; and power was first generated on May 19, 1926. The water impounded by this Dam is used to irrigate lands in the Salt River Reclamation Project and incidentally for the generation of power.

Pre-Trial Order, Agreed Facts, Appendix I, p. I–19

Finding 7.6.14

Horse Mesa Dam, which was constructed by the Salt River Valley Water User's Association, and the title to which is in the United States, is situated on the Salt River forty-three miles northeast of Phoenix, Arizona, and nine miles below Roosevelt Dam. Construction of this Dam was initiated in August 1924 and water was first impounded on May 27, 1927. The water impounded by this Dam is used to irrigate lands of the Salt River Reclamation Project and incidentally for the generation of power.

Pre-Trial Order, Agreed Facts, Appendix I, p. I–18, Tr. 596

Finding 7.6.15

Stewart Mountain Dam, which was constructed by the Salt River Valley Water User's Association, and the title to which is in the United States, is situated on the Salt River twenty-nine miles northeast of Phoenix, Arizona. Construction of this Dam was initiated on October 1, 1928; water was first impounded on February 22, 1930; and power was first generated on March 8, 1930. The water impounded by this Dam is used to irrigate lands in the Salt River Reclamation Project and incidentally for the generation of power.

Pre-Trial Order, Agreed Facts, Appendix I, p. I–19

Finding 7.6.16

Bartlett Dam is situated on the Verde River thirty-six miles northeast of Phoenix, Arizona. Construction of this Dam was initiated on August 12, 1936, and water was first impounded on February 5, 1939. Water impounded by this Reservoir is used to irrigate lands in the Salt River Reclamation Project and the Salt River Indian Reservation. The United States,

for and on behalf of the Indians of the Salt River Reservation, has a one-fifth interest in Bartlett Dam.

Pre-Trial Order, Agreed Facts, Appendix I, p. I–20, Plf. Ex. 30

Finding 7.6.17

Horseshoe Dam, which was constructed by the Phelps-Dodge Corporation under a cooperative agreement with the United States and the Salt River Valley Water Users' Association, and the title to which is in the United States, is situated on the Verde River fifty-five miles northeast of Phoenix, Arizona. Construction of this dam was initiated on November 30, 1943, and water was first impounded on November 16, 1945. The water impounded by this Dam is used, in part, to irrigate land in the Salt River Reclamation Project and also for municipal purposes by the City of Phoenix, Arizona.

Pre-Trial Order, Agreed Facts, Appendix I, p. I–21

Finding 7.6.18

The gross acreage of the Salt River Reclamation Project is now 240,000 acres. The land actually farmed in 1956 was approximately 200,000 acres.

Tr. 1805–1806

Finding 7.6.19

There are now 186 miles of canal, 826 miles of laterals leading from these canals, and 326 miles of drainage ditches in the Salt River Reclamation Project. There are also 260 wells in the Project.

Tr. 1877, 1884

Boulder City

Finding 7.7.1

By Order of the Secretary of the Interior dated August 7, 1920, specified lands were withdrawn from public entry, under the first form of withdrawal, as provided in Section 3, Act of June 17, 1902 (32 Stat. 388), for the Colorado River Storage Project, Black Canyon Reservoir Site.

U.S. Ex. 33

Finding 7.7.2

By Order of the Secretary of the Interior dated January 3, 1929, specified lands were withdrawn from public entry, under

the first form of withdrawal, as provided in Section 3, Act of June 17, 1902 (32 Stat. 388), for the Colorado River Storage Boulder Canyon Reservoir Site.

U.S. Ex. 34

Finding 7.7.3

The area known as Boulder City, Nevada, is situated upon lands of the United States included within those withdrawn from the public domain by orders of the Secretary of the Interior dated August 7, 1920, and January 3, 1929.

Tr. 20,495

Finding 7.7.4

The Secretary of the Interior by letter of May 19, 1931, transmitted to the Governor of the State of Nevada for filing in his office a description and plat of the lands included in the Boulder Canyon Project Federal Reservation in Clark County, Nevada. The reservation was established, according to the Secretary, to facilitate the construction and operation of Hoover Dam and appurtenant works authorized by the Boulder Canyon Project Act of December 21, 1928 (45 Stat. 1057).

U.S. Ex. 36–B

Finding 7.7.5

Boulder City, Nevada, was first established in connection with the construction of Hoover Dam when it served as construction headquarters and for the housing of personnel engaged in that operation. Subsequent to that time, it became the headquarters for Region Three of the Bureau of Reclamation of the Department of the Interior and since the completion of Hoover Dam it has been the headquarters for the operation of the Boulder Canyon Project.

There is located within the area known as Boulder City, Nevada, an installation of the Bureau of Mines of the Department of the Interior. The National Park Service also has installations within Boulder City.

Tr. 20,495–20,496; Tr. 15,850–1, U.S. Exs. 32, 2802

Finding 7.7.6

Since March 1932, the United States has diverted from the Colorado River and from Lake Mead the water required for

governmental, municipal and domestic purposes in Boulder City. In 1956, the quantity diverted was 2,747 acre-feet.

Tr. 20,496, U.S. Ex. 35

Finding 7.7.7

By the Act of September 2, 1958 (72 Stat. 1726), Congress provided for the disposal of certain Federal property in the Boulder City area and for assistance in the establishment of a municipality incorporated under the laws of Nevada. Section 9(a) of that Act provides as to water supply "Because of its climate and its location with respect to the only source of water, Boulder City faces extraordinary difficulties in connection with a domestic water supply. In recognition of this fact, the existing water supply system from Hoover Dam to, but not including, the Boulder City storage tanks shall be retained by the United States and shall be operated and maintained by the Secretary [of the Interior] in order to supply water to the municipality at said storage tanks, for domestic, industrial, and municipal purposes, at a maximum rate of delivery of three thousand six hundred and fifty gallons a minute * * *. There shall be no charge under the contract between the United States and the State of Nevada dated March 30, 1942, as amended, for water delivered in accordance with this section. Such delivery shall be subject to the availability of water for use in the State of Nevada under the provisions of the Colorado River compact and the Project Act and, except as hereinabove provided with respect to the charge for water, shall be in accordance with the terms of the aforesaid contract." Section 9(d) of the Act of September 2, 1958, provides that if the requirements of the municipality shall at any time exceed 3,650 gallons a minute, the Secretary may furnish whatever additional water and whatever additional carrying capacity may be needed.

A continuous flow of 3,650 gallons per minute would aggregate approximately 5,890 acre-feet per year.

Public Law 85–900 (Sept. 2, 1958), Pre-Trial Order, Agreed Facts, Appendix I, p. I–10

Conclusion 7.26

The United States is entitled to divert from storage in Lake Mead and to deliver to the Boulder City water supply system the water needed for governmental, municipal, industrial and domestic purposes in the area served by that system.

Conclusion 7.27

The waters of the Colorado River to be diverted from Lake Mead and delivered to the Boulder City water supply system are within the entitlement of Nevada under its 1942 water delivery contract, as amended, and the right of the United States to divert such waters for such purpose is subject to and controlled by the Colorado River Compact, the Boulder Canyon Project Act, the 1942 Nevada water delivery contract, as amended, and the Act of September 2, 1958 (72 Stat. 1726).

VIII. FORESTS

Finding 8.1

The national forests are used for the protection of watersheds to maintain the natural flow of the streams below, for the production and harvesting of timber, the production and harvesting of forage for domestic livestock permitted on the reservations, for the protection and propagation of fish and wildlife, and for recreation uses by the general public.

Tr. 16,014

Finding 8.2

Water is used in the national forests within the Lower Colorado River Basin for domestic, irrigation, stock watering, power and recreation purposes, for consumption by wildlife and preservation of fish, and for the vegetative cover in its natural state.

Tr. 16,015–16,019, U.S. Ex. 2723

Finding 8.3

Dixie National Forest was created as the Dixie Forest Reserve by Presidential Proclamation dated September 25, 1905. The area of the Dixie National Forest was later enlarged and modified.

34 Stat. 3147; U.S. Ex. 2702

Finding 8.4

Within that portion of the Dixie National Forest situated in the Lower Colorado River Basin are 18 existing water uses with an aggregate quantity of 276.21 acre-feet used per year. The priorities of 17 of these uses according to the dates of withdrawal of the particular area of the Forest Reserve are as follows:

Withdrawal date	*Number of uses*	*Total annual quantity (acre-feet)*
5/12/05	7	33. 12
9/25/05	9	241. 27
9/26/10	1	. 81
Total	17	275. 20

U.S. Exs. 2701–A, 2701–B, 2702

Finding 8.5

The priorities of the 17 existing uses on the Dixie National Forest acquired in conformity with the laws of Utah are as follows:

Priority date	*Number of uses*	*Total annual quantity (acre-feet)*
2/5/12	1	200. 17
2/3/37	1	17. 70
6/30/37	2	3. 91
8/13/37	1	. 42
9/10/37	3	24. 89
3/7/38	2	8. 26
9/29/38	1	8. 45
1/27/39	1	3. 08
6/26/43	2	. 96
6/28/47	1	. 81
4/6/50	1	. 51
Application pending	1	6. 04
Total	17	275. 20

U.S. Exs. 2701–A, 2701–B, 2702

Finding 8.6

The present use of 1.01 acre-feet per year on a Forest Service administrative site outside the boundary of the Dixie National Forest has a priority date acquired under the laws of Utah of April 11, 1911.

U.S. Exs. 2701–A, 2701–B, 2702, Tr. 16,023

Finding 8.7

By Presidential Proclamation dated November 5, 1906, the Charleston Forest Reserve was created, embraced in which were lands that later became part of the Nevada National Forest. The Nevada National Forest was discontinued as of October 1, 1957, and a portion of the Forest having water uses in the Lower Colorado River Basin became a part of the Toiyabe National Forest.

34 Stat. 3252; Tr. 16,025–26

Finding 8.8

In that part of the Toiyabe National Forest that lies in the Lower Colorado River Basin are nine existing water uses with an aggregate quantity of 821 acre-feet used per year. The priority date of all nine of these uses according to the time of withdrawal of the particular area of the Forest Reserve is November 5, 1906.

U.S. Exs. 2703, 2704, Tr. 16,027–16,028

Finding 8.9

The priorities of the nine existing uses in the Toiyabe National Forest acquired in conformity with the laws of Nevada are as follows:

Priority date	*Number of uses*	*Total annual quantity (acre-feet)*
10/10/31	1	542. 84
7/30/37	1	15. 28
4/4/38	1	4. 65
3/7/49	1	3. 38
Applications pending	5	322. 55
Total	9	888. 70

U.S. Exs. 2703, 2704

Finding 8.10

Kaibab National Forest was established by Presidential Proclamation No. 818 and Executive Order No. 909, both dated July 2, 1908, from a portion of the previously established Grand Canyon Forest Reserve. The area of the Kaibab National Forest was later enlarged and modified.

35 Stat. 2196; U.S. Ex. 2706

Finding 8.11

Within the Kaibab National Forest situated in the Gila-Verde and Lower Colorado river basins are 434 existing water uses with an aggregate of 2,341.737 acre-feet used per year. The priorities of these uses according to the dates of withdrawal of the particular area of the Forest Reserve are as follows:

Withdrawal date	*Number of uses*	*Total annual quantity (acre-feet)*
2/20/93	103	86. 813
8/17/98	206	935. 760
5/6/05	68	1, 272. 786
8/8/06	1	. 790
5/22/08	6	5. 478
7/2/08	48	39. 130
5/19/13	2	. 980
Total	434	2, 341. 737

U.S. Exs. 2705–A, 2705–B, 2706

Finding 8.12

The priorities of 42 of the 434 existing uses in the Kaibab National Forest acquired in conformity with the laws of Arizona are as follows:

Priority date	*Number of uses*	*Total annual quantity (acre-feet)*
2/16/28	1	1, 088. 782
9/21/34 and 1/19/50	1	329. 000
2/24/36	1	14. 600
7/23/36	1	11. 103
8/27/36	1	2. 200
7/29/37	1	1. 680
7/11/38	19	41. 449
12/2/38	1	8. 970
9/25/39	2	2. 280
7/15/40	3	11. 240
5/15/42	4	2. 040
7/30/42	1	. 270
1/11/43	2	1. 040
11/6/50	1	126. 400
2/24/56	1	5. 780
3/9/56	2	2. 330
Total	42	1, 649. 164

U.S. Exs. 2705–A, 2705–B, 2706

Finding 8.13

The present use of .156 acre-feet per year on a site outside the boundary of the Kaibab National Forest has a priority date of 1933 according to the year of its first use.

U.S. Ex. 2705–A, 2705–B, 2706

Finding 8.14

Prescott National Forest was created as a public reservation by Presidential Proclamation dated May 10, 1898. The area of the Prescott National Forest was later enlarged and modified.

30 Stat. 1771; U.S. Ex. 2708

Finding 8.15

Within the Prescott National Forest situated in the Gila River and Colorado River drainage areas in the Lower Colorado River Basin are 580 existing water uses with an aggregate quantity of 667.87 acre-feet used per year. The priorities of these uses according to the dates of withdrawal of the particular area of the Forest Reserve are as follows:

Withdrawal date	*Number of uses*	*Total annual quantity (acre-feet)*
8/17/98	26	49. 27
10/21/99	210	186. 96
11/26/07	82	111. 33
12/30/07	167	183. 85
2/1/09	22	17. 15
6/28/10	16	29. 40
10/7/10	37	51. 79
9/29/19	5	7. 05
4/2/28	15	31. 07
Total	580	667. 87

U.S. Exs. 2707, 2708

Finding 8.16

The priorities of 62 of the 580 existing uses in the Prescott National Forest acquired in conformity with the laws of Arizona are as follows:

Priority date	*Number of uses*	*Total annual quantity (acre-feet)*
4/2/28	1	9. 07
5/31/35	1	1. 12
10/30/37	4	22. 00
4/19/38	1	. 10
8/17/38	4	4. 63
9/28/38	1	1. 37
6/30/41	19	5. 68
7/7/41	1	. 67
6/1/42	27	14. 13
11/6/43	1	3. 53
3/16/53	1	. 49
4/15/54	1	. 31
Total	62	63. 10

35 Stat. 2196; U.S. Ex. 2710

Finding 8.17

The Coconino National Forest was created by Presidential Proclamation No. 818, dated July 2, 1908, as a consolidation of one national forest and portions of three other such forests, together with other lands not previously reserved. The area of the Coconino National Forest was later enlarged and modified.

35 Stat. 2196; U.S. Ex. 2710

Finding 8.18

Within the Coconino National Forest situated in the Little Colorado and Gila (Verde) River drainage areas are 810 existing water uses with an aggregate quantity of 1,560.70 acre-feet used per year. The priorities of these uses according to the dates of withdrawal of the particular area of the Forest Reserve are as follows:

Withdrawal date	*Number of uses*	*Total annual quantity (acre-feet)*
8/17/98	668	1, 374. 01
10/3/05	10	4. 80
1/13/08	47	28. 50
7/2/08	12	19. 00
6/28/10	11	52. 44
9/29/19	62	81. 95
Total	810	1, 560. 70

U.S. Exs. 2709, 2710

Finding 8.19

The priorities of 94 of the 810 existing uses in Coconino National Forest acquired in conformity with the laws of Arizona are as follows:

Priority date	*Number of uses*	*Total annual quantity (acre-feet)*
1/23/36	3	56.00
9/15/36	2	2.95
3/25/38	1	3.59
6/22/38	9	21.36
10/5/38	5	18.85
1/30/39	1	2.20
2/2/39	2	4.45
2/13/39	7	18.90
9/25/39	1	2.20
8/5/40	12	21.70
9/7/40	1	13.00
7/7/41	20	38.16
7/18/41	13	10.22
6/29/42	1	15.70
6/30/43	1	1.00
11/6/43	1	1.00
12/10/43	1	28.00
10/21/44	1	6.20
1/31/46	1	1.10
12/19/46	1	8.40
1/17/48	1	44.80
1/22/48	3	15.40
2/26/48	1	1.00
2/24/51	1	3.00
8/2/51	1	.60
2/20/52	1	1.23
9/29/52	1	11.20
8/14/53	1	4.70
Total	94	356.91

34 Stat. 3166; U.S. Ex. 2712

Finding 8.20

Tonto National Forest was created as a public reservation by Presidential Proclamation dated October 3, 1905. The area of Tonto National Forest was later enlarged and modified.

34 Stat. 3166; U.S. Ex. 2712

Finding 8.21

Within the Tonto National Forest, situated in the Gila River drainage area, are 1,257 existing water uses with an aggregate

quantity of 2570.33 acre-feet used per year. The priorities of these uses according to the dates of withdrawal of the particular area of the Forest Reserve are as follows:

Withdrawal date	*Number of uses*	*Total annual quantity (acre-feet)*
8/17/98	28	78. 23
3/20/05	52	305. 96
10/3/05	474	960. 13
10/3/05 and 1/13/08	1	. 75
12/30/07	144	319. 63
1/13/08	542	869. 29
2/10/09	1	. 75
9/26/10	9	17. 59
10/7/10	6	18. 00
Total	1, 257	2, 570. 33

U.S. Exs. 2711, 2712

Finding 8.22

The priorities of 164 of the 1,257 existing uses in the Tonto National Forest acquired in conformity with the laws of Arizona are as follows:

Priority date	*Number of uses*	*Total annual quantity (acre-feet)*
9/10/21	1	182. 00
7/28/22	1	28. 95
12/18/29	1	1. 68
3/30/31	7	63. 35
6/1/34	1	2. 97
7/13/34	1	9. 05
10/5/34	1	7. 83
6/28/35	2	2. 22
4/3/36	1	7. 85
6/12/37	6	35. 87
11/20/37	3	14. 22
7/30/38	28	21. 75
9/12/38	7	3. 51
1/16/39	3	2. 18
1/30/39	27	18. 90
3/1/39	12	9. 18
3/24/39	9	22. 77
4/24/39	1	. 67
9/25/39	1	2. 24
7/15/40	9	5. 94
8/17/40	5	3. 58

Priority date	Number of uses	Total annual quantity (acre-feet)
9/6/40	1	0.66
9/7/40	4	3.59
10/31/40	1	.28
1/23/41	2	.89
6/30/41	2	.74
10/6/47	1	1.12
10/22/47	1	1.14
7/21/48	1	.28
7/21/49	1	.81
10/12/50	1	1.68
10/18/50	1	7.67
10/1/51	2	60.39
8/22/52	1	.33
3/11/53	1	10.78
6/25/53	2	2.35
4/15/54	2	4.83
3/30/55	1	.09
4/22/55	1	1.12
9/13/55	7	4.53
10/13/55	1	5.51
11/14/55	3	1.25
Total	164	556.75

U.S. Exs. 2711, 2712

Finding 8.23

Of three present uses of three acre-feet each per year outside the boundary of Tonto National Forest, one has a priority date of prior to 1948 according to the year of first use, one has a priority date of 1945, and the other a priority date of 1950.

U.S. Exs. 2711, 2712

Finding 8.24

Sitgreaves National Forest was created by Executive Order No. 868, dated July 1, 1908, from portions of two national forests previously established. The area of Sitgreaves National Forest was later enlarged and modified.

U.S. Ex. 2714

Finding 8.25

Within the Sitgreaves National Forest situated in the Little Colorado River drainage area are 210 existing water uses with an aggregate quantity of 450.09 acre-feet used per year. The

priorities of these uses according to the dates of withdrawal of the particular area of the Forest Reserve are as follows:

Withdrawal date	*Number of uses*	*Total annual quantity (acre-feet)*
8/17/98	103	224. 53
8/17/98 and 7/12/07	7	73. 00
7/12/07	89	114. 20
7/12/07 and 8/24/10	1	8. 00
8/24/10	6	28. 28
10/13/23	4	2. 08
Total	210	450. 09

U.S. Exs. 2713, 2714

Finding 8.26

The priorities of six of the 210 existing uses in Sitgreaves National Forest acquired in conformity with the laws of Arizona are as follows:

Priority date	*Number of uses*	*Total annual quantity (acre-feet)*
10/11/51	1	22. 5
10/15/52	1	. 2
10/27/54	4	13. 2
Total	6	35. 9

U.S. Exs. 2713, 2714

Finding 8.27

Coronado National Forest was established by Executive Order dated July 2, 1908, as a consolidation of the Santa Rita, Santa Catalina, and Dragoon National Forests. The area of Coronado National Forest was later enlarged and modified.

U.S. Ex. 2716

Finding 8.28

Within that part of Coronado National Forest situated within the Lower Colorado River Basin and in the Gila River drainage area are 788 existing water uses with an aggregate quantity of 1650.74 acre-feet used per year. The priorities of

these uses according to the dates of withdrawal of the particular area of the Forest Reserve are as follows:

Withdrawal date	*Number of uses*	*Total annual quantity (acre-feet)*
4/11/02	41	97. 26
7/2/02	45	76. 60
7/22/02	35	144. 78
7/30/02	34	56. 48
10/6/06	10	61. 97
11/5/06	68	106. 04
11/6/06	180	502. 45
11/7/06	89	219. 53
5/25/07	11	12. 01
5/27/07	50	112. 80
7/19/07	79	56. 93
7/1/08	45	52. 39
4/21/10	15	23. 03
7/1/10	15	24. 72
9/26/10	61	90. 25
8/24/12	5	6. 00
8/6/19	5	7. 50
Total	788	1, 650. 74

U.S. Exs. 2715–A, 2715–B, 2715–C, 2716

Finding 8.29

The priorities of 90 of the 788 existing uses in Coronado National Forest acquired in conformity with the laws of Arizona are as follows:

Priority date	*Number of uses*	*Total annual quantity (acre-feet)*
3/30/31	2	28. 96
12/10/31	1	. 36
10/15/33	1	3. 07
1/23/35	10	123. 68
6/13/35	1	3. 55
8/12/35	1	4. 34
8/14/35	1	3. 69
9/13/35	1	21. 72
11/5/36	1	3. 28
7/1/37	1	8. 99
1/30/38	1	. 34
3/7/38	1	1. 23
6/16/38	3	3. 02
6/17/38	1	1. 68
6/18/38	3	1. 15
6/22/38	4	5. 79

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Priority date	*Number of uses*	*Total annual quantity (acre-feet)*
7/30/38	7	9. 30
8/1/38	2	16. 22
10/8/38	1	. 83
12/10/38	2	4. 50
1/5/39	4	6. 16
1/14/39	3	1. 08
1/19/39	3	2. 39
2/16/39	1	1. 68
2/23/39	1	1. 34
3/10/39	2	4. 51
3/15/39	1	. 55
1/5/40	1	18. 38
7/15/40	9	3. 32
8/19/40	6	4. 42
9/7/40	1	. 12
6/19/44	5	3. 81
12/4/44	1	23. 49
4/21/51	1	. 23
5/28/54	1	1. 12
11/2/55	5	. 43
Total	90	318. 73

U.S. Exs. 2715–A, 2715–B, 2715–C, 2716

Finding 8.30

The present use of .50 of an acre-foot per year on a site outside the boundary of Coronado National Forest has a priority date of 1944 according to the year of its first use.

U.S. Exs. 2715–A, 2715–B, 2715–C, 2716

Finding 8.31

Apache National Forest was created by Executive Order dated July 1, 1908, from part of the previously established Black Mesa National Forest. The area of Apache National Forest was later enlarged and modified.

U.S. Ex. 2718

Finding 8.32

Within the Apache National Forest, situated in the Little Colorado River, Salt River and Gila River drainage areas, are 315 existing water uses with an aggregate quantity of 516.12 acre-feet used per year. The priorities of these uses according

to the dates of withdrawal of the particular area of the Forest Reserve, and the States in which such uses are located, are as follows:

Withdrawal date	Arizona		New Mexico	
	Number of uses	Total annual quantity (acre-feet)	Number of uses	Total annual quantity (acre-feet)
8/17/98	147	274. 10	-------	-------
3/2/99	-------	-------	100	136. 00
7/12/07	19	34. 92	-------	-------
2/23/09	-------	-------	49	71. 10
Total	166	309. 02	149	207. 10

U.S. Exs. 2717, 2718

Finding 8.33

The priorities of 11 of the 315 existing uses in the Apache National Forest acquired in conformity with the laws of Arizona are as follows:

Priority date	*Number of uses*	*Total annual quantity (acre-feet)*
8/10/31	3	8. 76
9/6/40	7	13. 22
10/9/52	1	2. 24
Total	11	24. 22

U.S. Exs. 2717, 2718

Finding 8.34

Gila National Forest was created as a public reservation by Presidential Proclamation dated March 2, 1899. The area of the Forest Reserve was later enlarged and modified.

U.S. Exs. 2720–A and 2720–B

Finding 8.35

Within the Gila National Forest situated in the Gila River drainage area are 740 existing water uses with an aggregate quantity of 1600.41 acre-feet used per year. The priorities of these uses according to the date of withdrawal of the particular

area of the Forest Reserve, and the States in which such uses are located, are as follows:

Withdrawal date	Arizona		New Mexico	
	Number of uses	Total annual quantity (acre-feet)	Number of uses	Total annual quantity (acre-feet)
8/17/98	39	78. 99		
8/17/98 and 6/30/06	1	10. 00		
3/2/99			474	951. 90
7/21/05			28	44. 00
6/30/06	154	436. 72		
2/6/07			33	58. 10
6/18/08			1	. 50
2/23/09			6	16. 20
2/15/09			4	4. 00
Total	194	525. 71	546	1, 074. 70

U.S. Exs. 2719–A, 2719–B, 2720–A and 2720–B

Finding 8.36

The priorities of 32 of the 740 existing uses in Gila National Forest acquired in conformity with the laws of Arizona are as follows:

Priority date	*Number of uses*	*Total annual quantity (acre-feet)*
7/30/38	11	10. 73
1/14/39	1	. 56
7/15/40	19	6. 28
7/15/42	1	. 34
Total	32	17. 91

U.S. Exs. 2719–A, 2719–B, 2720–A

Finding 8.37

The priority date of one of the 740 existing uses in Gila National Forest of 2.1 acre-feet per year acquired in conformity with the laws of New Mexico is October 10, 1955.

U.S. Exs. 2719–A, 2719–B, 2720–B

Finding 8.38

Cibola National Forest was established by Executive Order No. 5752, dated December 3, 1931, from what was formerly named the Manzano National Forest.

U.S. Ex. 2722

Finding 8.39

Within the Cibola National Forest, situated in the Little Colorado River drainage area, are 43 existing water uses with an aggregate quantity of 123.29 acre-feet used per year. The priorities of these uses according to the dates of withdrawal of the particular area of the Forest Reserve are as follows:

Withdrawal date	*Number of uses*	*Total annual quantity (acre-feet)*
4/6/08	20	13.85
3/2/09	4	1.75
4/20/25	19	107.69
Total	43	123.29

U.S. Ex. 2722

Finding 8.40

The priorities of nine of the 43 existing uses in the Cibola National Forest acquired in conformity with the laws of New Mexico are as follows:

Priority date	*Number of uses*	*Total annual quantity (acre-feet)*
1/30/37	5	87.00
8/20/37	2	13.71
8/23/40	1	1.12
12/3/54	1	1.61
Total	9	103.44

U.S. Exs. 2721, 2722

Finding 8.41

The present use of 1.25 acre-feet per year on a site outside the boundary of the Cibola National Forest has a priority date of 1909, according to the year of its first use.

U.S. Ex. 2722

Finding 8.42

In the aggregate, the annual water uses for the National Forests within the Lower Basin of the Colorado River, exclusive of natural uses for fish and wildlife and vegetation, are as follows:

State	Forest	Location by drainage area	Quantity (acre-feet)
Arizona	Kaibab	Gila-Verde and Colorado Rivers.	2, 341. 893
	Prescott	Gila and Colorado Rivers.	667. 870
	Coconino	Little Colorado and Gila (Verde) Rivers.	1, 560. 700
	Tonto	Gila River	2, 579. 330
	Sitgreaves	Little Colorado River	450. 090
	Coronado	Gila River	1, 651. 240
	Apache	Little Colorado, Salt, and Gila Rivers.	309. 020
	Gila	Gila River	525. 710
Total in Arizona			10, 085. 853
Nevada (Total)	Toiyabe	Lower Colorado River Basin.	821. 000
New Mexico	Apache	Little Colorado, Salt, and Gila Rivers.	207. 100
	Gila	Gila River	1, 074. 700
	Cibola	Little Colorado River	124. 540
Total in New Mexico			1, 406. 240
Utah (Total)	Dixie	Lower Colorado River Basin.	276. 210
Total in all states			12, 589. 303

U.S. Exs. 2700–2722, Tr. 16,028

Finding 8.43

Additional use of water within the national forests of the Lower Colorado River Basin is anticipated to satisfy future requirements for recreational and stock-watering programs.

Tr. 16,029–16,031; 16,066–16,068, U.S. Ex. 2724

Conclusion 8.1

By reason of the establishment of the various National Forest Reserves within the Lower Basin of the Colorado River, and the rights under the laws of the United States and under the laws of the States wherein such National Forests are situated, the United States has the right to use waters within the drainage area of the Lower Colorado River on the various national forests in quantities not less than the following:

	Acre-feet per year
Arizona	10,086
Nevada	821
New Mexico	1,406
Utah	276

and, subject to availability of the necessary water, to increase such uses as necessary to accomplish the purposes of said national forests.

Parks

Finding 9.1

Water in the national parks, monuments, recreation area and memorial within the Lower Colorado River Basin is used basically for the public who visit such areas, for the support of fish and for consumption by wildlife. Water is also used for irrigation to make the areas suitable for human use and to develop the range for the wildlife, as well as for domestic, power, and stock-watering purposes.

Tr. 15,839–840, U.S. Exs. 2801–2821

Finding 9.2

Zion National Park was established by an act of November 19, 1919, from what had been previously established as a national monument. The area of Zion National Park was later enlarged.

41 Stat. 356; U.S. Ex. 2801

Finding 9.3

Within Zion National Park, situated within the Lower Colorado River Basin in Utah, are existing water uses with an aggregate quantity of 1,659.47 acre-feet used per year. The

priorities of these uses according to the dates of withdrawal of the lands on which such uses are located are as follows:

Withdrawal date	*Total annual quantity (acre-feet)*
7/31/09	1,648.18
3/18/18	1.25
1/22/37	2.22
7/31/09, 3/18/18, and 1/22/37	7.82
Total	1,659.47

U.S. Ex. 2801, Tr. 15,848; 15,849

Finding 9.4

Of the existing water uses aggregating 1,659.47 acre-feet per year in Zion National Park, 1,647.756 acre-feet per year have the following priorities acquired under and in conformity with the laws of Utah:

874.467 acre-feet per year	1877
383.031 acre-feet per year	1881
383.031 acre-feet per year	1894
7.227 acre-feet per year	May 31, 1929

U.S. Ex. 2801, Tr. 15,846–15,849

Finding 9.5

The Lake Mead National Recreation Area was established on the basis of agreements of October 13, 1936, and July 18, 1947, between the United States Bureau of Reclamation and the United States National Park Service, by which the Park Service agreed to administer recreational and various other uses in what was then referred to as the Boulder Canyon Project Area. The agreement covered lands previously withdrawn from the public domain.

U.S. Ex. 2802; E.O. Apr. 17, 1926; E.O. 5105, May 3, 1929; E.O. 5339, Apr. 25, 1930

Finding 9.6

Within the Lake Mead National Recreation Area, situated in the Lower Colorado River Basin, are uses aggregating 3,715.04 acre-feet per year. The priorities, according to the

dates of withdrawal of the pertinent areas, and the State in which such uses are located, are as follows:

Withdrawal date	*Nevada*	*Arizona*
4/17/26	317.99	-------
5/3/29	3,026.00	-------
4/25/30	226.5	139.55
5/3/29 and 4/25/30	5.0	-------
	3,575.49	139.55

U.S. Ex. 2802; E.O. Apr. 17, 1926; E.O. 5105, May 3, 1920; E.O. 5339, Apr. 25, 1930

Finding 9.7

Three of the existing uses in the Lake Mead National Recreation Area, included in those aggregating the 3,715.04 acre-feet per year, have the following priorities acquired in conformity with the law of Nevada:

Priority date	*Total annual quantity (acre-feet)*
8/22/10	26.00
2/16/37	317.99
12/1/37	3,000.00

U.S. Ex. 2802; Nevada Ex. 25-A

Finding 9.8

Grand Canyon National Park was established by an Act of Congress of February 26, 1919; included within the boundary of Grand Canyon National Park were lands embraced by a previously-established national monument that had been created within an already-existing national forest. The area of Grand Canyon National Park was later changed.

40 Stat. 1175, U.S. Ex. 2808

Finding 9.9

Within Grand Canyon National Park, situated in Arizona within the Lower Colorado River Basin, are uses aggregating 3,929.75 acre-feet per year. Priorities of these uses, according to the date of withdrawal of the pertinent areas range from February 20, 1893, to August 8, 1906.

U.S. Ex. 2808, Proc. 45, Feb. 20, 1893 (27 Stat. 1064); Proc. May 6, 1905 (34 Stat. 3009); Proc. Aug. 8, 1906 (34 Stat. 3223)

Finding 9.10

Of the existing uses aggregating 3,929.75 acre-feet per year within Grand Canyon National Park, those that have priorities acquired in conformity with the laws of Arizona are as follows:

Priority Date	*Total annual quantity (acre-feet)*
12/8/36	232.1
4/30/37 and 3/13/40	3,585.6
5/15/37 and 9/23/41	61.49
4/14/38	15.56

U.S. Ex. 2808

Finding 9.11

Montezuma Castle National Monument was established by Presidential Proclamation dated December 8, 1906. The area of Montezuma Castle National Monument was later enlarged.

34 Stat. 3265; U.S. Ex. 2809

Finding 9.12

Within Montezuma Castle National Monument, situated in Arizona within the Lower Colorado River Basin, are existing water uses with an aggregate quantity of 735.04 acre-feet used per year. Priorities of some of these uses, according to the dates of withdrawal of the areas on which the sources are located, are as follows:

Withdrawal date	*Total annual quantity (acre-feet)*
12/8/06	4.07
8/17/98	.91
Total	4.98

U.S. Ex. 2809

Finding 9.13

One of the existing uses within Montezuma Castle National Monument of approximately 730 acre-feet per year has a decreed priority of 1870. The total right as decreed aggregates 1,510 acre-feet per year.

U.S. Ex. 2809

Finding 9.14

There are additional water uses within the following National Monuments and Memorial:

Casa Grande National Monument
Chiricahua National Monument
Coronado National Memorial
Gila Pueblo (National Park Service Archeological Center)
Grand Canyon National Monument
Organ Pipe Cactus National Monument
Petrified Forest National Monument
Pipe Spring National Monument
Saguaro National Monument
Tonto National Monument
Tumacacori National Monument
Tuzigoot National Monument
Walnut Canyon National Monument
Wupatki National Monument
El Morro National Monument
Gila Cliff Dwelling National Monument

Also located within the Lower Colorado River Basin is Sunset Crater National Monument on which there are no present water uses.

These monuments and the memorial were established by various statutes and Presidential Proclamations from lands pre-

viously reserved for other federal purposes, or by withdrawal of lands from the public domain or by purchase.

40 Stat. 1818; U.S. Ex. 2803; 43 Stat. 1946; 52 Stat. 1551; U.S. Ex. 2804; 67 Stat. C18; U.S. Ex. 2805; U.S. Ex. 2806; 66 Stat. 7; 47 Stat. 2547; U.S. Ex. 2807; 50 Stat. 1827; U.S. Ex. 2810; 34 Stat. 3266; U.S. Ex. 2811; U.S. Ex. 2812; 43 Stat. 1913; 47 Stat. 2557; U.S. Ex. 2813; Proc. July 19, 1907 (35 Stat. 2147); Proc. 2032, Mar. 1, 1933 (47 Stat. 2557); 46 Stat. 3023; U.S. Ex. 2814; Proc. Aug. 17, 1898 (30 Stat. 1780); Proc. April 12, 1902 (32 Stat. 1991); 35 Stat. 2168; U.S. Ex. 2815; 35 Stat. 2205; U.S. Ex. 2816; 53 Stat. 2548; U.S. Ex. 2817; 39 Stat. 1761; U.S. Ex. 2818; U.S. Ex. 2819; 43 Stat. 1977; 34 Stat. 3264; U.S. Ex. 2820; 35 Stat. 2162; U.S. Ex. 2821; Tr. 15,876–877; 15,896–899; 15,918–919; 15,923–927

Finding 9.15

In the aggregate, the present annual water uses for the national parks, monuments, recreation area and memorial within the Lower Colorado River Basin are as follows:

State	Drainage areas	Quantity (acre-feet)	
Arizona	Gila River, Main Stream: Casa Grande National Monument	3.75	
			3.75
	Gila River Tributaries, except Salt River:		
	Chiricahua National Monument (Bonito Canyon).	5.42	
	Coronado National Monument (San Pedro River).	2.00	
	Organ Pipe Cactus National Monument (Growler Wash).	8.74	
	Saguaro National Monument (Santa Cruz River).	8.31	
	Tumacacori National Monument (Santa Cruz River).	4.47	
			28.94
	Salt River and tributaries:		
	Gila Pueblo National Monument (Pinal Creek).	0.62	
	Montezuma Castle National Monument (Beaver Creek).	735.04	
	Tonto National Monument (Roosevelt Reservoir).	1.76	
	Tuzigoot National Monument (Verde River).	0.12	
			737.54
	Little Colorado River:		
	Petrified Forest National Monument.	19.35	
	Walnut Canyon National Monument.	1.20	
	Wupatki National Monument.	1.39	
			21.94
	Tributaries of Colorado River between Little Colorado and Gila Rivers:		
	Grand Canyon National Park (Havasu Creek).	3.586	
	Grand Canyon National Park (Kanab Creek).	5.00	
	Pipe Springs National Monument.	24.10	
			32.686

State	*Drainage areas*	*Quantity (acre-feet)*	
Arizona	Colorado, Main Stream:		
	Lake Mead National Recreation Area.	139. 55	
	Grand Canyon National Monument.	24. 78	
	Grand Canyon National Park.	*391. 164	555. 494
Subtotal, Arizona			1, 380. 35
Nevada	Muddy River: Lake Mead National Recreation Area.		3, 026. 00
	Colorado River, Main Stream: Lake Mead National Recreation Area.		549. 49
Subtotal, Nevada			3, 575. 49
New Mexico	Little Colorado River and Tributaries: El Morro National Monument (Zuni River Drainage).		1. 01
	Gila River and Tributaries: Gila Cliff Dwelling National Monument (West Fork, Gila).		. 101
Subtotal, New Mexico			1. 111
Utah	Virgin River: Zion National Park.		1, 659. 471
Subtotal, Utah			1, 659. 471
Grand total for all States			6, 616. 42

*An additional 3,530 acre-feet is used within Grand Canyon National Park for generation of power.

U.S. Exs. 2800–21

Finding 9.16

In the 1957 water year, attendance by the visiting public at the national parks, monuments, recreation area, and memorial within the Lower Colorado River Basin aggregated 6,411,243. According to the present rate of increase of attendance by the visiting public at these areas, it is probable that the total attendance will reach about 14 million in 1960. If the attendance continues its present trend until 1975, the possible total in that year will be 29 million.

Tr. 15,946–15,947, U.S. Exs. 2822, 2823

Finding 9.17

The quantity of existing water uses on the national parks, monuments, recreation area and memorial within the Lower Colorado Basin is not sufficient to satisfy the future needs of these areas.

Tr. 15,934

Finding 9.18

Plans have been drawn for and work is in progress on a 10-year construction program, known as "Mission 66", for development of additional water supplies on the national parks, monuments, recreation area and memorial in the Lower Colorado River Basin.

Tr. 15,934–15,935, U.S. Ex. 2824

Finding 9.19

Estimates, based on the current attendance trend, of the future water use needs in the national parks, monuments, recreation area and memorial within the Lower Colorado River Basin are as follows:

State area	Estimated water use (acre-feet)			
	1966		1975	
	Consumptive use	Power	Consumptive use	Power
Arizona	2, 217. 27	7, 200. 00	3, 516. 80	15, 000. 00
Nevada	6, 194. 00	----------	6, 586. 00	----------
New Mexico	3. 51	----------	11. 01	----------
Utah	2, 208. 50	----------	2, 258. 50	----------
Total	10, 623. 28	7, 200. 00	12, 372. 31	15, 000. 00

Tr. 16,127–16,133, U.S. Ex. 2825

Conclusion 9.1

By reason of the establishment of the various national parks, monuments, recreation area and memorial within the Lower Colorado River Basin, and the rights under the laws of the United States and under the laws of the States wherein such areas are situated, the United States has the right to make

consumptive use of waters within the drainage area of the Lower Colorado River on the various said areas in quantities not less than the following:

	Acre-feet per year
Arizona	1,380
Nevada	3,575
New Mexico	1
Utah	1,659

and, subject to availability of the necessary water, to increase such uses as necessary to accomplish the purposes of said parks, monuments, recreation area and memorial.

Bureau of Land Management

Finding 10.1

The United States Bureau of Land Management administers the vacant public lands commonly designated as public domain. Included in the Bureau's activities are a range grazing administration program and soil moisture conservation operations authorized by the Taylor Grazing Act of 1934 and the National Soil Conservation Act of 1935, respectively. The primary objectives of these two acts are to manage and protect the vacant public lands so as to ensure maximum improvement, development, and beneficial use of the natural resources thereon. In addition, a specific objective of the Taylor Grazing Act is to stabilize the livestock industry that is dependent on public lands.

Tr. 16,076; 16,079; 16,095; 48 Stat. 1269; 49 Stat. 163

Finding 10.2

The primary consumptive uses of water in the United States Bureau of Land Management's administration of the public lands in the Lower Colorado River Basin are in connection with the grazing administration program for the watering of livestock. Some additional uses are in connection with range water spreading installations for the purposes of preserving and increasing forage, and controlling erosion.

Tr. 16,076–16,077

Finding 10.3

Lands under the jurisdiction of the Bureau of Land Management are made available for grazing and other purposes by the issuance of grazing permits or grazing licenses on lands within a grazing district, or by lease arrangement for lands outside the grazing districts. There are no major differences between the permit and lease arrangements.

Tr. 16,080

Finding 10.4

Approximate total acreages of lands under the jurisdiction of the United States Bureau of Land Management in the Lower Colorado River Basin portions of each of four states are as follows: Arizona, 12,569,000; California, 4,830,000; Nevada, 8,154,000; Utah, 2,776,428.

Tr. 16,116; 16,117

Finding 10.5

Most of the lands under the jurisdiction of the United States Bureau of Land Management within the Lower Colorado River Basin portions of Arizona, Nevada and Utah are administered as grazing lands. Approximately a third of the public land acreage under the jurisdiction of the United States Bureau of Land Management in that portion of California within the Lower Colorado River Basin is administered for grazing purposes.

Tr. 16,117

Finding 10.6

Within that part of California situated in the Lower Colorado River Basin are two water uses upon lands under the jurisdiction of the United States Bureau of Land Management aggregating 0.8 of an acre-foot used per year, both of which have a priority date of April 17, 1926, according to the date of withdrawal of the areas on which the uses are located.

U.S. Exs. 2900, 2901, 2912

Finding 10.7

Within that part of Nevada situated in the Lower Colorado River Basin are 16 existing water uses upon lands under the jurisdiction of the United States Bureau of Land Management aggregating 33.5 acre-feet used per year, all of which have a

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priority date of April 17, 1926, according to the date of withdrawal of the areas on which these uses are located.

U.S. Exs. 2902, 2903, 2912

Finding 10.8

Within that part of Utah situated in the Lower Colorado River Basin are 68 existing water uses upon lands under the jurisdiction of the United States Bureau of Land Management. The priorities of seven of these uses according to the year of construction or first use, whichever date was earliest, are as follows:

Year of construction or first use	*Number of uses*	*Total annual quantity (acre-feet)*
1854	1	4.06
1858	1	9.36
1860	2	51.03
1860–1880	3	59.01
Total	7	123.46

U.S. Exs. 2904, 2905, 2906, Tr. 16,088

Finding 10.9

Of the 68 existing water uses upon lands under the jurisdiction of the United States Bureau of Land Management within that part of Utah situated in the Lower Colorado River Basin, 61 uses aggregating 403.83 acre-feet used per year have a priority of April 17, 1926, according to the date of withdrawal of the areas on which the 61 uses are located.

U.S. Exs. 2904, 2905, 2906, 2912

Finding 10.10

Of the 68 existing uses within that part of Utah situated in the Lower Colorado River Basin upon lands under the jurisdiction of the United States Bureau of Land Management, three uses aggregating .0040 cubic feet per second, and one use totaling 4.8 acre-feet per year all have a priority date of September 14, 1946, acquired in conformity with the laws of Utah.

U.S. Exs. 2904, 2906

Finding 10.11

Within that part of Arizona situated in the Lower Colorado River Basin are 83 existing water uses upon lands under the jurisdiction of the United States Bureau of Land Management aggregating 734.7 acre-feet used per year. All 83 existing uses have a priority of April 17, 1926, according to the date of withdrawal of the areas on which these uses are located. These uses are within the drainage areas as follows:

Drainage area	*Number of uses*	*Total annual quantity (acre-feet)*
Gila River	54	482. 8
Little Colorado River	1	8. 0
Lower Colorado River	23	229. 5
Virgin River	5	14. 4
Total	83	734. 7

U.S. Exs. 2907–2911, 2912

Finding 10.12

The priorities acquired in conformity with the laws of Arizona of eight of the 83 existing water uses upon lands under the jurisdiction of the Bureau of Land Management within that part of Arizona situated in the Lower Colorado River Basin are as follows:

Priority date	*Number of uses*	*Total annual quantity (gallons per annum)*
10/28/38	3	2, 595, 000
11/14/38	1	1, 000, 000
2/10/39	2	784, 750
2/28/39	2	960, 000
Total	8	5, 339, 750

U.S. Exs. 2907–2911, Tr. 16,090–16,093

Finding 10.13

In the aggregate, the annual water uses for lands under the jurisdiction of the United States Bureau of Land Management within the Lower Colorado River Basin are as follows:

State	*Location by drainage area*	*Quantity (acre-feet)*
Arizona	Gila River	482. 80
	Little Colorado River	8. 00
	Lower Colorado River	229. 50
	Virgin River	14. 40
Total in Arizona		734. 70
California	Lower Colorado River	. 80
Nevada	Lower Colorado River	33. 50
Utah	Lower Colorado River	527. 29
Total in all States		1, 296. 29

U.S. Exs. 2900–2911

Finding 10.14

In addition to the 169 existing water uses on lands administered by the United States Bureau of Land Management in the Lower Colorado River Basin utilizing surface sources, there are other existing uses utilizing underground waters on lands administered by the Bureau in this area.

Tr. 16,094; 16,095

Finding 10.15

The amount required to satisfy the current consumptive demand for stock watering based on the permitted, licensed, or leased grazing privileges on the Lower Colorado River Basin area public lands is 6,473 acre-feet per year more than the aggregate amount supplied by existing federal water use developments that have been made by grazing permittees. This 6,473 acre-foot deficiency in the amount furnished by present stock-watering facilities exists entirely within that portion of the Lower Colorado River Basin situated in Arizona.

Tr. 16,106–16,108

Finding 10.16

The existing uses and existing federal developments on lands administered by the United States Bureau of Land Management are inadequate for accomplishment of the objectives of

the Taylor Grazing Act of 1934 and the National Soil Conservation Act of 1935 and the Bureau has developed a 20-year program. The plans for that program include the required additional water developments that it is contemplated will be needed to attain the objectives of those two Acts.

Tr. 16,095–16,096, U.S. Exs. 2913–2918

Conclusion 10.1

By reason of the reservation of lands containing sites of water uses that became part of the lands under the jurisdiction of the United States Bureau of Land Management, and by reason of the rights under the laws of the United States and under the laws of the States wherein the uses are situated, the United States has the right to use waters within the drainage area of the Lower Colorado River on the various areas under the jurisdiction of the United States Bureau of Land Management, in quantities not less than the following:

	Acre-feet per year
Arizona	735
California	1
Nevada	34
Utah	527

and, subject to availability of the necessary water, to increase such uses as necessary to accomplish the purposes of the laws of the United States respecting the management of said areas.

XI. GENERAL

Relationship of Rights of the United States to State Entitlements

Conclusion 11.1

Insofar as their relationship to the entitlements of the several Lower Basin States to the consumptive use of Colorado River System water for use within the respective States is concerned, the rights of the United States to the use of such waters fall within four general categories. The several groupings are as follows:

(a) Those rights of the United States to which consumptive uses within the entitlements of the several States are preferred.

(b) Those rights of the United States which are included within the respective entitlements of the States within which the uses occur.

(c) Those rights of the United States which are included within, but which are not limited by, the respective entitlements of the States within which the uses occur.

(d) Those rights of the United States which are not included within the entitlement of any of the States, and to which all of the State entitlements are subject.

Conclusion 11.2

Within the first category is the right of the United States to use the waters of the main stream of the Colorado River for the generation of electrical energy. By provision of the Project Act, the use of Hoover Dam for power generation is subordinate to that structure's use for river regulation, improvement of navigation, flood control, irrigation, and domestic uses. Accordingly, consumptive uses of the main stream waters for use within the entitlements of the several States are preferred to use for power generation. However, the discretion to determine whether stored waters may be released exclusively for power generation without jeopardizing existing or foreseeable

requirements for the uses preferred by the Project Act resides in the Secretary of the Interior of the United States. The establishment of criteria controlling releases of stored water exclusively for power generation is not a matter for judicial determination.

Conclusion 11.3

Within the second category are the rights of the United States with respect to its various reclamation projects and related uses utilizing main stream water reviewed in Section VII of these Findings and Conclusions. These rights of the United States, and the uses thereunder, are included within the entitlements of California, Arizona, and Nevada under their several water-delivery contracts and the quantities of such uses must be taken into account in determining the quantities of other waters deliverable in satisfaction of those entitlements.

For the purpose of determining the aggregate quantities of water deliverable in satisfaction of the several State entitlements, the quantities of use under the said reclamation projects and related uses of the United States utilizing main stream water are to be determined by application of the rule to be applied in determining for the same purpose the quantities of other uses.

While, by reason of express statutory provision and administrative interpretation thereof, a different rule must be applied in determining the meaning of the phrase "beneficial consumptive use" as that phrase is employed in the Gila Project Reauthorization Act of 1947 (Conclusion 7.20, *supra*), the fair and equitable rule for measuring, for the purpose of determining the aggregate quantities of water deliverable in satisfaction of the several State entitlements, the consumptive use of the quantities of water diverted from the main stream is the quantity diverted for use within a State less the quantity of determinable, by measurement or otherwise, return flow from that State to the main stream of the Colorado River in the United States or elsewhere in such manner that such return flow is available for other downstream uses in the United States or for satisfaction of the Mexican Treaty obligation.

All determinations of diversions from the main stream and of return flows within such rule are to be made by or under the direction of the Secretary of the Interior in the exercise of his discretionary functions with respect to operation of the Boulder Canyon Project and the delivery of stored water under contracts made in pursuance of the Project Act.

Conclusion 11.4

Also within the second category of rights of the United States are, for practical purposes at least, its uses of water in the National Parks, the National Forests, and in areas under the jurisdiction of the Bureau of Land Management of the Department of the Interior.

With the exception of the National Park uses by direct diversion from Lake Mead, none of such uses involves the diversion of water from the main stream.

Under Article 7(d) of the Arizona 1944 water delivery contract (Finding 1.38, *supra*), the quantity of water deliverable from storage in Lake Mead is to be diminished to the extent that uses in Arizona under such rights, as well as other uses in Arizona, diminish the flow into Lake Mead. Similarly, the Nevada entitlement under her water-delivery contract (Finding 1.40, *supra*) is subject to diminution on account of "all other waters diverted for use within the State of Nevada from the Colorado River System."

The Nevada contract is to be construed on a parity with the Arizona contract respecting the chargeability to the contract quantity of these tributary uses, and it is only to the extent such uses diminish the flow into Lake Mead that the respective contract entitlements are thereby diminished.

For the purpose of determining the aggregate quantities of water deliverable in satisfaction of the Arizona and Nevada water delivery contract entitlements, the quantities by which the flow into Lake Mead is diminished by these uses of the United States on the tributaries within those States is to be determined by or under the direction of the Secretary of the Interior in the exercise of his discretionary functions with respect to operation of the Boulder Canyon Project and the delivery

of stored water under contracts made in pursuance of the Project.

The uses by the United States in California of Colorado River system water on areas under the jurisdiction of the Bureau of Land Management are *de minimus,* and there are no National Forests or Parks within the natural drainage area of the Colorado River within that State.

For the purpose of determining the aggregate quantities of water deliverable in satisfaction of the Arizona and Nevada water-delivery contract entitlements, the quantities of National Park uses of water diverted from the main stream are to be determined in like manner as the quantities of other uses diverted from the main stream (Conclusion 11.3, *supra*).

For the purpose of determining the equitable shares of Utah and New Mexico in the waters of the tributaries of the Colorado River within those States, the uses by the United States within those States in the National Parks, National Forests, and areas under the jurisdiction of the Bureau of Land Management are to be accounted for against the shares of the respective States.

Conclusion 11.5

Within the third category of rights of the United States are its right to use water on the various Indian Reservations within the Lower Basin.

Uses under these rights are uses on lands of the United States within the meaning of Article 7(1) of the Arizona 1944 water-delivery contract and consumptive uses within Arizona within the meaning of Article 7(d) of the same contract. Likewise, such uses in Nevada are uses of water diverted for use within the State of Nevada from the Colorado River system within the meaning of Article 5(a) of the Nevada contract, as amended.

Accordingly, for the purpose of determining the aggregate quantities of water deliverable from storage in Lake Mead in satisfaction of the Arizona and Nevada entitlements, (1) the quantities of use on the Indian Reservations within those States utilizing Colorado River system water diverted from the main stream are to be determined in the same manner

specified in Conclusion 11.3, *supra,* for determination of the quantities of use under the reclamation projects of the United States, and (2) the quantities of use on the Indian Reservations utilizing the water of tributaries in Nevada and of tributaries in Arizona to the extent they diminish the flow into Lake Mead are to be determined in the same manner specified in Conclusion 11.4, *supra,* with respect to such tributary uses in the National Parks, National Forests, and areas under the jurisdiction of the Bureau of Land Management.

Except with respect to the Yuma Indian Reservation within the Reservation Division of the Yuma Reclamation Project, uses on the Indian Reservations in California are not contemplated by the express provisions of the several California water-delivery contracts. The Yuma Indian Reservation use is specifically recognized by each of such contracts and, along with other lands in the Reservation Division of the Yuma Project, is accorded the second priority under the apportionment among the California agencies for the use of Colorado River water available for use in California.

The use of Colorado River water on the other Indian Reservations in California, namely, Fort Mohave, Colorado River, and Chemehuevi, constitutes "consumptive use of water of and from the Colorado River for use in California" within the meaning of Section 4(a) of the Project Act and is therefore to be taken into account for the purpose of determining the aggregate quantities of water deliverable from storage in Lake Mead in satisfaction of the California entitlement.

For the purpose of such determination, the quantities of use on the Indian Reservations in California are to be determined in the same manner specified in Conclusion 11.3, *supra,* for determination of the quantities of uses under the reclamation projects of the United States.

For the purpose of determining the equitable share of New Mexico in the waters of the Little Colorado River system within that State, the uses of water in that State on the Navajo and Zuni Indian Reservations are to be accounted for as part of the New Mexico share. Similarly, the uses of Gila River water on the Indian Reservations, and on the San Carlos Proj-

ect and Florence Casa Grande lands served through the facilities of that Project, utilizing the waters of the main stream of the Gila River in Arizona, are to be accounted for as part of the Arizona share in the waters of the Gila River in effecting an apportionment of the waters of that river between Arizona and New Mexico.

Conclusion 11.6

While the uses upon the several Indian Reservations within the States are to be taken into account in determining the aggregate quantities of main stream water deliverable in satisfaction of the Nevada, California, and Arizona entitlements to such water, and in determining the equitable shares of New Mexico in the Little Colorado and of Arizona in the Gila, the rights of the United States under which such uses are made are rights against the respective stream systems unlimited by State boundaries. Such rights of the United States are not limited by the entitlements of the respective States in which the uses occur.

Accordingly,

(1) The entitlement of Nevada to the use of main stream water is subject to the rights of the United States, with the priorities specified in Section IV of the preceding Findings and Conclusions, (a) to use the waters of the tributaries in Arizona and New Mexico which join the main stream of the Colorado River above Hoover Dam upon the lands of the Indian Reservations which utilize the waters of such tributaries, and (b) to use the waters of the main stream upon the lands of the Indian Reservations downstream with respect to which rights to divert main stream waters exist.

(2) The entitlement of Arizona to the use of main stream water is subject to the rights of the United States, with the priorities specified in Section IV of these Findings and Conclusions, to use the waters of the Muddy River on the Moapa Indian Reservation in Nevada, the waters of tributaries of the Little Colorado on the Navaho and Zuni Indian Reservations in New Mexico, and the waters of the main stream of the Colorado River on the Fort Mohave Indian Reservation in

California and Nevada and on the Colorado River, Chemehuevi, and Yuma Reservations in California.

(3) The entitlement of California to the use of main stream water is subject to the rights of the United States, with the priorities specified in Section IV of these Findings and Conclusions, (a) to use the waters of the tributaries which join the main stream above the California points of diversion upon the lands of the Indian Reservations which utilize the waters of such tributaries, and (b) to use the waters of the main stream upon the lands of the Fort Mohave Indian Reservation in Arizona and Nevada and the Colorado River Indian Reservation in Arizona.

(4) The entitlement of Utah to an equitable share of the waters of the tributaries within that State is subject to the rights of the United States, with the priorities specified in Section IV of these Findings and Conclusions, to use the waters of the main stream of the Colorado River on lands of the Fort Mohave Indian Reservation in Arizona, California, and Nevada, the Colorado River Indian Reservation in Arizona and California, and the Chemehuevi and Yuma Indian Reservations in California.

(5) The entitlement of New Mexico to an equitable share of the waters of the Little Colorado River is subject to the rights of the United States, with the priorities specified in Section IV of these Findings and Conclusions, to use the waters of Black Creek on the Navaho Indian Reservation in Arizona, and the main stream of the Colorado on lands of the Fort Mohave Indian Reservation in Arizona, California, and Nevada, the Colorado River Indian Reservation in Arizona and California, and the Chemehuevi and Yuma Indian Reservations in California.

(6) The entitlement of New Mexico to an equitable share of the waters of the Gila River is subject to the rights of the United States, with the priorities specified in Section IV of these Findings and Conclusions, to use the waters of the main stream of the Gila River on the San Carlos, Gila, and Gila Bend Indian Reservations.

Conclusion 11.7

The rights of the United States to use of water for irrigation of the several Indian Reservations referred to in the preceding Conclusion have the priorities set forth in Section IV of these Findings and Conclusions, not only as against other uses within the States wherein the Reservation's are situated, but, as set forth in Conclusion 11.6, *supra,* also against uses in other States of waters from the same services.

However, there is sufficient presently unused water within the Nevada entitlement to main stream water to satisfy the requirements for the Fort Mohave Indian Reservation within that State, and all future uses within that State of main stream water, as well as those presently existing, are subject to the rights of the United States to use water on that Reservation.

There is sufficient presently unused water within the Arizona entitlement to main stream water to satisfy the requirements for the Fort Mohave and Colorado River Indian Reservations within that State and all future uses within that State of main stream water as well as those presently existing are subject to the rights of the United States to use water on those Reservations. The establishment of all the Colorado River Reservation antedates all presently existing non-Indian uses of main stream water in Arizona as does the establishment of part of the Fort Mohave Reservation.

Sufficient water within the California entitlement for satisfaction of the requirements for use on the Yuma Indian Reservation within that State is assured by the priority accorded the Reservation Division of the Yuma Reclamation Project under the several California water-delivery contracts. The establishment of the Colorado River and Fort Mohave Reservations antedates all presently existing non-Indian uses in California. The establishment of the Chemehuevi Reservation antedates many of the presently existing non-Indian uses in California. By reason of the early dates of establishment of these Reservations, all California uses of Colorado River water are subject to the rights of the United States to use water on the Colorado River and Fort Mohave Reservation, and many, if not all, are subject to such rights respecting the Chemehuevi Reservation. These early dates of establishment of the Reser-

vations assure satisfaction of their requirements with water within the California entitlement.

The extent to which the supply of main stream water is diminished by uses on Indian Reservations on the Muddy River in Nevada and the tributaries in Arizona and New Mexico which join the Colorado River above Hoover Dam and above the California points of diversion is relatively slight and does not materially affect the supply of main stream water available for use in Nevada, California, and Arizona.

Conclusion 11.8

In summary, except as the entitlements of Nevada and Arizona under their respective contracts for the delivery of water from storage in Lake Mead are subject to reduction with respect to uses within those States from the tributaries above Lake Mead to the extent such uses diminish the flow into Lake Mead, for practical purposes the quantity of waters stored in Lake Mead and available for delivery for use in California, Nevada, and Arizona within the meaning of their several water-delivery contracts need not be reduced by reason of uses by the United States of water (1) for generation of electrical power, (2) for its various reclamation projects and related uses, (3) for its National Parks, National Forests, and areas under the jurisdiction of the Bureau of Land Management, or (4) for its Indian Reservations.

Conclusion 11.9

Within the fourth category listed in Conclusion 11.1 of rights of the United States are (1) the right to use water of the Colorado River system for satisfaction of its obligations under the 1944 Mexican Water Treaty, (2) the right to use water for the Wildlife Refuge areas referred to in Section VI of these Findings and Conclusions, and (3) the right to operate Hoover, Davis and Parker Dams and release the waters impounded thereby for purposes of flood control, improvement of navigation, and river regulation.

Conclusion 11.10

The right of the United States to operate the said dams and to release the waters impounded thereby for purposes of flood

control, improvement of navigation and river regulation, is an overriding right to which all other uses of Colorado River waters within the United States are subject. While the quantity of water in storage in Lake Mead available for satisfaction of the several contract entitlements may from time to time be diminished by releases for such purposes, the right of the United States to make such releases is not subject to quantitative determination.

Conclusion 11.11

By Article III(c) of the Colorado River Compact, the States of the Colorado River Basin agreed that the waters required for satisfaction of such rights of Mexico as might be recognized by the United States should be supplied first from the waters which are surplus over the 16,000,000 acre-feet specified in paragraphs (a) and (b) of the same Article, and that if such surplus should prove insufficient, the burden of the deficiency should be equally borne by the Upper Basin and the Lower Basin.

The fair and reasonable construction of the agreement by the Lower Basin States to bear one-half of any such deficiency is that each State shall contribute to making up the deficiency a quantity of water which bears the same ratio to one-half of the deficiency as its aggregate use of Colorado River system water bears to the total supply of system water available for use in the Lower Basin. However, it would be impractical to attempt to supply such deficiency from remote tributary sources and the burden to contribute thereto from their uses of the tributary waters should not be imposed on Utah and New Mexico. Neither should the uses in those States of system water be included for the purpose of determining in this connection total supply of system water available for use in the Lower Basin. Accordingly, the burden is to be borne by Nevada, Arizona, and California by contribution from their contract entitlements to the delivery of water stored in Lake Mead.

Although for practical reasons such contributions should be made from the States' entitlements to the use of main stream water, all tributary uses in Arizona of Colorado River system water should be included in determining the aggregate use

within that State of Colorado River system water and in determining the total supply of system water available for use within the Lower Basin. Such uses should be included, however, only in the quantities by which they diminish the flow into the main stream of the Colorado River.

Conclusion 11.12

Whenever it shall be necessary for the States of Nevada, Arizona, and California to accept in any year deliveries of water from storage in Lake Mead in quantities less than their total contract entitlements by reason of contributions for service of the Mexican Treaty, uses of main stream waters on the Indian Reservations within the respective States shall not be reduced on account thereof and the burden of such reduction in the deliveries for use within the States shall be borne by the water users other than the United States for use on such Indian Reservations.

Conclusion 11.13

The uses of Colorado River water by the United States for maintenance of the Wildlife Refuges referred to in Section VI of these Findings and Conclusions are, among others things, in satisfaction of international obligations of the United States. They are not includible as uses within the entitlements of the several States, but constitute charges against the total supply of Colorado River system water available for use in the Lower Basin to be supplied, if the need should arise, by reduction of deliveries of main stream water to the States of Nevada, Arizona, and California under their contract entitlements in the same manner as specified in Conclusion 11.11, *supra,* with respect to water for the Mexican Treaty.

For all practical purposes, there will be no need for any contribution by the States of main stream water from their contract entitlements for the Wildlife Refuge requirements. The presently existing areas of these refuges make no use of water which would not otherwise be lost to natural causes. The plans for development of the areas contemplate the use of less water diverted from the river than will be salvaged by the developments.

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Water Physically Available for Contract Deliveries

Finding 11.1

For the period 1909 to 1956 the average annual "virgin" flow of the Colorado River at Lee Ferry was 15,211,000 acre-feet; for the period 1914 to 1956 it was approximately 14,900,000 acre-feet; for the period 1914 to 1945, 15,638,000, and for the period 1897–1943, 15,875,000. For the longest period of record, 1896–1956, the average annual "virgin" flow at that point was 15,180,000 acre-feet. It has been estimated that there is a 50–50 chance that the average annual undepleted flow at Lee Ferry for the next 61-year period will be between 16,140,000 and 14,220,000 acre-feet, and there is a 1 in 4 chance that it will be either below or above that range.

Calif. Exs. 2202–A, 5523; Tr. 21,452; Calif. Ex. 2216; Plf. Ex. 366; Tr. 21,282–3; 21,344

Two estimates of average annual flow into Lake Mead based on the assumed repetition of the 1909–1956 average flow were 9,650,000 and 9,950,000 acre-feet respectively, the difference being that one assumed Upper Basin depletions at Lee Ferry of 6,500,000 acre-feet annually and the other 6,200,000. A third estimate of average annual inflow into Lake Mead based on assumed repetition of the 1914 to 1956 average flow and average annual depletions by the Upper Basin of 7,500,000 acre-feet was 8,500,000 acre-feet. The two studies of flow into Lake Mead based on the 1909 to 1956 average annual "virgin" flow at Lee Ferry were extended to make estimations of the net water supply available from the main stream on a long term basis for use in the Lower Colorado River Basin. One yielded a result of 6,075,000 acre-feet per year and the other 7,400,000. Both witnesses estimating net supply of main stream water available for use within the Lower Basin deducted reservoir losses to arrive at the stated conclusions.

Conclusion 11.14

Net reservoir losses within the Lower Basin are a part of the Lower Basin's "beneficial consumptive use" under the Colorado River Compact.

The Arizona 1944 water delivery contract specifically provides (Article 7(d)) that the obligation of the United States to deliver water thereunder shall be subject "to such reduction, on account of evaporation, reservoir, and river losses, as may be required to render this contract in conformity with said compact and said act."

Losses in storage of water stored for use in California constitute "consumptive use (diversions less returns to the river) of water of and from the Colorado River for use in the State of California" within the meaning of Section 4(a) of the Boulder Canyon Project Act and within the meaning of the California Limitation Act.

Losses in storage of water stored for use in Nevada constitute water supplied to the State of Nevada within the meaning of the Nevada water delivery contract.

Losses in storage are to be borne by the several States as part of their entitlements to the delivery of stored water in the proportions which their respective entitlements bear to the total of such entitlements.

Finding 11.2

Both witnesses who estimated the net water supply available from the main stream on a long term basis for use in the Lower Basin concluded that the supply would be less than 7,500,000 acre-feet per year, the aggregate of the contract entitlements of Nevada, Arizona, and California without the use of surplus or unapportioned water.

Finding 11.1, *supra.*

By the addition to that net supply, in accordance with Conclusion 11.14 hereof, of the Erickson deduction for net reservoir losses in the amount of 750,000 acre-feet, the Erickson estimate of 7,400,000 acre-feet per year becomes 8,150,000 acre-feet per year.

Plf. Ex. 366

By addition to the Stetson estimate of 6,075,000 acre-feet per year of his deduction for net reservoir losses in the amount of 950,000 acre-feet, that estimate becomes 7,025,000 acre-feet per year. Correction of his deduction for channel losses from

700,000 acre-feet to 600,000 acre-feet adds another 100,000 acre-feet. If his assumed depletion by the Upper Basin of 6,500,000 acre-feet per year be reduced to 6,200,000 acre-feet in accordance with the Bureau of Reclamation's latest estimate for the year 2062 as reported in Senate Document No. 101, 85th Congress, 2d Session, his estimate would become 7,425,000 acre-feet per year. If his concession that inflow from the Gila River would amount to 50,000 acre-feet per year be taken into account, the net result of his study becomes 7,475,000 acre-feet per year.

Calif. Ex. 2216; Tr. 21,836; 21,344; 12,181

According to the testimony of witness Mitchell, River Control Engineer, Bureau of Reclamation, at Boulder City, Nevada, salvage of river losses by channelization between Davis Dam and Topock of 130,000 acre-feet per year will be realized and additional salvage can be effected by channelization between Parker Dam and the International Boundary. At least 130,000 acre-feet per year should therefore be added to the Stetson estimate of net supply. According to the further Mitchell testimony, and to that of his predecessor in office, Mr. John W. Stanley, deliveries of water to all users downstream from Hoover Dam, including Mexico, can be regulated so that the waters reaching the limitrophe section of the river in excess of the aggregate annual order will be under 100,000 acre-feet per year. The Stetson estimate of net supply would accordingly be increased another 100,000 acre-feet for a total of at least 7,700,000 acre-feet per year net supply in the main stream available for use in the Lower Basin.

Tr. 21,100; 915–918; 21,130

If account be taken of the provision of Article III(c) of the Colorado River Compact that if the surplus waters shall be insufficient to supply the Mexican Treaty requirement, "The States of the Upper Division shall deliver at Lee Ferry water to supply one-half of the deficiency * * * in addition to that provided in paragraph (d)," substantial additional quantities would be added to the Stetson estimate of net Lower Basin supply by reason of deliveries by the Upper Basin at

Lee Ferry in excess of 7,500,000 acre-feet in certain years and by reason of the opportunity for salvaging at least part of the spills from Hoover Dam estimated by Stetson through operation of Hoover Dam in anticipation of such additional deliveries from the Upper Basin.

Tr. 12,154–158; 12,164–173

So adjusted the Stetson estimate is an estimate of substantial surplus available in the main stream over the basic contract entitlements rather than one of shortage.

If the Riter estimate of inflow into Lake Mead of 8,500,000 acre-feet be adjusted to an assumed depletion in the Upper Basin of 6,200,000 acre-feet per year in accordance with the Bureau of Reclamation's latest estimate for the year 2062, that estimate would become 9,800,000 acre-feet per year, within 150,000 acre-feet of the average annual inflow to Lake Mead assumed in the Erickson study. If it were adjusted to reflect 950,000 acre-feet inflow between Lee Ferry and Lake Mead, a quantity accepted by both Erickson and Stetson and reduced to 900,000 by Riter by rounding down, the Riter estimate of inflow to Lake Mead would become 9,850,000. If the Riter estimate were predicated on the average annual undepleted flow at Lee Ferry for the period 1909–1956 of 15,211,000 acre-feet per year, as were both the Erickson and Stetson studies, instead of such flow for the period 1914–1956 in the amount of 14,900,000 acre-feet per year, it is apparent that his estimate of inflow to Lake Mead would be still further increased and perhaps even greater than the estimates of Stetson and Erickson.

Conclusion 11.15

Insufficiency of the net supply of water available in the main stream of the Colorado River for use in the Lower Basin for delivery of the basic contract entitlements of California, Nevada, and Arizona is sufficiently unlikely within the predictable future that a necessity for decision how such shortage should be borne by the contracting States is not present.

If such shortage should occur, it would be by reason of the Mexican Treaty obligation. Shortages which result from reduction of the net supply of main stream water available for

use in the Lower Basin by reason of Treaty deliveries to Mexico are to be borne by Arizona, California, and Nevada as specified in Conclusions 11.11 and 11.12, *supra*.

Conclusion 11.16

It is unnecessary for purposes of decision of this case to reconcile the conflicts in the evidence respecting the supply of main stream water available for use in the Lower Basin or to arrive at a precise or even estimated determination of what may be considered the dependable supply. By Section 4(a) of the Boulder Canyon Project Act and by contracts made by the Secretary of the Interior in pursuance of Section 5 of the Act and in conformity with Section 4(a), substantially all the main stream waters available for use in the Lower Basin have been allocated, subject to, and subject to and including, the rights of the United States as above determined, for use in the States of California, Nevada, and Arizona.

California Entitlement

Conclusion 11.17

By Section 4(a) of the Project Act and by the California Limitation Act, the California entitlement to the consumptive use of water of and from the Colorado River for use in that State may not exceed 4,400,000 acre-feet per year of the waters apportioned to the Lower Basin by Article III(a) of the Colorado River Compact, "plus not more than one-half of any excess or surplus waters unapportioned by said compact, such uses always to be subject to the terms of said compact." By contracts between the Secretary of the Interior and California agencies, the State of California is entitled to delivery of those quantities of water necessary to provide for the consumptive use for use in California of 5,362,000 acre-feet per year. To the extent, however, that the California entitlement exceeds 4,400,000 acre-feet of consumptive use, the additional use may not exceed one-half the surplus waters unapportioned by the Compact. Delivery of the waters necessary to provide for the consumptive use for use in California of the full quantity of 5,362,000 acre-feet per year depends, therefore, upon there being available at least 1,924,000 acre-feet of surplus waters

unapportioned by the Compact. Continued use in California after October 1, 1963, of such part of the unapportioned waters is subject to the further apportionment thereof as provided for in subdivisions (f) and (g) of Article III of the Colorado River Compact.

Reference to Article III(f) of the Compact demonstrates that the only waters of the Colorado River system unapportioned by the Compact are those waters "unapportioned by paragraphs (a), (b), and (c)" of that article.

Moreover, the legislative history of Section 4(a) of the Project Act shows that Congress in enactment of that Section considered "waters apportioned to the Lower Basin by Article III(a) of the * * * compact" as waters available in the main stream and equated the apportionment by Article III(a) of the "exclusive beneficial consumptive use of 7,500,000 acre-feet of water per annum" to the Lower Basin with the Upper Basin's agreement by Article III(d) of the Compact not to "cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75,000,000 acre-feet for any period of ten consecutive years * * *." Construed in the light of its legislative history and by reference to paragraphs (d) and (f) of Article III of the Colorado River Compact, Section 4(a) of the Project Act precludes the consumptive use of Colorado River water for use in California in excess of 4,400,000 acre-feet per year except to the extent of one-half the waters in the main stream available for use in the Lower Basin in excess of 7,500,000 acre-feet per year.

Nevertheless, while there is unused water available in the main stream in the Lower Basin which users outside California, including the United States, are entitled to use, the Secretary of the Interior may continue, until such users are ready to put such water to use, to deliver water in excess of the California limitation, for consumptive use in California, to the full extent of California's contract quantity.

Nevada Entitlement

Conclusion 11.18

By the provisions of the Nevada water-delivery contract, as amended (Finding 1.40, *supra*), the entitlement of that State to the delivery of main stream water for consumptive uses in Nevada is so much water, including all other waters diverted for use within the State of Nevada from the Colorado River system, as may be necessary to supply the State a total quantity of 300,000 acre-feet per year. By Article III(f) of the Arizona water delivery contract the latter State has recognized that Nevada may contract with the United States for additional deliveries to the extent of 1/25 of the surplus waters available in the Lower Basin unapportioned by the Compact, subject to the further apportionment of such unapportioned waters after October 1, 1963.

Arizona Entitlement

Conclusion 11.19

By the provision of the 1944 Arizona water delivery contract the entitlement of that State to the delivery of main stream water for use in the State is so much water as may be necessary for the beneficial consumptive use for irrigation and domestic uses in Arizona of 2,800,000 acre-feet per year, less the quantity by which consumptive uses in Arizona above Lake Mead diminish the flow into Lake Mead, plus such part of one-half of any excess or surplus waters unapportioned by the Compact which is not used by the States of New Mexico and Utah within their equitable shares of the Colorado River system water (Article 7(b) and 7(g)) or by Nevada to the extent of 1/25 of such unapportioned water. (Article 7(f)). Use in Arizona of such part of the unapportioned waters after October 1, 1963, is subject to the further apportionment thereof as provided for in Article III(f) and Article III(g) of the Colorado River Compact (Arizona Contract, Article 7(f)).

The existence of unapportioned waters available for delivery under the Arizona contract for use in Arizona is to be determined in like manner as specified in Conclusion 11.17, *supra*, with respect to determining the availability of such waters for use in California.

XII. UTAH'S EQUITABLE SHARE

With respect to Utah's claim of right to the use of an equitable share of the waters of the tributaries of the Colorado River within that State, the United States submits no additional proposed findings.

However, the following conclusions in this respect are proposed:

Conclusion 12.1

In determination of Utah's equitable share of the waters of the tributaries of the Colorado River within that State, there are to be included the rights and uses of the United States in the National Forests, National Parks, and areas under the jurisdiction of the Bureau of Land Management within that State as determined by the Findings and Conclusions in Sections VIII, IX and X hereof. (Conclusion 11.4 (last paragraph), *supra.*)

Conclusion 12.2

The entitlement of Utah to an equitable share of the waters of the tributaries of the Colorado River within that State is subject to the rights of the United States, with the priorities specified in Section IV of these Findings and Conclusions, to use the waters of the main stream on lands of the Fort Mohave Indian Reservation in Arizona, California, and Nevada, the Colorado River Indian Reservation in Arizona and California, and the Chemehuevi and Yuma Indian Reservations in California. (Conclusion 11.6 (particularly paragraph 4 thereof), *supra.*)

XIII. NEW MEXICO'S EQUITABLE SHARE

With respect to the claim of New Mexico of right to use an equitable share of the tributaries of the Colorado River within that State, the United States submits no additional proposed Findings and Conclusions.

However, the following conclusions in this respect are proposed:

Conclusion 13.1

In determination of New Mexico's equitable share of the waters of the Little Colorado River and its tributaries within that State, there are to be included the rights and uses of the United States in the National Forests and National Parks within New Mexico as determined by the findings and conclusions in Sections VIII and IX of these Findings and Conclusions and on the Zuni and Navaho Indian Reservations within New Mexico as determined by the Findings and Conclusions in Section IV hereof. (Conclusions 11.4 (last paragraph), 11.5 (last paragraph), *supra.*) Arizona's equitable share of such waters is subject to the rights and uses of the United States, with the priorities specified in Section IV hereof, on the Zuni and Navaho Indian Reservations in New Mexico.

Conclusion 13.2

The entitlement of New Mexico to an equitable share of the waters of the Little Colorado River and its tributaries within that State is subject to the rights of the United States, with the priorities specified in Section IV of these Findings and Conclusions, to use the waters of Black Creek on the Navaho Indian Reservation in Arizona and to use the waters of the main stream of the Colorado River on lands of the Fort Mohave Indian Reservation in Arizona, California, and Nevada, the Colorado River Indian Reservation in Arizona and California, and the Chemehuevi and Yuma Indian Reservations in California. (Conclusion 11.6 (particularly paragraph 5 thereof), *supra.*)

Conclusion 13.3

In determination of New Mexico's equitable share of the waters of the Gila River and its tributaries within that State, there are to be included the rights and uses of the United States in the National Forests and the National Parks within that State as determined by the Findings and Conclusions in Sections VIII and IX hereof. (Conclusion 11.4 (last paragraph), *supra.*)

Conclusion 13.4

The entitlement of New Mexico to an equitable share of the waters of the Gila River and its tributaries within that State is subject to the rights of the United States, with the priorities specified in Section IV of these Findings and Conclusions, to use the waters of the Gila River on lands of the Gila Bend Indian Reservation, the Gila River Indian Reservation, the San Carlos Indian Reservation and the San Carlos Federal Irrigation Project and lands of the old Florence Casa Grande Project served through facilities of the San Carlos Project, all within the State of Arizona, and such downstream uses of the waters of the Gila River by the United states are to be accounted for as a part of the Arizona share in the waters of the Gila River in effecting an apportionment of the waters of that River between Arizona and New Mexico. (Conclusions 11.5, 11.6 (particularly paragraph (6) thereof), *supra.*)

Respectfully submitted.

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