BEFORE THE DIVISION OF WATER RIGHTS
DEPARTMENT OF PUBLIC WORKS
STATE OF CALIFORNIA

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IN THE MATTER OF APPLICATION NUMBER 435 and APPLICATION NUMBER 3560 OF THE MOJAVE RIVER IRRIGATION DISTRICT TO APPROPRIATE FROM DEEP CREEK AND WEST FORK OF MOJAVE RIVER, TRIBUTARY OF THE MOJAVE RIVER IN SAN BERNARDINO COUNTY, FOR AGRICULTURAL PURPOSES

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DECISION NO. 435 - 3560 D 72
Decided

APPEARANCES AT HEARING HELD MARCH 26 - 27, 1924:

For Applicant -	L. A. Reserve W. E. Tussing
For Protestants - Estate of Peter Merlick, Deceased -	McWabb and Hodge, by E. E. McWabb
Proposed Harvard Irrigation District -	George W. Wilson J. E. Lewis
Appleton Land Water and Power Co.	Anderson & Anderson, By James A. Anderson and J. S. Thayer
Grier Ranch Inc., Wm. E. Robinson Mojave River Riparian Owners Association, Dix Van Dyke, Abby L. Waterman, H. H. Grier, George W. Golden and Mary Van D. Golden, Samuel K. Rodgers and Mrs. E. K. Langford -	Byron Waters and Grant Holcomb
Ray F. Hogan and certain other owners -	Ray F.Hogan
Yermo Mutual Water Company, Thos. O. Williams and Barbara Williams -	Thos. O. Williams
Helendale Mutual Water Company,	F. E. Merrill

S. K. Bennette,	in propria persona
W. O. Peck,	" " "
Atchinson, Topeka and Santa Fe Railroad Company,	
Carl Meier,	W. E. Lucey,
Abby L. Waterman	in propria persona
	in propria personam
APPEARANCES:	Edward Hyatt, Jr., Acting Chief of the Division of Water Rights, Department of Public Works, State of California.
	Donald M. Baker, Hydraulic Engineer for the Division, assisting Mr. Hyatt.

O P I N I O N

General Features of Applications

Application Number 438 of the Mojave River Irrigation District was filed on August 21, 1916, and was the first filing made on the Mojave River or its tributaries under the Water Commission Act of 1913.

Application Number 5360 was filed on April 16, 1923 and is identical with Number 438. It is not intended as an application for additional water but as a refiling of Application Number 438 in case the earlier application should be rejected. In this opinion any matter pertinent to one may be considered as also appertaining to the other.

As presented at the hearing held on March 26 - 27, 1924, both applications proposed an appropriation of 50,000 acre feet per annum for agricultural purposes on 26,666.36 acres of land within the boundaries of the Mojave Irrigation District; the water to be diverted to storage

between October 1st and September 30th of each season of which under normal conditions 60% would be diverted from the West Fork of the Mojave River and the remainder from the East Fork of Mojave River or Deep Creek, the diversion from Deep Creek to be at a rate not to exceed 100 cubic feet per second.

On May 22, 1924, the Mojave Irrigation District, at the suggestion of the Division of Water Rights, made a formal request that the amount of diversion to storage named in its two applications be reduced from 50,000 acre feet per annum to 30,000 acre feet per annum, and the applications have been amended accordingly.

P R O T E S T A N T S

The applications in the form as presented at the hearing were protested by 163 protestants as follows, many of them being members of the so called Riparian Owners Association.

Name of Protestant	Date upon which Protest was filed	
J. W. Adams	7-16-23;	10-24-23
Olive A. Adams	12-1 -24	
Appleton Land Water and Power Co.	5-23-23;	12-31-23
Atchison, Topeka and Santa Fe Railroad	8- 9-23;	10-25-23
M.S. Burckhartt	12- 3-24	
Myrtle E.Brown	11-15-24	
E. D. Bradley	6-30-24	
Truman Buell	7-14-23;	10-24-23
Fred Besch	7-14-23;	10-24-23
C. A. Booth	10-24-23	

Name of Protestant	Date upon which Protest was filed		
John A. Clark	12- 1-24		
O. Clyde Compton	11-28-24		
A. E. Cole	7-14-23;	10-24-23	
Carrie E. Coleman	7-14-23;	10-24-23	
V. A. Cross	7-14-23;	10-24-23	
A. E. Clark	7-14-23;	10-24-23	
E. J. Clark	10-19-23		
F. E. Clinkinbeard	12-15-24		
Agnes De Wolf	11-28-24		
Jesse A. Decrow	11-10-24		
George A. Decrow	11-10-24		
Ami A. Derrauts	7-14-23;	10-24-23	
E. M. Derrance	7-14-23;	10-24-23	
E. A. Douglas	7-14-23;	10-24-23	
Edward Dolch	7-14-23	10-24-23	
C. F. Dail	7-14-23;	10-24-23;	12- 1-24
Kittie J. Dail	7-14-23;	10-24-23	
L. E. Emerson	7-14-23;	10-24-23;	11-10-24
Sarah L. Emerson	7-14-23;	10-24-23;	11-10-24
E. Lillian Foster	7-14-23;	10-24-23	
E. A. Foster	7-14-23;	10-24-23	
E. E. Fanning	7-14-23;	10-24-23	
J. C. Fisher	7-12-23		
Golden State Portland Cement Co.	7-16-23;	10-24-23	
Lloyd Gomes	7-14-23;	10-24-23	
Lyle Graham	12- 3-24		
W. E. Green	11-10-24		
Effie Barton Green	11-10-24		
Grier Ranch Inc.	11-26-22		
Mary Van Dyke Golden	7- 9-23;	7-14-23;	10-24-23; 5-31-24
George W. Golden	7- 9-23;	10-24-23;	5-31-24
H. H. Greer	7-11-23;	7-14-23;	10-24-23
Frank Garson	7-14-23;	10-24-23	
Chas. E. Hanna	7-14-23;	10-24-23	
E. L. Harding	7-14-23;	10-24-23	
E. E. Haws	12- 1-24		
C. E. Hopewell	7-14-23;	10-24-23	
Albert Halstead	12- 1-24		
T. C. Hines	7-16-23;	10-24-23	
Hammond W. Hodge	12- 1-24		
E. J. E. Hale	7-14-23;	10-24-23	
C. E. Hodge	11-10-24		
R. E. Hodge	11-10-24		
Anna Herlich (Est. of F. Herlich Deceased)	12-15-23		

Name of Protestant	Date upon Which Protest was Filed
Enock Harris	7-14-23; 10-24-23
S. S. Hill	7-14-23; 10-24-23
W. H. Howe	7-14-23; 10-24-23
Jessie A. Howe	7-14-23; 10-24-23
Paul I. Haimut	7-12-23; 10-22-23
Luke I. Haimut	7-12-23; 10-22-23
J. L. Hannon	12-13-24
Helendale Mutual Water Co.	10-22-23
Harvard Irrig. District (proposed)	7-11-23; 10-17-23
Henrietta L. Hogan	10-13-23
Margaret L. Hogan	10-13-23
May F. Hogan	7-14-23; 9-26-23; 1-29-25
W. W. Ingraham	11-10-24
Mrs. H. Ingraham	11-10-24
Imperial Utilities Corporation	6-22-23; 10-11-23
E. M. Kinslow	12- 1-24
Herman C. Kaufman	11-14-24
E. J. Krouse	11-10-24
J. T. Jenkins	12- 1-24
Los Angeles and Salt Lake Railroad Company	5-26-24
C. G. Lewis	7-14-23; 10-24-23
H. L. Mellon	12- 3-24
C. O. Malone	12- 1-24
J. W. Morrison	11-14-24
J. A. McKenzie	11-10-24
W. P. McArthur	6-30-24
Nora F. McArthur	6-30-24
John A. Mahuk	7-14-23; 10-24-23
Orrin McGovern	7-14-23; 10-24-23
Cora W. Mussetter	7-14-23; 10-24-23
Frederick R. Miner	6-23-23; 10-25-23
D. T. McEthaney	12- 1-24
Carl S. McNew	3-27-24
Ben H. Micholas	7-14-23; 10-24-23
Fred C. Nickerson	7-14-23; 10-24-23
C. G. Phillips	7-14-23; 10-24-23; 12- 1-24
William H. Paine	7-14-23; 10-24-23
Helen E. Prescott	7-18-23; 9-13-23

Name of Protestant	Date upon Which Protest was Filed
Earl B. Rowley	11-10-24
Frank C. Prescott	6-18-23; 6-22-23; 9-12-23
Irma G. Parks	10- 5-23
Frank D. Ryerse	10-10-23
W. S. Mitchie	10-24-23
Mary B. Rice	7-14-23; 10-24-23
Charles S. Keeler Estate	7-16-23; 10-24-23
J. D. Rich	7-14-23; 10-24-23; 12- 1-24
Mary Charlotte Riley	11-14-24
Rista Rikalo	11-10-24
Geo.T. Roberts	6-30-24
Wm. H. Robinson	1-10-24
Edwin Rhodes	7-14-23; 10-24-23
Nobel C. Sherman	10- 5-23
Southwestern Portland Cement Co.	7-16-23; 10-24-23
William Sutton	12- 5-24
Walter C. Strousburg	11-10-24
John A. Siramian	12- 1-24
Edward A. Stephens	7-14-23; 10-24-23; 11-10-24
Margaret Stephens	11-10-24
J. H. Smith	12- 1-24
George Siemon	7-14-23; 10-24-23
M. L. Seymour	12- 1-24
Louis H. Skobel	7-14-23; 10-24-23
Anton Spath	7-14-23; 10-24-23; 11-28-24
C. C. Shafer	12-13-24
Hazen J. Taylor	12- 1-24
Edward H. Taylor	7-14-23; 10-24-23; 11-10-24
J. C. Turner	7-14-23; 10-24-23
C. F. Ten Eyck	7-14-23; 10-24-23
H. G. Tienken	7-16-23 10-24-23
W. Tanner	10-24-23
A. C. Tappe	7- 6-23
James Upton	11-28-24
Dix Van Dyke	7- 5-23; 7-14-23; 10-24-23; 5-31-24
Asa Vandermast	7- 5-23; 7-14-23; 10-24-23
Mrs. Lizzie L. Violett	7-14-23; 10-24-23
Charles S. Van Doren	12-13-24
Ferdeurn Webber	12- 1-24; 12- 5-24
W. W. Warren	7-14-23; 10-24-23; 12- 1-24
Abby L. Waterman	7-14-23 10-24-23; 12- 1-24
Thomas B. Walker	11-28-24
Albert C. Wilson	7-16-23; 10-24-23; 11-28-24
Lillian M. Wilson	11-28-24
C. W. Wees	11-10-24
M. Wooldridge	11-10-24

Name of Protestant	Date upon Which Protest was Filed
Jane L. Walton	6-30-24
Chas. H. Walton	6-30-24
C. E. Wallace	7-16-25; 10-24-25
Thomas C. Williams	1-29-25
Barbara A. Williams	1-29-25

These applications were completed in accordance with the Water Commission Act and the requirements of the Rules and Regulations of the Division of Water Rights and being protested were set for public hearing on March 26, 1924 at 10:00 o'clock A. M. in the Supervisor's Room of the County Court House, San Bernardino, California.

Of this hearing, the applicant and those of the protestants whose protests were filed prior to the date set for the hearing were duly notified. No new grounds of protest were raised by the protest filed subsequent to the hearing.

INSPECTION TRIP

On June 3rd and 4th an inspection trip was made by the following parties at interest over the entire territory embraced in the application. The representatives of the various interests were as follows:

Mojave River Irrigation District	(Messrs. Tussing, Goodhall, E. A. Rowe (and W. F. Rowe
Appleton Land Water and Power Co.	Mr. Thayer
Riparian Owners Association	Messrs. Holcomb, Van Dyke and Bellew
Grier Ranch Inc.	Mr. Page
Atchison, Topeka and Santa Fe Railroad Co.	Messrs. Davenport and Keer
Chamber of Commerce of Barstow	Mr. Hill
Division of Water Rights	Donald M. Baker

The party was joined in the afternoon of June 4th by Mr. Thomas O. Williams and on the evening of the same day by Mr. Edward Hyatt, Jr., Acting Chief of the Division of Water Rights.

GENERAL STATEMENT OF PROTESTS

It is not deemed necessary to discuss each and every protest in detail as reference may be had to the protests themselves which are placed on file with the Division, but in general the protestants base their rights on riparian ownership and prior appropriations and allege in effect that there are no unappropriated waters flowing in the Mojave river or its tributaries; that the lands now dependent upon the waters of the Mojave River for irrigation, by virtue of the riparian and appropriative rights to both the surface and sub-surface waters of the river are of a larger area than can be properly irrigated by the waters of the river; that the proposed diversion would deprive the natural underground basins or reservoirs of water situated along the course of the river from the supply which is stored therein and which serves to regulate the flow of the surface and underground waters of the river; that this diminution of the underground supply will cause a considerable lowering of the underground water surface, thereby requiring additional and more expensive pumping equipment and in some cases resulting in the complete ruination of the property for agricultural purposes; that they are dependent to a certain extent upon the artesian wells which are now being used for a certain amount of water supply and that these wells would cease to flow if any of the storm waters which feed the underground channels are to be diverted as proposed; that the amount of water applied for is excessive being equal to more than half

of the total estimated acreage flow of the stream and that the diversion of water as proposed will not serve the community at large but instead will cause great and irreparable damage to the protestants by diminishing the supply of water which they have been using and upon which they are now dependent.

PHYSICAL CONDITIONS

The Mojave River, situated in San Bernardino County has two main tributaries which originate in the northern slopes of the San Bernardino Mountains which vary in elevation from 2,000 feet above sea level at the junction of these two main tributaries to 8,000 feet at the summit of the range.

The most important of these tributaries is the West Fork of Deep Creek which is a perennial stream draining a watershed area of approximately 142 square miles and having a mean annual discharge of approximately 50,800 acre feet per annum.

Practically all the runoff from the West Fork, the other tributary, occurs during the winter months and is from a watershed whose area is about 75 square miles. The mean annual discharge of this stream is approximately 36,200 acre feet.

These two tributaries unite at the base of the mountains at "the Forks" below which there is no surface tributary of any consequence.

The general course of the river is northward about 30 miles to Helendale, thence northeasterly about 20 miles to Barstow and finally eastward about 40 miles sinking at Soda Lake at an elevation between 900 and 1,000 feet above sea level.

The Mojave River is a very erratic stream flowing with considerable volume only to sink out of sight for some distance and reappear some miles further down the channel and except in times of flood has the appearance of being a chain of lakes.

During the summer the water of the river sinks at a point somewhere between the base of the mountains and the Hesperia road, leading to the Hoboken Valley, about 14 miles below "the Forks", but appears again about five miles above the upper Narrows at Victorville, gradually increasing in volume as it approaches the Narrows and at all times may be seen as a good sized stream under the wagon bridge just beyond Victorville.

The river again sinks at a point several miles below Oro Grande and appears again at Helendale, about ten miles ~~below~~ Oro Grande and again at Hicks.

From the mountains to Hicks the valley is confined between bluffs but between Hicks and Barstow it widens on the northwest side. From Barstow to Daggett the channel is again between bluffs and the water appears at the surface of the ground at Barstow and at Nebo, four miles above Daggett.

Below Daggett the river crosses a broad plain, but is twice more between bluffs at Camp Cady and the "Caves" where the water again appears at the surface. Below the "Caves" the channel is dry during the summer.

In the late winter from December to April or May, the flood waters, resulting from the melting snow always reach to Barstow and generally to Camp Cady as an unbroken stream, and in times of excessive flood are known to reach the broad basins of Soda and Silver Lakes, which are filled to a shallow depth with water which gradually is lost by evaporation and percolation.

In Water Supply Paper No. 490B of the United States Geological Survey Mr. David G. Thompson describes the condition of the flow as follows:

> "near Baxter station the river emerges from a canyon and spreads out over a large alluvial fan. Some of the flood waters as they emerge from the canyon run northward to Cronese Lake (a playa), and some continue eastward to the playa of Soda Lake, frequently called "the sink of the Mohave". The water that collects on these playas disappears by evaporation or by sinking slowly into the soil. In extreme floods some of the water may flow from Soda Lake into Silver Lake."

During a normal year there is no flow into Silver Lake but in times of excessive floods such as existed during 1884, 1910, 1914, 1916 and 1921-1922, Silver Lake contained water.

It was reported that from about the middle of December, 1921, to March, 1922, Silver Lake was covered to a maximum depth of about 6 feet, and even greater depths have been reported at other times.

North of the junction of the east and west forks of the Mojave river there is an alluvial plain which has been formed from disintegrated rock debris washed down from the San Bernardino and San

Gabriel mountains and which extends for a distance of about twenty-five miles from the foot of the San Gabriel and San Bernardino Mountains and is about thirty miles in width. This alluvial plain is divided unequally by the Mojave River into what is commonly known as the East and West Mesa.

REPORT OF MOJAVE RIVER COMMISSION

In order to develop these lands, there were two irrigation districts formed, the Mojave Irrigation District and the Victor Valley Irrigation District, and in 1917, the Mojave River Commission was appointed and provided with funds by the Board of Supervisors of San Bernardino County to analyse and make a comprehensive study of the utilization of the waters of the Mojave River.

The Commission consisted of three members, Mr. W. F. McClure, State Engineer, Chairman, Mr. J. A. Bourwine, County Engineer of San Bernardino County and C. E. Tait, Senior Irrigation Engineer, Office of Public Roads and Rural Engineering, U.S. Department of Agriculture and after a very thorough and complete investigation the findings of this commission was submitted in a report under date of April 30, 1918, to the Board of Supervisors, County of San Bernardino.

This Report was published in Bulletin No. 5 of the State Engineering Department and is also incorporated, in its entirety, in the Sixth Biennial Report of the Department of Engineering.

Reference is made to this report as being a very complete and impartial analysis of the situation and especial attention is directed

to the summary of the suggestions and findings as follows:

"(1) "The proper duty of water is approximately 1.80 acre feet per acre per annum for the east mesa and 1.25 acre feet per annum for the west mesa.

"(2) "The total annual average discharge of Mojave River is approximately 90,000 acre feet of which about one-third is available for storage in Little Bear Valley Reservoir now partially constructed, about one-third is available for storage in proposed upper West Fork reservoirs and about one-third should be allowed for the riparian lands along the river

"(3) We suggest the use of the water supply under two projects, one for the west mesa to make use of the upper West Forks reservoirs with an initial unit having storage in Reservoir No. 3A of 38,000 acre feet and a district of 18,400 acres and an ultimate project with storage in both reservoirs of 60,000 acre feet and a district of 25,000 acres; the other to use Little Bear Valley reservoir, water from which may be delivered by the shortest route to the lands of the east mesa, utilizing the greater inherent power en route and irrigating approximately 20,000 acres net, or allowing for 15% of the total being unirrigated, a total project area of 23,000 acres. The total net area under the two systems would be about 43,000 acres and allowing 15% for lands unirrigated within the exterior boundaries a total gross area of about 52,000 acres."

At the time of the investigation by the Mojave River Commission there were several large enterprises who either used or contemplated using the waters of the Mojave River for irrigation purposes, namely, the Appletom Land Water and Power Company, the Arrowhead Reservoir and Power Company, the Mojave Water and Power Company, the Rancho Verde Company, the Daggett Ditch Project, the Verde Mutual Water Company, the Mojave River Irrigation District and the Victor Valley Irrigation District.

The Appleton Land and Water Company as we have seen is still active and claims that 19,200 acre feet are required for the irrigation of 15,000 acres gross in the Hesperia Mesa. The greatest use of water, however, has been for the irrigation of 800 acres from the water of Deep Creek, the irrigation of 75 acres from wells sunk in the Mojave River and 125 acres of alfalfa from the Mojave River or Deep Creek, and in addition about 10 inches has been used for domestic purposes at Victorville.

At the time of the organization of the Mojave River Irrigation District, negotiations were entered into with the Arrowhead Reservoir and Power Company who controlled practically all of the reservoir sites in the mountains, with a view of acquiring the necessary works for the development of a water supply to meet the requirements of the District. These negotiations did not progress in a manner satisfactory to the District and a condemnation suit was filed against the entire holdings of the Arrowhead Reservoir and Power Company. This suit was pending in the courts for a number of years until at last an agreement was drawn up between the Company and the District by which the Mojave Irrigation District secured by option the title to the flowage rights of the West Fork Reservoir, together with a waiver by the Arrowhead Reservoir and Power Company of their claims to all waters of the Mojave River appurtenant to about 4,000 acres of riparian lands owned by the Arrowhead Reservoir and Power Company, and located on the Mojave River below the West Fork Damsite.

The Mojave Water and Power Company contemplated the storage of water by the construction of a dam at the Victorville Narrows, but so far

its plans have been unsuccessful.

The Rancho Verde is now owned by the Grier Ranch Incorporated and is probably the most extensive of the producing properties in the Valley.

The Daggett ditch is now owned by Dix Van Dyke, Mary Van Dyke Golden and George W. Golden, who at the present time are irrigating about four or five hundred acres.

The Yermo Mutual Water Company is now owned by Thomas O. Williams who, together with the proposed Harvard Irrigation District has done very little to keep alive the appropriative rights which existed at one time.

The Victor Valley Irrigation District has not been able to procure the necessary water rights to enable them to proceed with any of its proposed development.

In addition to these enterprises there are a number of smaller ones in existence whose use of water is not large.

The Mojave River Commission questioned the feasibility of building a reservoir at the West Forks Reservoir site and recommended the construction of dams higher up on the stream, but an examination was made of the reservoir site by a commission appointed by the District's engineers, and consisting of Mr. Bradshaw, an engineer of the Arrowhead Lake Company, Mr. J.B. Lippincott, representing the District and a third engineer, Mr. J. H. Quinton, who, after making elaborate tests approved the West Forks damsite and pronounced it feasible and practicable to impound water to a depth of 160 feet.

The gross area of the District is 25,878.56 acres, the gross irrigable area is 25,000 acres and the net irrigable area which will be irrigated in any one year is 20,000 acres, and with a duty of water of 1½ acre feet per net acre as recommended by the Mojave River Commission, the total amount required for irrigation would be 30,000 acre feet, the use being from March 1st to September 30th of each season. This amount would probably not allow any carry-over from one year to another.

In general, the irrigation of mesa lands in Southern California has been found to convert them into great saturated underground storage reservoirs which feed both surface streams and underground sources and act as regulators of the discharge.

From hydrographic contours of the underground water plane shown upon a map which is made a part of the report of the Mojave River Commission, it is readily apparent that the ground water plane of the lands which the Mojave River Irrigation District proposes to irrigate on the east mesa, slopes westerly toward the river and as the mesa is composed of material highly alluvial in character, it would indicate that if large quantities of regulated flood waters were placed upon these lands, the return waters therefrom would be such as to yield a better supply to the lands adjacent to the river than they would receive from the passing of violent occasional floods.

From measurements and observations made by the Mojave River Commission it is clearly shown that practically all of the water which enters the underground basin below the Forks is re-collected above the Narrows and flows out through them.

EVAPORATION LOSSES

The discharge of subsurface water has been divided into two classes: hydraulic discharge, which is the discharge through springs, wells, infiltration ditches and infiltration tunnels and evaporation discharge, which is the discharge through plants by the process of transpiration and through the soil, the water being raised by capillarity from the zone of saturation nearly to the surface where evaporation takes place.

Although this vegetal and soil discharge of ground waters are quantitatively very important, they are less conspicuous and consequently receive less attention than hydraulic discharge because they do not produce a supply of water that can be utilized for human consumption. Economically this ground water disposed of by soil discharge is wasted and that disposed of by vegetal discharge produces plants which may or may not be of value.

In arid regions, such as the Mojave Valley, where maximum beneficial use should be made of the underground supply, an attempt should be made to reduce the vegetal and soil discharge to a minimum, in order to have as large a supply as possible through wells.

By the proposed storage of the applicant it is evident that a great deal of the underground waters which is now lost by evaporation in the valley would be conserved and put to beneficial use.

Between the Victorville, Narrows and Daggett there are several underground barriers commonly called dykes which cause the underflow to rise close to the surface and areas are formed from which much evaporation can take place.

The evaporation from these areas may be from a depth of a few inches to as much as 4 or 5 feet, and even where the water surface may be beyond the limits of capillarity there is still a great loss by transpiration from vegetation, for at each place where the dykes occur there is a considerable growth of mesquite, cottonwood, willows and other vegetation.

It is evident that the loss from evaporation and transpiration is from an area of approximately several thousand acres and must amount to several thousand acre feet annually.

During the inspection trip made by representatives of the various interests on June 3rd and 4th, 1924, the moist area above Camp Cady was particularly noticed. It consisted of between 5,000 and 6,000 acres of moist lands with the water table standing sufficiently close to the surface to support grass and a dense growth of trees, which area, Mr. Thomas O.Williams stated has remained fairly constant for many years. In fact one of the outstanding features of the inspection was the apparent large losses by evaporation and transpiration which must occur from the large moist area and from trees in the river bed.

In addition to the loss as described above there is a probability that a large quantity of water passes from the Mojave River Valley into Harper Valley, north of Hinkley, where it is also discharged by transpiration and evaporation.

In his "study to Determine the Effect of the Construction of the West Fork Dam and Deep Creek Diversion Conduit as Proposed by the Mojave River Irrigation District on the Lower River" the engineer for the Dis-

trict has attempted to show that during the period 1892 to 1915, the average surplus on the Mojave River was 78,300 acre feet, of which the evaporation loss was 52,650 acre feet and the waste past Camp Cady was 25,600 acre feet, and that with an average annual delivery to the Mojave River Irrigation District of 41,000 acre feet the total loss would be by evaporation only and would amount to 55,600 acre feet, the conserved losses amounting to 44,700 acre feet per annum, and his conclusion is that the proposed diversion might be made without reducing the available supply for the lower irrigators and that losses which are now occurring could be conserved which amount to more than the total amount of water proposed to be diverted by the irrigation district; that the fluctuation of the water plane would be within narrow limits and any increase in pumping lifts would be immaterial.

While it is impossible to determine precisely what this actual conservation by the proposed diversion would be, yet, we do not hesitate to state that it would undoubtedly result in the conservation for beneficial use of a considerable quantity of water which would otherwise be wasted by evaporation and transpiration and it matters not whether waters are wasted in this way or by finding their way to the ocean, if any of these waters can be conserved and put to beneficial use, the interests of the community and the State at large are best served by so doing.

LOWER MOJAVE VALLEY

There has been very little irrigation practiced in the Lower Mojave Valley below Daggett. In 1919 there appears to have been less than

500 acres irrigated in that portion of the valley lying between Daggett and Camp Cady. North of the Mojave River, between Camp Cady and Baxter there is an area which could be cultivated if water were available but the depth to water is great and the yield small, so that under present conditions irrigation is not feasible.

Although the depth to water is not great in Crucero Valley, extending from Baxter to Soda Lake, there has been practically no development due to poor transportation facilities and the condition of the soil which is very sandy and cannot be prevented from blowing over the cleared land. The ground waters also have a very high alkali content.

Conditions on Cronise Valley do not appear to be favorable for much development as a great part of the valley is covered by the "playa" or "dry lake", the water is of poor quality for irrigation purposes and since the water plane lies close to the ground surface there is danger of water logging the land if irrigation were practiced.

If the ground water of Crucero and Cronise Valleys is derived from the floods of the Mojave River the ground water supply would probably be diminished somewhat by the proposed diversion of flood waters of the Mojave but it has been shown above that south of Baxter it is not probable that irrigation could be practiced to any extent even under normal conditions.

If the water plane in those valleys was lowered by the proposed diversion of the applicant it might possibly result in a decrease in the alkalinity of the water, and the danger would undoubtedly be less of water logging the land by irrigation. California is dependent upon the

development of its agricultural resources for its future welfare and prosperity and these resources cannot be developed adequately without the use of water for irrigation purposes.

This is particularly true in the southern portion of the State where, were it not for the practice of irrigation, many acres of land would remain in their desert condition, and for this reason every effort should be made to conserve as much of the runoff as it is possible to conserve that it may be put to an immediate, economical and beneficial use.

So far, it is apparent from a study of the situation that this has not been accomplished in the Mojave River Valley.

GENERAL

At the time of the investigation conducted by the Mojave River Commission, there were approximately 10,000 acres of land on the Mojave River and in Victor Valley, which were being irrigated out of a gross agricultural area of approximately 325,000 acres, and it is not evident that this area has increased appreciably since that time.

There appears to be a considerable portion of the valley lands which are irrigated by sub-irrigation only, most of these lands being used for pasture only, and consequently a large quantity of water is brought to the surface of the ground, to be lost by evaporation, and unless great care is used the land is inclined to become water-logged and the alkali content of the soils increased. This is undoubtedly an extravagant method of irrigation and to permit the level of the underground waters to be kept at such a height that it would permit a great evaporation loss, is not to the interests of the State or to the Community itself.

The amount of runoff as measured at the forks, the geological conditions, the area irrigated and the probable amount of water necessary for that area appear to be undisputed and the only question is whether the amount of proposed diversion by the applicant will interfere with the vested rights to such an extent that it should not be allowed.

There are a number of protestants who claim riparian and appropriative rights who have put little or no water to beneficial use and it is against the best interests of the State and in direct violation of Section Eleven of the Water Commission Act to deny the use of a portion of this supply to any applicant who intends to make immediate and beneficial use of the same in order to conserve it for these prospective users who may or may not make beneficial use of the water at some future date.

As the proposed appropriation has been reduced to 30,000 acre feet there will remain 60,000 acre feet from the average annual flow of the river which will be available for the other users on the river and which should be ample to protect their prior vested rights.

The storage of 30,000 acre feet of flood waters and their later application to mesa lands will cause a very considerable return flow which in our opinion will in general more than overcome the tendency to reduce the ground water which the diversion to storage might be expected to have and will be an actual benefit rather than a detriment to the majority of the downstream users. If there should be in isolated cases a slight increase in pumping lift from wells the extra pumping cost if any would be very small - the lift being very low at present - and would not justify refusal of the permit.

The conservation of the storm waters for beneficial use is essential to the proper utilization of the variable flow and ~~that~~ a storage of 50,000 acre feet in the upper reaches of the Mojave River would probably benefit the lower users by acting as a control of the flood waters which are occasionally of such magnitude that great injury is done to the lower valley.

STIPULATED PROTESTS

In general the matter hereinbefore presented is applicable to all protests, but in order that the situation may be more thoroughly understood, certain of the protests will be given individual attention.

The Appleton Land, Water and Power Company bases its claim on riparian ownership and appropriation and use of water from Deep Creek and the Mojave River below the Forks.

The protestant Company claims that it has diverted the waters of Deep Creek up to the capacity of its diversion works, all of the flow during the irrigation season having been so diverted for use upon its lands and at Hesperia; that additional waters are required from the surface and underground flow of the Mojave River below the Forks, the company having already diverted such water to the extent of 200 inches which amount will be increased in the future; that the proposed diversion would deprive the protestant Company of waters to which it is lawfully entitled as riparian proprietor and would cut off the supply of water which it has been diverting from the stream below the forks as well as the underground waters which are necessary for its use.

The Appleton Land Water & Power Company and its predecessor, the Hesperia Land and Water Company have owned and operated since 1885, for irrigation purposes a canal, locally known as the Hesperia Ditch, with connecting pipe lines leading to about 20,000 acres of land more or less owned by the applicant.

It appears to be the most active of any of the enterprises on the Mojave River. The company claims that 19,200 acre feet are required for the irrigation of 15,000 acres gross on the Hesperia Mesa, which is all riparian to the river.

At the present time only a minimum portion of the 15,000 acres is equipped with a distribution system but the company appears to be diligently progressing with the development work and considerable money has been expended on the project.

The maximum use of water by the Appleton Land Water and Power Company appears to have been for the irrigation of approximately 800 acres of land from the waters of Deep Creek, the irrigation of 75 acres from wells sunk in the Mojave River bed, the irrigation of 125 acres from either the Mojave River or Deep Creek and for domestic purposes at Victorville to the extent of about 10 miner's inches.

From evidence submitted it would appear that the Appleton Land, Water and Power Company would be entitled to the flow of Deep Creek during the irrigation season up to the capacity of its diversion works and any right which the Company may have, would have to be recognized by subsequent appropriators.

The Atchinson Topeka and Santa Fe Railway Company alleges in effect that their water supply is obtained from wells located at the towns of Helendale, Victorville, Hicks, Hinkley, Newberry and Barstow and that they are entitled to the use of 7 miner's inches at Helendale, 68 miner's inches at Victorville, 7 miner's inches at Hicks, 20 miner's inches at Hinkley and 110 miner's inches at Newberry; that protestant purchases its water supply from the Imperial Utilities Corporation and that the use of water as proposed by the applicant would materially and seriously interfere with the rights of the Company.

An exhibit presented by the protestant at the hearing shows that the present supply from the towns named above including 0.70 miner's inches obtained by purchase from the Appleton Land and Water Company at Hesperia was 88.5 miner's inches, or 1730 acre feet per annum, and that the probable future need of the company would not exceed 132.75 miner's inches or 2,435 acre feet per annum.

From testimony presented at the hearing it seems entirely clear that the fluctuations in the water levels in the company's wells was not noticeable from one season to another, the fluctuations not being of enough magnitude to affect the operation of the pumps.

The seasonal variation in the run off from the Mojave River watershed has been shown to be considerable at times and if the water levels are affected only slightly with the seasonal variation it would appear that the proposed diversion of the applicant would not have an injurious effect upon the protestants supply.

The Grier Ranch Incorporated claim the ownership of the "Rancho Verde" consisting of 3,040 acres of land in Township 5 N. R. 4 W. S. B. B. & M. together with the right to use on said land for irrigation and domestic purposes, the surface and underground waters of the Mojave River, this right being based upon riparian ownership, the continuous beneficial use of water from 19 artesian wells which it is claimed produce an aggregate of 800 miner's inches (measured under a four inch pressure) upon the use of water by natural sub-irrigation and upon the diversion of from 500 to 2,000 miner's inches of surface water from the Mojave River.

Protestant claims that if the application be approved it will be deprived of the source of supply from underground storage and that other interests in the valley will be injured due to the fact that there is no unappropriated water and that the applicants scheme is not practicable.

The Rancho Verde lies in the Mojave River bottom just above the Victorville Narrows and is probably the most extensive of the producing properties in the valley and is the largest user of water from the Mojave River. Since 1912 the ranch has been producing alfalfa and sugar beets. A portion of the ranch is at the present time, being subdivided into smaller tracts.

From evidence presented at the hearing the ranch has an abundance of water and there is 1,000 acres of it where the water level would not be over three feet below the surface of the ground.

If the underground water level were lowered somewhat by the proposed diversion, the additional cost of pumping if any would be very small, and would offer no adequate grounds for the

denial of the application.

Any rights which the protestant may have will be fully protected under the terms of the permit, the protestant having adequate redress under the law, should any of its rights be interfered with.

William E. Robinson claims that the proposed diversion would deprive him and others in the valley of a supply of water which is necessary for the proper irrigation of their lands and that the scheme of the applicant is impracticable inasmuch as no flood water will have dependable recurrences of supply and during a cycle of dry years the district will be without a necessary supply.

From testimony presented at the hearing it appears that the Robinson Ranches consist of three parcels of land the upper parcel containing 240 acres of land, no part of which has been irrigated but which is naturally swampy by virtue of the Mojave River passing through it.

The Lane ditch heads on this 240 acre tract and diverts water from the Mojave River to the second Robinson Ranch, which is about one-half mile downstream from the north end of the upper parcel. The ditch has a carrying capacity of 250 miner's inches measured under a four inch pressure, of which Robinson owns a one-fifth interest, acquired about 1897, and which from 1916 or 1917 has been continuously used to irrigate 35 acres of orchard and 10 acres of alfalfa and some pasture land. It appears that no other water has been used on that land other than by that right.

The third tract is situated about 5 miles further down the

river in a northerly direction about two miles southwest of Helendale Station and contains about 220 acres of which about 80 acres of alfalfa and pasture land and one acre of orchard are irrigated about twice a month during the summer, commencing about March 1st and ending October 1st. The water is obtained from a ditch, the intake of which is about 4 or 4½ miles south of Helendale. The protestant claims a one-fourth interest in this ditch, the capacity of which is 600 miner's inches.

In addition to the sources above named Robinson sunk a well on the lower ranch and installed a 6" centrifugal pump having a capacity of about 60 miner's inches from which source water is used for the irrigation of alfalfa.

It appears that no great amount of development has been accomplished by means of surface irrigation; not more than about 80 acres being irrigated out of a total possible area of 700 acres and it is believed that the proposed diversion of the applicant will not interfere with the protestants diversion. The application is for permission to appropriate unappropriated water, subject to existing rights and approval thereof can be made only subject to vested rights, and should there be any interference with the use under vested rights, there is ample legal recourse for the protestant.

If there should be a cycle of dry years as the protestant suggests it is very possible that the district may suffer from an inadequate supply but this fact should not be the determining factor as

to the feasibility of the project as the supply for most districts is predicated upon a year of normal run-off and a succession of dry years would of course necessitate a curtailment of the amount of water used.

Miss Abby Waterman claims 200 miner's inches of water measured under a four inch pressure by virtue of riparian and appropriative rights, claiming to have used that amount continuously since 1910 for the irrigation of 75 acres of land in the vicinity of the town of Barstow. She claims also that she has 300 acres of irrigable land which is susceptible of irrigation under the above right.

At the hearing the fact was developed that the water used for irrigation and domestic purposes was obtained from three wells located on her property; that the lands were irrigated by means of a 7 inch pump having a capacity of about 116 miner's inches or about 2.3 cubic feet per second, and that the protestant irrigates every two weeks covering the 75 acres of ground four inches deep at each irrigation for about 6 months which represents 4 acre feet per acre each season, or 300 acre feet for the total area irrigated. This is equivalent to a continuous flow of approximately 0.80 cubic feet per second during the six months irrigation season. It would appear that the diversion contemplated would not interfere with the right of protestants of this class.

Dix Van Dyke, Mary Van Dyke Golden and George W. Golden claim that there are no unappropriated waters in the Mojave River or its tributaries and that the applicants proposed diversion would interfere with

their prior vested rights.

The protestants claim the ownership of the "Daggett Ditch" which has an alleged capacity of 1600 miner's inches; that 350 acres have been planted to alfalfa and other crops, 100 acres have been used for grazing purposes, that an additional 100 acres have been prepared for irrigation, and that they have been anticipating the planting of a large acreage to deciduous fruit.

Protestant claim that in winter and spring, when surface water is flowing past the point of diversion, 12 second feet of water are delivered by the aqueduct, that after the surface waters have ceased flowing, the water level at the point of diversion gradually lowers and the amount percolating into the underground flume diminishes until, during mid summer the amount delivered by the aqueduct is about 9 second feet and during the fall about 7 second feet, and that during the dry season of 1925 the amount flowing through the aqueduct on April 7th, was 6½ second feet, obtained from underground sources.

Assuming a duty of 4.5 acre feet per acre which is equivalent to a continuous flow of one second foot to eighty acres of land for a six months irrigation period, there would probably have been enough water available during this dry season in the underground channels which are tapped by the protestants diversion works, to irrigate the lands of the protestants which they claim have been irrigated in the past and during a normal year when the midsummer flow is about 9 second feet the supply would be sufficient to irrigate at least 720 acres of ordinary crops at the duty assumed above.

For this reason it is believed that the proposed diversion would not interfere with the rights of the applicant, as the applicant's diversion to storage would be at a time of maximum stream flow and any irregularity caused by the diversion would be smoothed out by the slow movements of the underground waters. The applications of the District if approved would be subject to the vested rights of the protestant and if these rights were interfered with the protestant would have adequate remedy at law.

Anna Herlick as administratrix of the estate of Peter Herlick, deceased claim that the proposed diversion of the applicant would interfere with the protestants prior vested right to both the surface and underground waters of the Mojave River.

The Estate of Peter Herlick, deceased, is the owner of about 1340 acres of land located along the banks of the Mojave River near Helendale which is claimed to be riparian to the stream. It consists of two separate parcels of land which are generally known as the North and South Ranches.

The North Ranch consists of about 600 acres of land and is used for grazing purposes only and although apparently a portion of it has been irrigated by means of a ditch in the past it is generally irrigated by sub-surface waters only.

The South Ranch consists of 640 acres of land, 100 acres of which has been planted to alfalfa, 15 acres to orchard, and 30 to 40

acres to general crops, the remainder being used for pasture purposes only.

The South Ranch is irrigated from the Mojave River by means of a gravity ditch about 40 years old and is designated as the Robinson, Boren, Bledsoe, and Clark ditch, having a capacity of about 600 inches (12 cubic feet per second), the estate having a one-fourth interest therein, or 3 cubic feet per second, and also by means of a pumping plant consisting of a 6 inch centrifugal pump driven by a 15 horsepower motor, having a capacity of about 2 cubic feet per second, and which has been operated for six or seven years.

In addition to the water which is received through the ditch the pump runs practically continuously during the summer months from the middle of June until the alfalfa is harvested. No attempt has been made to use any of the flood waters of the Mojave River except as the overflow would naturally irrigate the pasture.

If the protestant has the right to 5 second feet of the surface and underflow of the Mojave River any subsequent appropriation which may be granted by the Division will of course be subject to this prior vested right.

The amount of water to which the protestant is entitled for the irrigation of the North Ranch is not clearly shown altho it would appear that the protestant is entitled to such an amount of water from underground sources as is necessary to maintain the land for grazing purposes.

The Trustees of the Proposed Hesperia Irrigation District claim

the prior right to 55.0 cubic feet per second under a filing made in 1910 on 20,000 miner's inches (measured under a 4 inch pressure)

A portion of the above priority, the trustees claim, has been kept alive during the entire period, but it would appear from evidence presented at the hearing that the little water that had been put to beneficial use was taken from a well which lay in a different township from that specified in the original claim.

The Mojave River Land and Water Company purchased eleven alternate sections of land in 1910, intending to sell water stock to persons taking up the intervening sections by desert land entries and to have the Government accept the expenditure for the water stock of the Company as satisfactory annual expenditure on a desert land entry. This, however, the Commissioners of the General Land Office in Washington refused to do in 1917, after an investigation had been made by an authorized agent as to the resources and reliability of the company, which was at that time reorganized under the name of the Yermo Mutual Water Company.

Up to 1916, the construction and development work appears to have been prosecuted with due diligence. The Company drilled one 12-inch and four 16-inch wells, and constructed about ten miles of concrete lined canal which headed at the wells on the S½ of Section 32, T 10 N, R 3 E, and extended to a point near the quarter corner of Sections 25 and 26 T 10 N, R 2 E, S. B. B. & M. a portion of this canal having a capacity of 1,350 miner's inches and the remainder 3,300 miner's inches.

Only one of the five wells sunk was apparently used to any extent, the capacity of this well being about 126 miner's inches.

The Mojave River Land and Water Company having expended about $75,000 on the construction and development work became so heavily indebted, that in 1916 it reorganized under the name of the Yermo Mutual Water Company.

A copy of the report of the commissioners of the General Land Office, Department of the Interior, which was addressed to the Register and Receiver at Los Angeles, concerning the action on the Yermo Mutual Water Company, successor of the Mojave River Land and Water Company, is on file with the Division as Exhibit No. 1 of protestant Williams.

The report showed that up to the date thereof the Company had developed water to the extent of about 187½ miner's inches only.

At the hearing evidence was presented that would indicate that very little diligence was shown in putting the water to beneficial use since that date, Mr. Thomas Williams stating that during April, May and June of 1916 the Yermo Mutual Water Company had irrigated about 60 acres of grain, in 1917 they had irrigated two or three different times, in 1918 and 1919 no lands were irrigated on account of the inability to get fuel and labor, and in 1920 the plant was operated about three months and since then had been operated on an average of twice a month for three or four months, a twenty acre piece being irrigated in 1922 and a forty acre piece in 1923 and 1924. In 1920 the Harvard Irrigation District was proposed

to take over the holdings of the Yermo Mutual Water Company and to continue with the project. F. B. Lewis and George W. Wilson, trustees for the proposed Harvard Irrigation District filed Application Number 2579 with the Division of Water Rights on October 7, 1921, for forty cubic feet per second of the waters of the Mojave River to be diverted from March 1st to November 1st of each season for agricultural and domestic purposes and Application Number 3081 on Oct. 13, 1922, for a direct diversion of 15 cubic feet per second from the underground waters of the Mojave River, to be diverted from March 1st to November 1st of each season for agricultural and domestic purposes. The waters under both applications being for use on the proposed Harvard Irrigation District, containing 8,160 acres of land.

The applications were duly advertised but the trustees of the district do not control the land at the proposed point of diversion, as this land consisting of 105 acres of water bearing ground (25 acres where the wells are located and 80 acres on the river) was sold at a State Controller's sale to Mr. Thomas O. Williams for non-payment of taxes. The trustees of the proposed district, however, may redeem the land after the expiration of five years after the date of sale.

No petition has been presented to the board of supervisors for the formation of the District, nor has the proposed District anything official before the office of the State Engineer.

Under date of January 29, 1925, the trustees informed the Division of Water Rights that a contract had been entered into with the

Yermo Mutual Water Company to purchase their plant together with 112 acres of water bearing land at the proposed points of diversion which included the wells above mentioned and although the property had been sold for taxes the redemption period had not yet expired and money was available to redeem it.

A very small amount of water has actually been put to beneficial use by the Yermo Water Company and the Proposed Harvard Irrigation District, but that use would constitute a right which apparently should be respected by subsequent appropriators.

As Application Number 438 of the Mojave Irrigation District was filed at an earlier date than Applications Numbers 2879 and 3081 of the Proposed Harvard Irrigation District any right initiated by the filing thereof would have the priority over the later applications.

CONCLUSION

The Division of Water Rights has given a great deal of time and study to the Mojave River situation, in order that a just decision might be rendered.

Lengthy reports and briefs, as well as a considerable amount of other pertinent matter have been filed with this office by both applicant and protestant in support of their respective arguments which have required careful examination.

Especial attention has been given to the above mentioned report of the Mojave River Commission which was submitted to the Board of Super-

visors of San Bernardino County under date of April 30, 1918 and to the "Special Report on Ground Water Conditions along the Mojave River", by Mr. David G. Thompson of the United States Geological Survey, which latter report was prepared during 1921 and to which reference is made in the transcript of the hearing held in San Bernardino on March 26-27, 1924. These reports have been of great assistance to the Division on account of the fact that they have been prepared by impartial authorities.

In 1923 a preliminary survey and investigation of the conditions which obtained in the Mojave Drainage Basin, was made by Mr. John T. Whistler under the direction of the Division of Water Rights, at a cost of approximately $1,000.

In addition to this investigation a field inspection was made by representatives of this office in June, 1924.

From a careful consideration of all available material, it is the opinion of this office that during an average year there is a sufficient amount of unappropriated water in the Mojave River to enable the applicant to divert 30,000 acre feet per annum to storage, from about October 1st to about March 31st of each season, without appreciably interfering with prior vested rights on the Mojave River.

It appears that this diversion could be obtained entirely from the West Fork of the Mojave River, thereby reserving the waters of Deep Creek for other appropriators, but in justice to the applicant the right to divert from Deep Creek should be reserved for a period of three years

from date of issuance of permit. If, after this period of time has elapsed there appears to be no effort on the part of the District to make possible the use of the waters of Deep Creek, this portion of the application should be cancelled.

Since application 5360 is simply a refiling of number 438 and not intended to cover an additional water supply it can serve no purpose after the approval of number 438 and should be rejected.

O R D E R

Applications Numbers 438 and 5360 of the Mojave Irrigation District for permits to appropriate water having been filed with the Division of Water Rights as above stated, protests having been filed, a public hearing having been held and the Division of Water Rights now being fully informed in the premises,

IT IS HEREBY ORDERED that said Application Number 438 be approved and that a permit be issued subject to the usual terms and conditions, except that the period of diversion be limited to the period from about October 1st to about March 31st of each season, and that the following clause be inserted therein:

> "The amount of water appropriated shall be limited to the amount which can be beneficially used and shall not exceed 30,000 acre feet per annum, from either or both sources, provided, however, that the entire diversion shall be made from the west fork, when water is available."

The right to divert from Deep Creek shall be reserved to the District for a period of three years from the date of the permit. If, after the expiration of this period it is the opinion of the Division that the construction work necessary for such diversion has not been prosecuted with due diligence, that portion of the permit relating to the diversion from Deep Creek may be revoked, and

IT IS FURTHER ORDERED that the said Application Number 9360 be ~~and the same is hereby~~ rejected and cancelled upon the records of this office.

DATED at Sacramento, California, this _____day of_____, 1925.

WRB:GG

(Edward Hyatt,Jr.)
CHIEF OF DIVISION OF WATER RIGHTS