

STATE OF NEVADA

BIENNIAL REPORT

OF THE

STATE ENGINEER

✦

For the Period
July 1, 1944, to June 30, 1946, Inclusive

✦

ALFRED MERRITT SMITH
State Engineer of Nevada



CARSON CITY, NEVADA
STATE PRINTING OFFICE - - JACK MCCARTHY, SUPERINTENDENT
1946

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STATE OF IOWA

ANNUAL REPORT

1901

OF THE

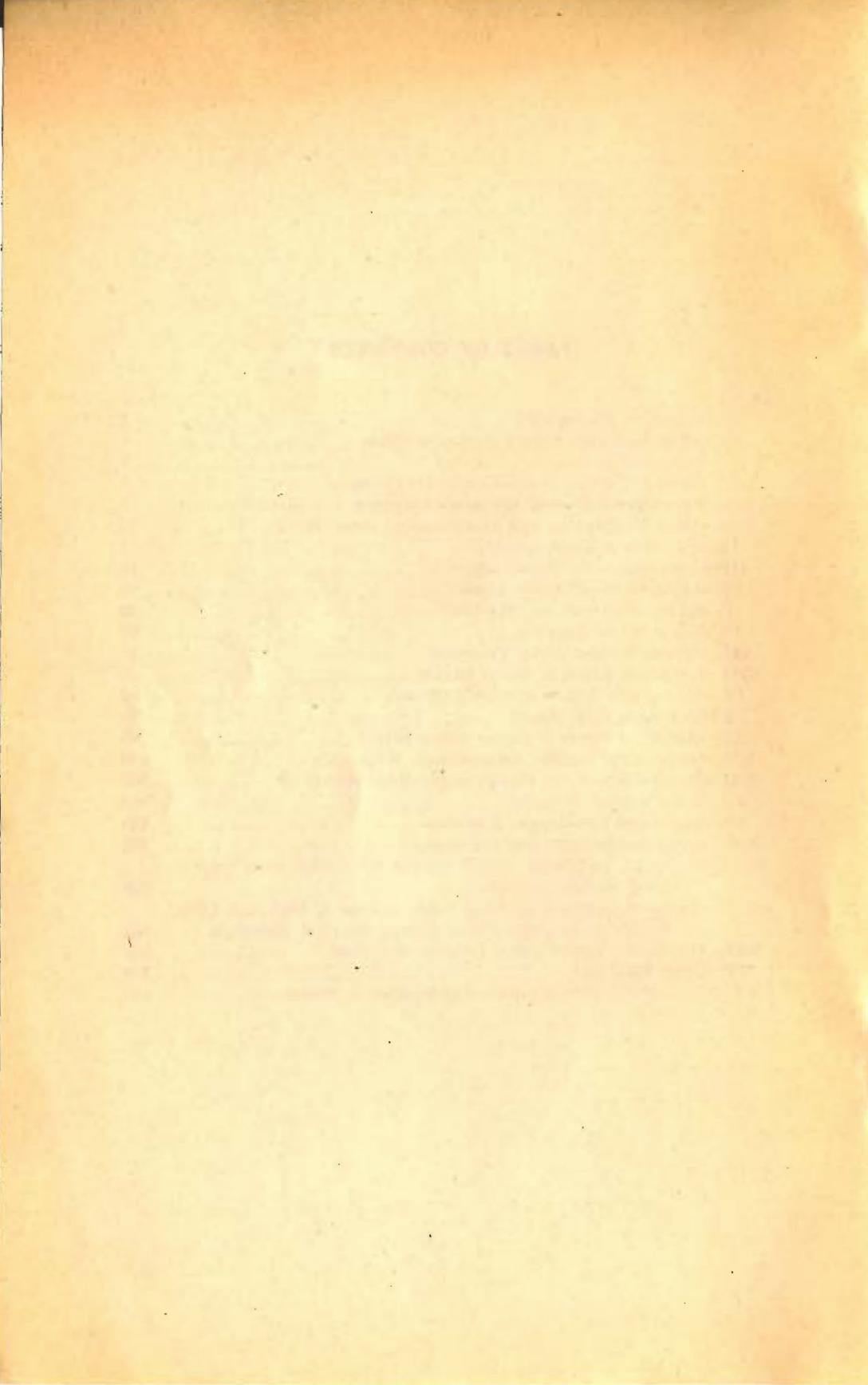


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LETTER OF TRANSMITTAL

STATE OF NEVADA,
OFFICE OF STATE ENGINEER,
CARSON CITY, July 15, 1946.

*To His Excellency, HONORABLE VAIL PITTMAN, Governor of Nevada,
Carson City, Nevada.*

SIR: In compliance with the provisions of section 14, chapter 140, Nevada Statutes 1913, and section 1, chapter 171, Nevada Statutes 1931, I have the honor to transmit herewith the Biennial Report of the State Engineer for the period ending June 30, 1946.

The report of the Colorado River Commission for the biennium is included herein as an appendix.

Respectfully submitted,
ALFRED MERRITT SMITH,
State Engineer.

STATE ENGINEERS SINCE CREATION OF OFFICE

A. E. CHANDLER..... May 29, 1903, to May 1, 1905
HENRY THURTEL..... May 1, 1905, to May 1, 1907
FRANK R. NICHOLAS..... May 1, 1907, to March 3, 1910
EMMET D. BOYLE..... March 8, 1910, to March 21, 1911
W. M. KEARNEY..... March 21, 1911, to May 15, 1917
J. G. SCRUGHAM..... May 16, 1917, to January 10, 1918
SEYMOUR CASE..... January 25, 1918, to March 28, 1919
J. G. SCRUGHAM..... March 28, 1919, to October 7, 1922
ROBERT A. ALLEN..... October 7, 1922, to March 28, 1927
GEO. W. MALONE..... March 29, 1927, to May 28, 1935
ALFRED MERRITT SMITH..... May 28, 1935—

OFFICIAL ROSTER DEPARTMENT OF STATE ENGINEER

OFFICE PERSONNEL

Carson City, Nevada

July 1, 1944, to June 30, 1946

ALFRED MERRITT SMITH.....	State Engineer
HUGH A. SHAMBERGER.....	Assistant State Engineer
EDMUND MUTH.....	Deputy State Engineer
F. N. DONDERO.....	Office Engineer
C. E. THIEK.....	Chief Clerk
W. J. NEWMAN ¹	Engineer
MARIE GRAHAM ANDERSON ²	Stenographer
ELDEANE MURPHY ³	Stenographer
BETTY BROWN ⁴	Stenographer
NADA NOVAKOVICH ⁵	Secretary
KATHLEEN A. COCHRAN ⁶	Secretary
VALENCIA E. SCOTT ⁷	Secretary
ALTA THIEK.....	Extra Clerical

WATER DISTRIBUTION PERSONNEL

Las Vegas and Pahrump Artesian Basins

HARRY E. JAMESON..... Commissioner, 1944-1946

Humboldt River, 1944

J. A. MILLAR, Supervising Water Commissioner.....	Entire River
E. H. GREEN, Special Commissioner.....	Entire River
ALBERT QUILL, Water Commissioner.....	Starr Valley and North Fork
ORVAL AMES, Water Commissioner.....	Lamoille and South Fork
WM. ORTON, Guard.....	Lamoille

Humboldt River, 1945

J. A. MILLAR, Supervising Water Commissioner.....	Entire River
E. H. GREEN, Special Commissioner.....	Entire River
ALBERT QUILL, Water Commissioner.....	Elko
SAM KING, Water Commissioner.....	Battle Mountain
MYRON CLARK, Water Commissioner.....	Winnemucca
PETER ANKER, Water Commissioner.....	Lovelock
WM. HOLT, Hydrographer.....	Lovelock

Humboldt River, 1946

J. A. MILLAR, Supervising Water Commissioner.....	Entire River
W. J. NEWMAN, Special Commissioner.....	Entire River
E. H. GREEN, Special Commissioner.....	Entire River
ALBERT QUILL, Water Commissioner.....	Elko
SAM KING, Water Commissioner.....	Battle Mountain and Winnemucca
PETER ANKER, Water Commissioner.....	Lovelock
JERRY WIGNAL, Hydrographer.....	Lovelock

¹March 16, 1946, to April 30, 1946.

²Resigned April 30, 1945.

³September 16, 1945, to December 5, 1945.

⁴December 5, 1945, to June 21, 1946.

⁵Resigned September 15, 1944.

⁶September 27, 1944, to June 27, 1945.

⁷June 25, 1945, to date.

Little Humboldt River, 1944-1946

E. H. GREEN, Water Commissioner.....Entire District
 WILLIAM HOLT, Assistant Water Commissioner.....Entire District

CUREANT AND DUCKWATER CREEKS, 1944-1946

W. E. HAWKINS, Water Commissioner.....Entire District

Muddy River, 1944

THOMAS COTTAM, Water Commissioner.....Entire District

Muddy River, 1945

THOMAS COTTAM, Water Commissioner.....Entire District
 E. S. BOWMAN, Water Commissioner.....Entire District

Muddy River, 1946

CLARENCE A. LEWIS, Water Commissioner.....Entire District

Pahranagat Lake, 1944

DONALD K. PERRY, Water Commissioner.....Entire District

Pahranagat Lake, 1945

DONALD K. PERRY, Water Commissioner.....Entire District
 GILBERT STEWART, Water Commissioner.....Entire District

Pahranagat Lake, 1946

ALDEN STEWART, Water Commissioner.....Entire District

Baker and Lehman Creeks, 1944-1946

DON BECK, Water Commissioner.....Entire District

SUMMARY OF THE WORK OF THE STATE ENGINEER

STATE COMMISSIONS AND BOARDS

The State Engineer upon taking office automatically becomes a member of the following Commissions:

1. The Nevada Public Service Commission.
2. The Nevada State Irrigation District Bond Commission.
3. The State Range Commission.
4. The Nevada State Planning Board.

By gubernatorial appointment the present State Engineer is also a member of the following:

5. The Colorado River Commission of Nevada.
6. State Board of Registered Professional Engineers.

RECLAMATION ORGANIZATIONS

1. The Association of Western State Engineers (seventeen Western States).
2. The National Reclamation Association.
3. The "Committee of Fourteen and Sixteen." Two members from each of the Colorado River Basin States, appointed by respective Governors.
4. Colorado River Water Users Association.

STATUS OF ADJUDICATION OF STREAM SYSTEMS

The work of adjudicating the waters of the Nevada stream systems has proceeded since the inception of this office in 1903 to the present time:

1. Stream systems adjudicated, 1903 to date.....	35
2. Acres under adjudicated streams.....	388,738
3. Vested water users under adjudicated streams.....	616
4. Adjudicated stream systems supervised by this office during the past biennium.....	7
5. Adjudicated stream systems not supervised by this office during the past biennium.....	28
6. Streams in process of adjudication.....	25
7. Adjudications completed during past biennium.....	6
8. Stream systems on which decrees have been entered by civil suit not under supervision of this office.....	11
9. Stream systems adjudicated by United States District Court	3
10. Stream systems under process of adjudication by United States District Court.....	2

STATUS OF WATER APPLICATIONS AND PROOFS OF APPROPRIATION

1. Water applications filed 1903 to June 30, 1946.....	11,624
2. Water applications acted upon, 1903 to June 30, 1946.....	11,201
3. Water applications on which no action has been taken.....	423
4. Water applications acted on, July 1, 1944, to June 30, 1946	488

5. Water applications filed July 1, 1944, to June 30, 1946.....	487
6. Proofs of commencement of work filed, July 1, 1944, to June 30, 1946.....	241
7. Proofs of completion of work filed, July 1, 1944, to June 30, 1946	175
8. Proofs of beneficial use filed, July 1, 1944, to June 30, 1946	154
9. Protests filed against the granting of applications, July 1, 1944, to June 30, 1946.....	101
10. Certificates of appropriation issued under permitted water rights, July 1, 1944, to June 30, 1946.....	160
11. Proofs of appropriation filed, 1903 to June 30, 1946.....	2,331
12. Proofs of appropriation filed, July 1, 1944, to June 30, 1946	4

COOPERATIVE WORK

The State Engineer also carries on cooperative work in stream gaging, snow survey and ground water studies through three State appropriations. The cooperating agencies are:

The Water Resources Branch of the United States Geological Survey.

The Nevada Cooperative Snow Surveys.

The stream gaging and ground water study programs are carried out by the United States Geological Survey under two separate cooperative programs.

The activities of the State Engineer are related under their proper headings elsewhere.

PUBLIC SERVICE COMMISSION

The Nevada Public Service Commission is composed of the following members:

George Allard, Chairman, Carson City.

Charles V. Williams, Yerington.

Alfred Merritt Smith, Carson City.

Lee S. Scott, Secretary, Carson City.

The work of this commission is published by the chairman in a biennial report. During the past biennium many hearings have been held in various parts of the State on matters concerning the rate schedules of public utilities, rail and motor vehicle carriers, complaints as to public service, and requests for certificates of convenience and necessity for the operation of public utilities.

THE STATE IRRIGATION DISTRICT BOND COMMISSION

The State Irrigation District Bond Commission was created by an Act of the Legislature approved February 26, 1921, being sections 8217-8228 Nevada Compiled Laws 1929. The commission consists of the following members:

Vail Pittman, Governor of Nevada.

Grant L. Robison, Bank Examiner.

Alfred Merritt Smith, State Engineer.

It is the duty of the commission to pass upon the eligibility of bonds of irrigation districts as legal investments within Nevada.

THE STATE RANGE COMMISSION

This commission consists of the following members:

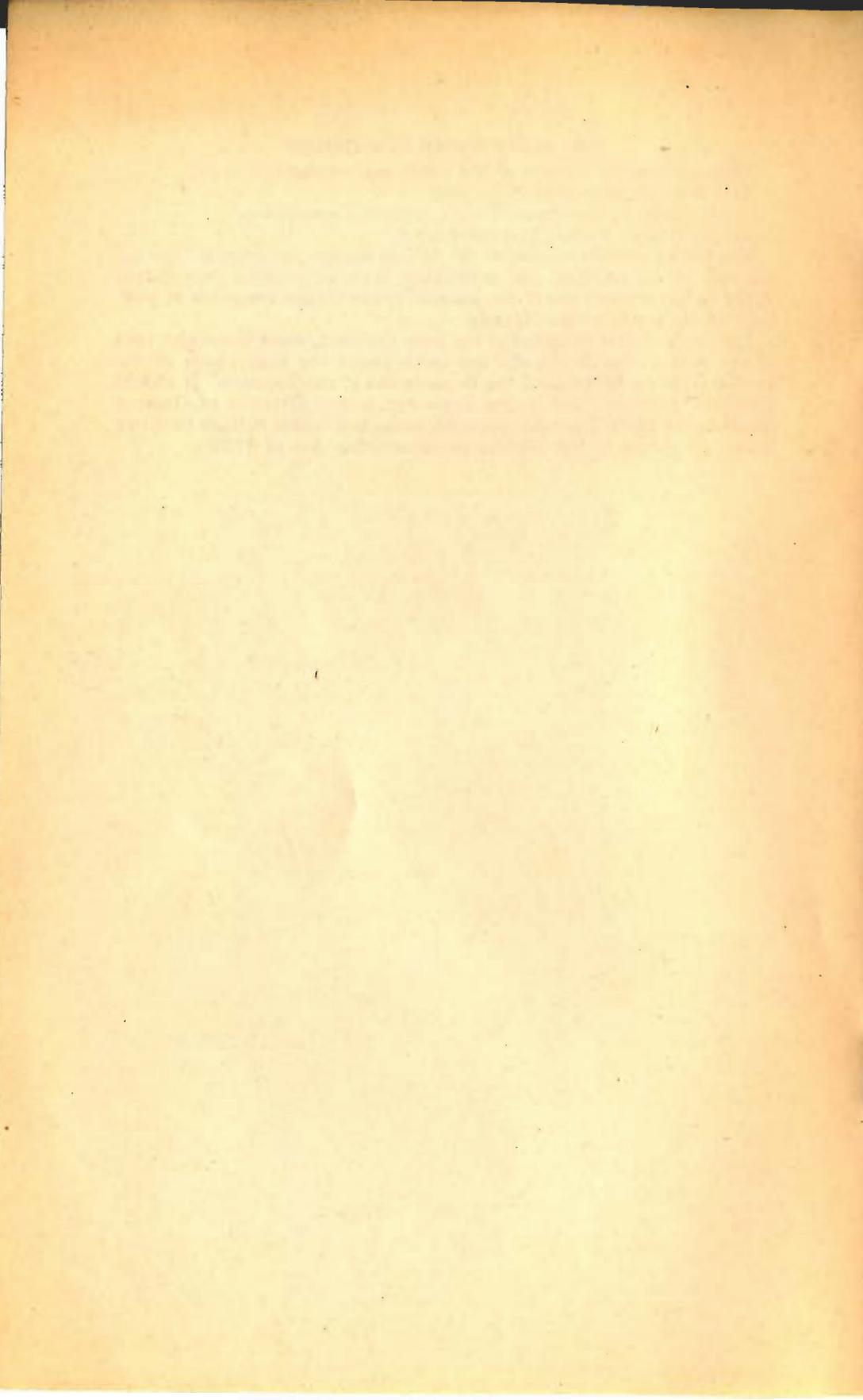
Vail Pittman, Governor of Nevada.

George Allard, Chairman, Public Service Commission.

Alfred Merritt Smith, State Engineer.

The 1929 Legislature created the "State Range Commission" for the purpose of determining the principles, laws, or policies that should apply to the grazing use of the natural range forage resources of publicly owned lands within Nevada.

The work of this commission has been dormant, since the major part of the range area in Nevada has come under the supervision of the Taylor Grazing Division of the Department of the Interior. It should be noted, however, that in the areas not within Division of Grazing Districts the State Engineer bases decisions and makes rulings on water filings according to the Nevada Stockwatering Act of 1925.



BIENNIAL REPORT OF STATE ENGINEER, 1944-1946

ACKNOWLEDGMENTS AND RECOMMENDATIONS

ACKNOWLEDGMENTS

In submitting this report covering the sixth two years of work by my associates and myself in the department of the State Engineer, I wish especially to praise the splendid and unstinted service to the department and the State rendered by the staff. During this biennium period the cooperative ground water program was started in cooperation with the United States Geological Survey and has added a great deal of additional work for the staff.

Other new additional activities that have been initiated during this period, in addition to the cooperative ground water program, were the organizing of the Humboldt River Board as described in Chapter X; the coordinated group meetings of all Federal and State agencies concerned with water and its development in Nevada, which is mentioned in Chapter VII; and the preparing of certificates of water appropriations on all adjudicated stream systems.

Acknowledgments and sincere thanks are extended to the following persons for contribution of valuable data appearing under the given titles:

George Hardman, "Quality of Water of Lower Virgin River."

M. T. Wilson, "Cooperative Stream Measurement Work in Nevada."

J. E. Church, "Snow Surveys."

H. P. Boardman, "Snow Surveys."

Clyde E. Houston, "The Nevada Snow Survey Program."

M. R. Miller, "The Quality of the Waters of the Humboldt River."

Wallace W. White for furnishing important data covered in the chapter entitled, "Town Water Supplies in Nevada."

I wish to repeat and emphasize a statement I have often made before, which is that the success and efficiency of the department are in no small measure due to the help of State officers in other departments. These officers, with whom we are in daily contact, and whose work is often related to our own, have, by fine cooperation and helpful advice, greatly lightened and expedited our own tasks. Former Governor E. P. Carville, Governor Vail Pittman, Attorney General Alan Bible and his able assistants Wm. T. Mathews, George P. Annand, and Homer Mooney, have been, each of them, of so much assistance to me and my staff in dealing with many difficult problems and situations that it is entirely beyond my ability to give them proper credit and thanks for what they have done.

I extend my thanks to our representatives in Congress, Senator Pat McCarran, Senator E. P. Carville, and Congressman Berkeley Bunker, who have never failed to lend their aid and council when called upon. Also, to the many other State and county officers throughout our wide State who have rendered willing aid and the best of cooperation.

RECOMMENDATIONS

1. *Cooperative Stream Measurement Program.* During the past biennium there have been fourteen additional gaging stations installed

in Nevada. The cost of operation and maintenance of gaging stations has increased considerably during this biennium. The U. S. Bureau of Reclamation is making extensive studies on the Truckee River, Carson River, and Walker River and will need many more additional gaging stations. The installation and maintenance of gaging stations is the responsibility of the United States Geological Survey, which can only carry on such work on a cooperative basis. On the Truckee River alone there are 12 stations that must be rehabilitated. It is planned that the costs will be divided as follows: State 25 percent, water users 25 percent, and U. S. Geological Survey 50 percent. In order to assist in the investigations of up-stream storage on these rivers as well as to carry on our existing program, there should be a minimum State appropriation of \$5,000 per year, or \$10,000 for the biennium. (See Chapters IX and XII.)

2. *Snow Survey Work.* An active organization for State-wide snow surveying should be authorized by the Legislature. During the past biennium the scope of this work in Nevada has been greatly broadened and its importance is being increasingly felt. The Legislature should provide an adequate appropriation to carry on and intensify the work. (See Chapter XIV.)

3. *Waste and Drainage Water.* It is recommended that the Legislature enact a statute similar to the State of Oregon statute which provides for the appropriation of waste or drainage waters.

4. *Underground Water Law.* During the 1945 legislative session an amendment to the 1939 Underground Water Law was presented and was passed by both the Senate and the Assembly, but due to an oversight in the Assembly, the amendment was not enacted into law. This amendment provided for the licensing of well drillers. It is suggested that this amendment again be presented to the Legislature.

5. *Flood Control Districts.* The Legislature should consider legislation for flood control districts or areas that will provide an organization having proper authority and taxing powers to enter into cooperative agreements with the U. S. Army Engineers for the construction, operation, and maintenance of flood control works.

6. *Distribution of Water on Adjudicated Streams.* It is recommended that certain amendments be added to the present water laws giving the State Engineer more authority in the distribution of water. Section 52 of chapter 209, Statutes of 1931, should be broadened to provide funds for the operation and maintenance of a stream system by the State Engineer.

7. *Cooperative Ground Water Program.* This program is fully described in Chapter VII. There has been general approval of this program as it has been carried on in cooperation with the United States Geological Survey throughout the State. It is recommended that the Legislature appropriate sufficient money to carry it on as planned.

ALFRED MERRITT SMITH,
State Engineer.

CHAPTER I

Office Engineering and Miscellaneous Office Work

During the two years covered by this report a considerable increase in office work can be noted. This was due in part to the fact that more applications were received to appropriate water than in any similar period since 1930. Other factors were the increased activity in adjudication proceedings and new work undertaken by the office. A great deal of time is taken up with examining all new applications and checking and filing maps submitted in support thereof. With respect to this work, the aim of this office has been to eliminate all errors before filing and publishing the notices of proposed appropriations. All proofs of commencement of work and completion of work, and proofs of application of water to beneficial use, together with the maps in support thereof, are carefully examined for errors before filing. Proofs of appropriation of water and supporting maps covering vested water rights or rights initiated prior to March 1, 1905, are also given careful study before filing as a part of our routine office work in order to expedite the work of preparing data for adjudication proceedings.

Issuance of certificates of appropriation of water under both permits and decreed rights under statutory adjudication has occupied considerable time. In connection with this work it must be borne in mind that the certificate of appropriation of water is the final step in a perfected water right and, therefore, it is of vital importance that no errors exist, and for this reason they are examined at least three times before they are sent to the County Recorder in the county where the appropriation exists for recording.

Budgets covering the costs of water distribution prepared and submitted to the County Clerks are a part of our annual work.

Many deeds affecting the transfer of water rights of record are carefully examined in order to ascertain that there is no missing link in the chain of title from the owner of record to the new owner. In other words, the succession of title to the water right of record must be strictly adhered to so as to keep in close contact with the new owners, especially in cases of rights covering pending applications and permits where the attention of the holder of such application and permit is required to keep it in good standing, and also for the purpose of enabling this office to issue the certificate of appropriation of the perfected right to the legal owner or owners of record. In cases where the State Engineer's file numbers are omitted in the deeds, but the description of the land and appurtenances are given, much time is devoted in searching through the records to determine with certainty that none of the water rights covered by such deeds are omitted.

During the biennium, 487 new applications were filed as against 293 during the preceding period. A tabulation showing the number of applications and manner of use for the past five biennium periods is set forth in Chapter III.

Adjudication proceedings were completed on the following six streams during the period covered by this report: Leidy Creek, Cold Creek Spring, Piute Creek, Battle Creek, Bartlett Creek, and Cane

Spring Creek. Pertinent information concerning these proceedings is given in Chapter IV. The work involved in adjudicating the waters of a stream is quite extensive even if there are no conflicts.

On July 1, 1945, the office of the State Engineer entered into a cooperative agreement with the United States Geological Survey, Ground Water Division, to carry on an extensive ground water study program. This work is proceeding in a satisfactory manner and is fully reported on in Chapter VII.

In April 1945 the office revised and published the Nevada Water Law, and in 1946 revised and published The Nevada Irrigation District Act. These publications are available upon request.

Many field investigations and hearings were held in connection with applications to appropriate water. A great number of applications for stockwatering purposes were made for sources within grazing districts. Considerable time has been spent with officials of the Division of Grazing and members of the Central Grazing Board relative to working out a satisfactory manner of handling such applications. Legislation to clear the problem will probably be introduced at the next Legislature.

Numerous complex water commissioner problems arise every year relative to the distribution of water, which occupy our immediate attention and time. In certain cases charts and tables relative to the division and allotment of water have been prepared for the water commissioners to facilitate the work. A great deal of office and field work has been devoted to straightening out the many complex details associated with distribution problems. Deputy State Engineer Edmund Muth is in charge of water distribution problems.

Assistance was given to the Water Resources Branch of the United States Geological Survey by making measurements of the flows of the Carson River at the Carson City gaging station and of the East Fork of the Carson River at Horseshoe Bend gaging station during the high peak. Frequent checks and adjustments are made on the Carson City water stage recording gage.

There has been a notable increase in the submitted number of documents in connection with applications, as shown by the filing of proofs of commencement of work; 175 affidavits of completion of work; 154 proofs of application of water to beneficial use, and 101 protests to the granting of applications. At least 100 maps under proofs of application of water to beneficial use have been carefully examined and filed. The filing of proofs of application of water to beneficial use and supporting maps made it possible to issue some 160 certificates of appropriation of water. At least 250 blueprints of maps of record in this office were made available on request, for which the sum of \$295.00 was received for this service.

Prompt and cordial attention has been accorded to the many visitors on matters chiefly pertaining to water engineering and to matters pertaining to this State. In many instances the entire day was devoted to these visitors. The daily routine office correspondence, official notices, and clerical work also required our attention.

CHAPTER II

State Water Right Surveyors of Nevada

Following is a complete list of licensed State Water Right Surveyors authorized to practice before the Office of the State Engineer during the past biennium:

NEVADA

- | | |
|----------------------------------|-----------------------------------|
| Alamo—W. F. Thorne. | Mina—L. B. Spencer. |
| Battle Mountain—James R. Wilson. | Minden—J. A. Millar. |
| Beatty—Charles G. Walker. | Walter G. Reid. |
| Caliente—Wayne Cox. | Mountain City—Edward C. Stephens. |
| Carson City—John B. Chattin. | Montello—John D. Smith. |
| Wayne McLeod. | Overton—L. A. Harris. |
| Harry E. MacNelly. | Paradise Valley—F. B. Stewart. |
| Robert W. Wickenden. | Pioche—Frank Walker. |
| Robert A. Allen. | Reno—R. W. Prince. |
| W. T. Holcomb. | Henry R. Weiss. |
| Albert Quill. | John E. Curran. |
| Elko—W. H. Settelmeyer. | L. H. Taylor. |
| R. A. Kinne. | A. C. Bruhns. |
| John W. King. | C. V. Taylor. |
| W. S. Raine. | D. H. Updike. |
| Ely—F. W. Millard. | Thos. R. King. |
| Neil A. McGill. | Fred W. Clayton. |
| Eureka—M. M. Harcourt. | John V. Mueller. |
| Floyd Sadler. | M. A. Pray. |
| Nye Tognoni. | Carl Stoddard. |
| Fallon—L. W. Crehore. | Harold Layman. |
| Hugh M. Wilson. | David Mitchell. |
| E. P. Osgood. | Geo. W. Malone. |
| J. C. Coniff. | William J. Moran. |
| Fernley—W. A. Pray. | C. J. Preece. |
| Gardnerville—O. L. Hussman. | C. C. Taylor. |
| S. Krummes. | John D. Franklin. |
| Goldfield—Ed. S. Giles. | A. E. Holgate. |
| Henderson—Ernest H. Clary. | Round Mountain—J. W. E. Taylor. |
| Las Vegas—Jack Asher. | Sparks—James N. Nelson. |
| William Clark. | Robert F. Guinn. |
| Harlan Brown. | Sprucemont—J. L. Vandiver. |
| Chas. L. Knaus. | Tonopah—D. S. Johnson. |
| C. D. Baker. | C. A. Liddell. |
| Van O. Eastland. | Tuscarora—Chester L. Woodward. |
| Frank D. Rathbun. | Winnemucca—W. A. Wentz. |
| Lovelock—Robert S. Leighton. | H. H. Sheldon. |
| J. H. Causten. | Yerington—George Parker. |
| Peter F. Anker. | Claude E. Hunter. |
| Manhattan—Arthur E. Smith. | |

CALIFORNIA

- Alturas—J. W. Archer, P. O. Box 167.
 Benton—Joseph Markert.
 Berkeley—R. E. Tilden, 2829 Benvenue Avenue.
 Sacramento—G. F. Engle, 1857 Forty-fourth Street.
 San Francisco—T. L. Phillips, Chief Engineer, W. P. R. R. Co., Mills Bldg.

OREGON

- Burns—Mott V. Dodge.

UTAH

- Ogden—Louis H. Boukol, Care of Southern Pacific Company.
 K. W. Kennedy, 1544 Twenty-seventh Street.
 Salt Lake City—Norman Blye, 503 Scott Building.
 C. R. Hagen.
 St. George—Leo A. Snow, Snow Building.

CHAPTER III

Applications for Water Rights

During the biennial dating July 1, 1944, to June 30, 1946, inclusive, there have been 487 applications filed with this office for permission to appropriate water, as compared to 293 applications filed during the preceding biennium. The following tabulation shows the manner of use of the water applied for during the past five biennial periods:

	1944- 1946	1942- 1944	1940- 1942	1938- 1940	1936- 1938
Irrigation.....	159	96	101	73	47
Mining and milling.....	28	26	75	130	110
Stockwatering.....	179	104	46	40	48
Domestic.....	13	7	21	10	9
Migratory waterfowl refuge.....	.....	.....	.....	.....	3
To change point of diversion, man- ner or place of use.....	27	26	11	9	19
Municipal.....	10	9	8	2	8
Bathing.....	.....	1	2	.....	2
Gravel and sand washing.....	.....	1	.....	.....	2
Power.....	1	.....	6	6	6
Recreational.....	1	.....	4	2	6
Fish rearing.....	5	.....	.....	.....	1
Manufacturing.....	1	3	3	.....	.....
Quasi-municipal.....	61	19	37	.....	.....
Railroad.....	2	1	4	.....	.....
Total.....	487	293	318	272	261

Definite action has been taken on 488 applications during this biennium. This represents action on 278 applications filed prior to July 1, 1944, and 210 filed during this period.

Pertinent information regarding water applications filed in this office since its creation will be found on page 9. The status of applications filed and certificates issued will be found as follows:

1. Status of applications filed during the biennium 1944-1946, Chapter XVII.
2. Status of applications filed prior to July 1, 1944, upon which action has been taken during the past biennium, Chapter XVIII.
3. Certificates issued under permits during the past biennium, Chapter XIX.

CHAPTER IV

Adjudication of Water Rights

Section 1, chapter 4, Statutes of 1903, provided a law creating the office of State Engineer and furnished a method for the determination of the relative rights in and to waters already appropriated. Several amendments were subsequently made, with the result that our water law is now admirably adapted to conditions in Nevada, and has been declared constitutional in its entirety by decisions rendered by the Supreme Court of Nevada.

Amendatory Acts were passed during the 1907 and 1909 sessions of the Legislature. In 1913 a new water law was enacted and the old water law in its entirety was repealed. The new law was approved on March 22, 1913. Under this Act the water law was greatly broadened, both as to the adjudication procedure on the determination of vested rights and the appropriation of water procedure on the determination of vested rights and the appropriation of water procedure by application to the State Engineer. Subsequent amendments to the laws relating to the adjudication procedure were enacted in the following sessions of the Legislature, viz, 1915, 1917, 1919, 1921, 1925, 1927, 1931, 1933, and 1937. A brief description of these various amendments may be found in chapter 6 of the 1936-1938 report, wherein a summary of the laws enacted by the Nevada Legislature relating to water and the office of the State Engineer is given. A summary of the statutory procedure to determine the relative rights in and to the waters of a stream system under a claim of vested right may be found in our 1934-1936 Biennial Report and also in the compiled edition of the water laws of this State published in 1945 by this office, both of which are available upon request.

PROOFS OF APPROPRIATION FILED DURING THE YEARS OF THE PRESENT BIENNIUM

During this period the following proofs of appropriation, which are claims of vested water rights, have been filed for future use in the determination of the relative rights and also to make of record such claims. A condensed statement giving the salient data is herewith given in the order of:

1. Proof serial number.
2. Date filed.
3. Name of claimant.
4. Source of water supply.
5. Location by county.
6. Use claimed.

02328....	1-31-45....	Simone Lompa; Gregory or Ash Canyon Creek; Ormsby County; Irrigation and domestic purposes.
02329....	2-13-45....	B. H. Robinson; Spring Gulch Lower Spring; White Pine County; Stockwatering.
02330....	3- 5-45....	E. L. Cord; Underground; (Adobe Well); Esmeralda County; Stockwatering.
02331....	10-15-45....	B. F. Porter Estate; Cane Spring Creek; Humboldt County; Irrigation and stockwater.

ADJUDICATIONS COMPLETED**BASSETT CREEK**

Bassett Creek is located on the easterly slope of the Shell Creek Range and drains into Spring Valley in and about Township 18 N., Range 66 E., M. D. B. & M. There are two claimants to the waters of this source.

December 16, 1938—Petition requesting the determination of relative rights filed in the State Engineer's office.

December 21, 1938—The report of the investigation of the stream system was filed in the office of State Engineer.

December 22, 1938—State Engineer entered order granting the petition.

December 23, 1938—State Engineer entered notice and order for taking proofs.

August 29, 1940—Abstract of Claims filed in State Engineer's office.

August 21, 1941—Final Order of Determination filed in State Engineer's office.

September 12, 1942—Decision of District Judge L. O. Hawkins filed with the Clerk of the Seventh Judicial District Court.

October 30, 1942—District Court denies motion for new trial.

November 10, 1942—Decree filed.

November 19, 1942—Notice of appeal from the decision of the District Court.

January 29, 1945—Supreme Court renders opinion reversing District Court and directing trial court to enter a decree sustaining the findings of the State Engineer.

October 10, 1945—Findings of Fact, Conclusions of Law and Decree filed in District Court. Harvest lands 131.80 acres and meadow pasture lands 338.60 acres.

LEIDY (ROBINSON) CREEK

Leidy (Robinson) Creek rises in the White Mountains in the Inyo National Forest, Mono County, California, and flows in an easterly direction into Fish Lake Valley, Esmeralda County, Nevada.

March 8, 1945—Petition requesting determination of relative rights filed by E. L. Cord in office of State Engineer.

March 12, 1945—Report of Investigation by State Engineer filed.

March 14, 1945—Order granting petition filed.

September 1, 1945—Order of Determination filed.

April 29, 1946—Decree filed. 195.03 acres harvest lands and 142.55 acres meadow pasture lands.

COLD CREEK SPRING

Cold Creek Spring is located in T. 23 N., R. 55 E., M. D. M., at the easterly base of the Diamond Range and flows easterly into Newark Valley. There is one claimant to this water.

January 11, 1943—Petition requesting determination of relative rights filed in office of State Engineer.

May 4, 1945—Report of investigation filed in office of State Engineer.

May 7, 1945—Order granting petition filed.

December 27, 1945—Order of Determination filed.

April 15, 1946—Decree filed. 160.6 acres harvest lands, 456.1 acres wild hay land, and 1,546.5 acres pasture.

PIUTE CREEK

Piute Creek is situated in the western part of Humboldt County on the west slope of Black Rock Desert and being within T. 39 N., R. 27 E., M. D. M. There is only one claimant.

December 20, 1929—Petition, etc.

May 5, 1930—Report on investigation, etc.

May 9, 1930—Order granting petition filed.

June 14, 1939—Supplementary Report of investigation filed.

August 15, 1945—Order of Determination filed.

March 6, 1946—Order of Judgment entered in Sixth Judicial District Court. 265.82 acres harvest and pasture lands and 164.0 acres of pasture lands.

BATTLE CREEK

Battle Creek is situated in the western part of Humboldt County, on the west slope of Black Rock Desert and being within T. 40 N., R. 27 E., M. D. M. There is only one claimant.

December 20, 1929, Petition, etc.

May 9, 1930—Order granting petition filed.

May 22, 1930—Report of Investigation, etc.

June 15, 1939—Supplementary Report of Investigation filed.

March 6, 1946—Order for Judgment entered in Sixth Judicial District Court. 133.2 acres harvest and meadow and 349.40 acres pasture lands.

BARTLETT CREEK

Bartlett Creek is situated in the western part of Humboldt County, on the west slope of Black Rock Desert and being within Township 41 and 42, North, and Ranges 27 and 28 East. There is only one claimant.

December 20, 1929—Petition filed, etc.

May 9, 1930—Order granting petition filed.

June 12, 1939—Report of Investigations filed, etc.

November 23, 1945—Order of Determination filed.

March 6, 1946—Order for Judgment entered in Sixth Judicial District Court. 156.32 acres of harvest and meadow lands and 99.7 pasture lands.

CANE SPRING CREEK

Cane Spring Creek is situated in the western part of Humboldt County, on the west slope of Black Rock Desert and being within T. 39 N., R. 27 E., M. D. M. There is only one claimant.

May 24, 1945—Petition filed, etc.

May 26, 1945—Report of Field Investigation filed, etc.

May 29, 1945—Order granting petition filed.

November 21, 1945—Order of Determination filed.

March 6, 1946—Order for Judgment entered in Sixth Judicial District Court. 25.95 acres meadow and pasture lands.

CHAPTER V

Humboldt River Distribution System—July 1 to December 31, 1944By J. A. MILLAR, *Supervising Water Commissioner***ORGANIZATION**

J. A. MILLAR, Supervising Water Commissioner.....	Entire River
ALBERT QUILL, Water Commissioner.....	Starr Valley and North Fork
ORVAL AMES, Water Commissioner.....	Lamoille and South Fork
WM. ORTON, Guard.....	Lamoille

The heavy June run-off from the Elko District continued into the month of July creating a total discharge of 35,120 acre-feet at the Palisade Gaging Station. The daily flow at this station was 1,364 c.f.s. on July 1 and reached a maximum of 1,455 c.f.s. on July 3. From this date until the end of the month, the flow gradually decreased to a flow of 97 c.f.s. This decrease in flow continued during the month of August until it dropped to the minimum flow of 4 c.f.s. This low discharge of 4 c.f.s. remained constant until September 23. From then on the flow gradually increased until there was a flow of 79 c.f.s. on the last day of the year. The high rate of flow at Palisade was reflected at the Comus Gaging Station. However, due to the return flow from the irrigated areas in the Battle Mountain District, the discharge of 37,000 acre-feet at Comus showed a material gain over the flow at Palisade for the same period. This same condition held true during the month of August. The total discharge at Comus for this period was 4,990 acre-feet, and the discharge at Palisade for the same period was 1,617 c.f.s. On September 1 there was 30 c.f.s. at Comus but by the end of the month the flow dropped to 1 c.f.s.

The same conditions prevailed on the tributary streams in Elko District, where late summer irrigation is practiced. It was not until August 10 that the commissioner was called upon to form rotation systems in the Lamoille, Starr Valley, and South Fork Districts. On September 15 all irrigation was stopped and all the water users in the above-named districts were cut to stockwatering flows. The regulation of the stockwatering streams was continued until the fall storms set in late in October.

January 1 to December 31, 1945By J. A. MILLAR, *Supervising Water Commissioner***ORGANIZATION**

J. A. MILLAR, Supervising Water Commissioner.....	Entire River
ALBERT QUILL, Water Commissioner.....	Elko
SAM KING, Water Commissioner.....	Battle Mountain
MYRON CLARK, Water Commissioner.....	Winnemucca
WM. HOLT, Hydrographer.....	Lovelock

Many heavy storms throughout the month of November and December 1944 and January and February 1945 placed a big snow cover over all the upper reaches of the Humboldt River watershed. However, due to very cold weather only 3,386 acre-feet passed the Palisade Gaging Station during the month of January. On February 2, the

discharge at this point increased from 120 c.f.s. to 381 c.f.s. and continued to gain throughout the entire month, with a total discharge of 14,119 acre-feet. From the first of March until May 15 the discharge increased from 353 c.f.s. to 3,520 c.f.s., which caused widespread flooding from Beowawe to the lower end of the Winnemucca District. The total monthly discharges for the three-month period were as follows: March, 22,059 acre-feet; April, 45,999 acre-feet; and May, 83,950 acre-feet. During the latter part of May the cold weather cut the flow from 3,520 c.f.s. down to 1,910 c.f.s. but on June 5 the flow began to increase again and reached a peak of 3,760 c.f.s. on July 11. Although there was a gradual decrease in the flow for the rest of the month, 78,360 acre-feet passed this station during June. The high water brought about flood conditions throughout most of the month of July, creating a total discharge of 36,556 acre-feet at the Palisade Gaging Station. Due to the inability to regulate the flood conditions in the Battle Mountain and Winnemucca Districts, the Water Commissioners were called upon to observe conditions only twice each week. It was not until July 20 when the flow dropped to about 900 c.f.s. that any effort could be made to stop irrigation in these two districts. Then it took another twenty days before the land was dry enough to start haying operations.

The same flooding conditions prevailed along the river bottom lands in the Elko District and it was not until the last of June that the high water began to subside. The tributary streams that flow out of the Ruby Mountains remained high all season, and with the exception of Starr and Lamoille Valleys no late summer regulation was necessary.

The Rye Patch reservoir remained full all season, and several hundred thousand acre-feet were by-passed into the Humboldt Sink. This created a critical condition in the lower Lovelock Valley due to a break in the levee between the river channel and the drainage canal. This break was eventually plugged by a timber mat and sacks filled with earth. Considerable dredging was also done at the outlet through the so-called natural dam. This combined work lowered the water surface of the Humboldt Sink and alleviated the damage to the crop lands bordering on the sink. The hydrographic work on the Humboldt River was conducted by the Geological Survey, Water Resources Branch, from October 1, 1944, to September 30, 1945. Current water measurements were made and unpublished records were submitted for the following stations:

	<i>Acre-feet</i>
South Fork at Bolton Ranch.....	73,710
South Fork at Bullion.....	195,600
North Fork Devil's Gate.....	70,890
Humboldt River, Palisade.....	588,300
Marys River above Cabin Field.....	62,830
Humboldt River, Moleen Canyon.....	510,000
Humboldt River, 12 miles east of Elko.....	311,000

During the fall months new gaging stations were installed at the following points:

- (1) Humboldt River, near Mosel.
- (2) Humboldt River, below Battle Mountain Bridge.
- (3) Rock Creek, 10 miles north of Dunphy.
- (4) Pine Creek, 1 mile south of Palisade.

About 10,000 acre-feet was released from the Willow Creek reservoir during the fall months in order to lower the water surface to a point whereby the outlet gates could be repaired.

During the season the Supervising Water Commissioner was called upon to conduct two different parties of U. S. Army Engineers over the entire Humboldt River Stream System. Reservoir sites on the North Fork, South Fork, and Marys River were visited and inspected. Damage done to hay crops as a result of continued high water was pointed out and the excessive erosion that took place along the entire length of the river was called to their attention.

After September 15 all irrigation was stopped in every district and the necessary diversion was regulated to stockwatering supply. This regulation continued until the fall storms set in early in November.

January 1 to June 30, 1946

By J. A. MILLAR, *Supervising Water Commissioner*

ORGANIZATION

J. A. MILLAR, Supervising Water Commissioner.....	Entire River
ALBERT QUILL, Water Commissioner.....	Elko
SAM KING, Water Commissioner.....	Battle Mountain and Winnemucca
JERRY WIGNAL, Hydrographer.....	Lovelock

Heavy storms that took place during the months of October, November, and December 1945 created a high rate of flow in the Humboldt River and the Rye Patch reservoir filled to its capacity by December 20. In order to supply storage space for the January and February run-off, about 60,000 acre-feet was released and allowed to run into the Humboldt Sink during the month of January.

Very little precipitation fell in the upper reaches of the Humboldt River watershed during the months of January and February, but the fall storms were of sufficient magnitude to create a heavy run-off that started early in March and caused flooding conditions on the river bottom lands in the Winnemucca, Battle Mountain, and Elko Districts throughout the spring season.

This early high rate of flow soon filled the Rye Patch and Pitt-Taylor reservoirs, and soon after March 15, 1,000 c.f.s. over and above irrigation needs was released and allowed to run into the Humboldt Sink for a period of at least 60 days, creating a waste of water to the extent of about 120,000 acre-feet. A long period of dry weather during April and most of May caused the water users on the tributary streams to start irrigation much earlier than usual. The dry hot weather also created heavy run-off on the tributary streams, and for a period of time it looked as though there would be a water shortage, but on or about May 20 it started to storm and all the watersheds were covered with a heavy fall of rain and snow which alleviated conditions in the areas effected. However, there is a possibility there will be a shortage of water the last of July and August. In spite of the flooding conditions on the river bottom lands, irrigation on lands served by ditch systems was not started until May 15. Hydrographic records were kept on these diversions.

The Lovelock hydrographer measured and made records on all the diversions in the Lovelock Valley. In addition to this work, measurements were made of the released water entering the Humboldt Sink.

The ditch riders in this area were also called upon to keep records of the amounts of water delivered to each ranch.

All the drainage canals in the lower Lovelock Valley were dredged and cleaned by the U. S. Army Engineers.

The hydrographic work on the Humboldt River was again conducted by the Geological Survey, Water Resources Branch, and covered the measurements on at least 14 gaging stations.

During the month of April, the Supervising Water Commissioner was called upon to conduct Mr. R. R. Edwards of the Army Engineers over most of the Humboldt River Stream System. All the available reservoir sites were visited and all the gaging stations operated by the Geological Survey, Water Resources Branch, were inspected.

LITTLE HUMBOLDT RIVER DISTRIBUTION SYSTEM

July 1, 1944—June 30, 1946

ORGANIZATION

E. H. GREEN.....Water Commissioner
 WM. HOLTAssistant

During the water distribution season of 1944 the benefits to the water users of the program of improvement started in 1943 were noticeable. Although the stream flow was far below normal, it was possible to distribute the water so that the ranches with early priorities for water use were served in accordance with their decreed rights. Without these improvements, little or no water would have reached the ranches on the lower end of the stream system.

In June of 1944 two suits were filed against the State Engineer by water users on the upper reaches of the Little Humboldt River. The suits involved distribution matters and the legality of certain improvements initiated in 1943. The consequences of this litigation was that the program of stream channel improvement came to a stop as it was impossible to get assistance from any of the water users pending the outcome of the suits. In May 1945 an opinion and decision was given by the District Court in these suits. However, the issues are still unsettled, pending the entry of a decree and an appeal from the District Court's rulings.

Prior to the opening of the 1945 irrigation season which was set by the State Engineer for March 1, a controversy over distribution of water arose between the State Engineer and one of the water users. The authority of the State Engineer to distribute water on the Little Humboldt System was challenged. This controversy extended throughout the 1945 season, and as a result all attempts at orderly distribution by the State in the lower valley were successfully blocked by the water user.

The State endeavored to have its case heard before the Sixth Judicial District Court, the court whose decree the State Engineer was trying to enforce, but the court sustained the demurrer of the defendant water user, and the issues involved were never settled.

The State then petitioned the Supreme Court for a writ of certiorari for the purpose of determining whether or not the District Court had exceeded its jurisdiction in ruling on the demurrers in the manner that it did. On March 30, 1946, the Supreme Court filed its ruling on

the writ of review holding to the established rule that it, the Supreme Court, had no jurisdiction in such matters.

Since the State had exhausted all its remedies at law, there was no orderly distribution possible.

A review of all the factors relating to the distribution of irrigation water by the State Engineer shows an immediate need for the revision of our existing water laws as they apply to distribution matters. All of the conditions under which the State Engineer has attempted to distribute water on the Little Humboldt System can and do, to a greater or lesser extent, exist whenever water distribution is under the direction of the State Engineer's office.

These matters will be presented to the coming Legislature for their consideration.

PAHRANAGAT LAKE AND TRIBUTARIES

July 1, 1944—June 30, 1946

DON PERRY.....	Water Commissioner, 1944-1945
GILBERT STEWART.....	Water Commissioner, 1945
ALDEN STEWART.....	Water Commissioner, 1946

The distribution of the waters of the Pahrnagat Lake and tributaries has become a routine matter as all the water users know and accept their decreed amounts of water. The procedure followed in distribution could be well taken care of by the water users themselves, and it is hoped that the water users will soon become organized so that they can handle their own problems without the need of a commissioner. A saving of about \$1,000 a year would be made to the farmers if they become so organized.

The Alamo Irrigation Company is preparing to concrete line all their distribution ditches.

The water users on the Richardsville ditch are attempting to form an irrigation company so that they can make some much needed improvement to their irrigation systems.

The greatest need in Pahrnagat Valley is for an over-all organization that can instigate and carry through a program of channel cleaning and maintenance.

DUCKWATER CREEK DISTRIBUTION

July 1, 1944—June 30, 1946

W. E. HAWKINS.....	Water Commissioner
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Duckwater Creek is located in the northeast corner of Nye County. The Creek has as its principal source the Big Warm Spring which rises on the plateau to the north of the irrigated lowlands.

The distribution of the waters of this stream has been under the supervision of the State Engineer since 1910 when the rights of the claimants to the waters of Duckwater Creek were adjudicated in a civil action.

A program of improvement to the distribution system was started by the water users during the past few months. Considerable channel work has been done and measuring devices are being installed in all the ditches. As soon as material is more readily available, diversion structures and headgates will be installed.

The U. S. Indian Service, the largest holder of water rights on Duckwater Creek, is constructing a new control structure at the outlet of the Big Warm Spring. They are also making many substantial improvements to their ditches and diversion structures.

All the ranches on Duckwater Creek should be greatly benefited by the better conditions for handling their water.

Consideration should be given to the formation of a water user's association so that the cost of distribution can be reduced or eliminated. The stream system is so small and the water use is so well established that the water users should be able to handle their own problems without the need of a highly paid water commissioner.

CURRENT CREEK DISTRIBUTION

July 1, 1944—June 30, 1946

W. E. HAWKINS.....Water Commissioner

There was no water distribution on this stream system during the past biennium.

BAKER-LEHMAN CREEKS

July 1, 1944—June 30, 1946

DON BECK.....Water Commissioner

An adequate water supply has been available for distribution on this stream system during the past biennium.

The Baker ranch has made extensive improvements to its irrigation system. These improvements will result in a much more efficient use of water.

There is an immediate need for the reconstruction of the weir designated by the decree as being the point where the priorities for water use are set. Until such time as this weir is corrected, the water commissioner is distributing water to all those users named in the decree under the assumption that there is sufficient water to serve all priorities.

CHAPTER VI

Town Water Supplies In Nevada

A complete compilation of the domestic water supplies for the towns in Nevada has never been assembled for public reference. With this in mind, and also the thought that such material will be of interest, we are herewith setting forth this information. We are indebted to Wallace W. White, Director, Division of Public Health Engineering, State Health Department, for furnishing a great deal of this data.

Town	Name of Water Company	Type of Ownership
Alamo.....	None.....	Individual
Austin.....	Town of Austin Water System.....	Municipal
Babbitt.....	U. S. Navy.....	Federal
Battle Mountain.....	Battle Mountain Water Works.....	Municipal
Beatty.....	Revert Brothers.....	Private
Boulder City.....	Bureau of Reclamation.....	Government
Bunkerville.....	Bunkerville Domestic Water Supply Association.....	Municipal
Caliente.....	Caliente Public Utilities.....	Municipal
Carlin.....	Carlin Water System.....	Municipal
Carson City.....	Carson Water Company.....	Private
Dayton.....	Dayton Water Works.....	Private
Elko.....	City of Elko Water Co.....	Municipal
Ely.....	Ely Water Company.....	Private
Eureka.....	Eureka Water Works.....	Private
Fallon.....	City of Fallon Water Co.....	Municipal
Fernley.....	Truckee-Carson Irrig. Co.....	Irr. District
Gabbs.....	Defense Plant Corporation.....	Government
Gardnerville.....	Gardnerville Town Water Co.....	Municipal
Gerlach.....	Western Pacific Railroad Co.....	Railroad
Goldfield.....	Goldfield Water System.....	Municipal
Gold Point.....	Ohio Mines Corp. and Nevada Gold Inc.....	Private
Hawthorne.....	Hawthorne Water System.....	Municipal
Henderson.....	War Assets Corporation.....	Government
Imlay.....	Central Pacific Railway.....	Railroad
Kimberly.....	Consolidated Copper Co.....	Private
Las Vegas.....	Las Vegas Land & Water Co.....	Railroad
Lovelock.....	City of Lovelock Water System.....	Municipal
Luning.....	Town of Luning Water Co.....	Municipal
Lamoille.....	Lamoille Water Company.....	Private
Manhattan.....	Manhattan Water Co.....	Private
Mason.....	Mason Water, Light & Power Co.....	Private
McDermitt.....	None.....	Individual
McGill.....	Kennecott Copper Corp.....	Private
Mesquite.....	Mesquite Domestic Water Supply Association.....	Municipal
Mina.....	Town of Mina.....	Municipal
Minden.....	Minden Water Co.....	Municipal
Montello.....	Central Pacific Railway.....	Railroad
Mountain City.....	None.....	Individual
Nixon.....	Indian Service.....	Government
North Las Vegas.....	North Las Vegas Water Co.....	Municipal
Panaca.....	Panaca Farmstead Water Assn.....	Municipal
Pioche.....	Pioche Water Co.....	Private
Pittman.....	None.....	Individual

Town	Name of Water Company	Type of Ownership
Reiptown.....	Water User's Association.....	Mutual
Reno-Sparks.....	Sierra Pacific Power Co.....	Private
Ruth.....	Kennecott Copper Corp.....	Private
Round Mountain.....	Shoshone Water Company.....	Private
Schurz.....	Indian Service.....	Government
Silver Peak.....	None.....	Individual
Stewart.....	Indian Service.....	Government
Tonopah.....	Water Company of Tonopah.....	Private
Virginia City.....	The Virginia City Water Co.....	Private
Wadsworth.....	Wadsworth Water System.....	Municipal
Wells.....	Wells Municipal Water Works.....	Municipal
Whitney.....	Whitney Water Company.....	Private
Winnemucca.....	Western States Utilities Co.....	Private
Yerington.....	City of Yerington Water Works.....	Municipal

ALAMO

Domestic water for Alamo is obtained from privately owned wells. Plans are now being prepared for a mutual water system.

AUSTIN

The water supply of Austin is obtained from springs and tunnel developments in Pony and Marshall Canyons. The Pony Canyon source is located about $\frac{3}{4}$ mile easterly from Austin and the Marshall Canyon source about $1\frac{1}{2}$ miles southeasterly from Austin. Water is conveyed through pipelines by gravity to Austin.

BABBITT

(See Hawthorne)

BATTLE MOUNTAIN

Battle Mountain obtains its water from a 725 ft. deep artesian well. The outside casing is 12" slip-joint and goes down 47 ft. Within that is a 10" screw-joint casing which goes down 200 ft. Within this and terminating 180 ft. from the top and extending down to the full depth of the well (725') is a 6" screw-joint. A blue clay near the bottom is the main seal over the artesian flow. This arrangement was made to provide for a deep-well pump if necessary. A 4" suction pipe is sealed into the 10" casing and extends 22 ft. down. A small concreted pit is provided, the floor of which was poured tightly about the casing and suction pipe so there can be no possibility of surface water contamination. The sides of the pit walls extend only a few inches above the ground. The pit is provided with a rough wooden cover.

The water is drawn from the well by a centrifugal pump and elevated 125 ft. to a completely covered steel tank from which it is distributed to the town.

BEATTY

The water supply for Beatty is from large springs at the old Beatty ranch located about 1 mile northeasterly from the town. A new 8" pipe line brings the water to the edge of town. It is then conveyed through 6" pipe lines through the townsite. The flow from the springs is diverted directly into the town distribution system. The water system is owned and operated by the Revert Bros.

In 1903 a portion of the water from these springs was conveyed to Rhyolite by means of a pipe line and two pumping stations. The pipe line beyond Beatty has long since been abandoned.

BOULDER CITY

Water is taken from the intake towers on Lake Mead by inlets 250 feet off of the lake bottom through penstocks to the power house, where it is pumped $7\frac{1}{2}$ miles in two stages to the treatment plant in Boulder City. Water is pumped by means of 4 stage, horizontal, Byron-Jackson pumps through an 8-inch pipe to the No. 1 station; thence through 1,000 feet of 10-inch and 3 miles of 12-inch pipe to the No. 2 station; thence through a 10-inch pipe to the treatment plant.

At the plant, primary and secondary settling is provided in Dorr clarifiers with coagulators, ash, lime, calgom, and activated carbon being the chemicals applied in two International Filter dry feeders.

Plant is operated intermittently; one 8-hour shift per day, 5 days a week, and on two days, three 8-hour shifts per week; average treatment rate 600 to 800 g. p. m., the capacity being 1,175 g. p. m.

Water is metered, daily use is 262 gallons in summer and 100 gallons in winter per day per person. Records are complete and well kept. A well-equipped laboratory is at the plant, tests are consistently good. One half to two million gallons of water are treated for domestic use daily.

BUNKERVILLE-MESQUITE

The water for both communities was first supplied through the development of one source, the Cabin-Mica Notch springs area approximately 10 miles from points of use. Since the development and expansion of the market milk production program in both communities, it became clearly evident that additional supplies of domestic and culinary water were seriously needed. Consequently, the Bunkerville Community sold all rights to their portion of the joint supply and installation to the Mesquite Community. Bunkerville then proceeded with the development of a supply at what is termed the "Duds" and the "Seeps" drainage area at the opposite (west) end of the Virgin Mountain Range. Each community is now fairly well supplied with excellent quality water. Further expansion of use will, however, necessitate storage of early spring run off. Plans are under way whereby all available water from the respective sources will be held under storage.

This domestic-culinary water is supplied each community under the direction of a community water committee who supervises all phases of work connected with the supply. Monthly payments are made by users under three classes of use: Family homes, schools, and commercialized interests. There are 164 users in the two communities.

Supervisory and managerial committees are:

For the Bunkerville Domestic Water Supply Association: Parley Hunt, Chairman; Read Leavitt, Secretary-Treasurer; Washington Leavitt, Merl Wittwer, Charles Leavitt, and John Leavitt.

For the Mesquite Domestic Water Supply Association: Max Hafen, Chairman; Alfred Frehner, Director and Secretary-Treasurer; Leonard Reber, John Jensen, and Orval Abbott.

CALIENTE

At the present time Caliente is being furnished with water from their Well No. 3 located at the lower edge of town in Block 40. This well is 180' deep cased with 12" casing, the bottom 40 feet being perforated. The well is equipped with an eight stage Pomona pump. Well No. 2 located opposite the U. P. roundhouse is 180' deep. The pump in this well fouled and at the present time is not in operation. There are three shallow wells near Well No. 2 from 40 to 60 ft. in depth. Water is pumped by means of a Gould triplex pump. These shallow wells are used only in emergencies.

Water is pumped into two 50,000 gallon wood stave tanks having an elevation of about 130 feet above town.

Another well is located on the Alice Culverwell Dixon park and will soon be equipped to operate.

A new well has just been completed by the Caliente Public Utilities. This well is 12" in diameter and 130 feet deep and is located in block 45 of the North Side Addition. A three-day test on this well indicated a drawdown of 30 feet at 700 g.p.m. The water has a temperature of 104 degrees.

Caliente-R. R. Supply. For culinary purposes; 2 wells located within $\frac{1}{4}$ mile of each other on Union Pacific property in yards.

Supply A. Main Domestic Supply. Drilled well 470 ft. deep, suction pipe 5" casing 13" (heavy) casing bolted to pump frame and well sealed. Housed in wood frame building with gravel floor. Casing extends 6" above floor and passes through several water-bearing strata with pipe perforated at each strata. First perforations 70' deep. Static level 30' below surface. Pumped by means of airlift.

Supply B. Auxiliary Domestic Supply. Located just north of power house in a concrete sump 4' x 6' x 9' deep with concrete floor and covered with heavy iron water-proof top. A drilled well about 400' deep with 13" casing bolted to flanged cover about 6" above the floor, is located in this sump. Discharge line is 6" and the pump is powered by a Worthington steam pump located in the adjoining power house. The static water level is 20 ft. below surface of sump which drains to sewer.

Supply C. Primarily for engines but connected for domestic use if needed. Drilled well same depth. Strata, etc., as Supply A, housed in wooden building with concrete floor, 3" curb and casing bolted tight to Price pump frame. A Fairbanks-Morse 20 hp. induction motor is located directly over well. This well is located midway between the two domestic supplies. The static water level is 20 feet below surface. Water from both wells for domestic supply is pumped to a covered 60,000 gallon elevated steel storage tank from which it is drawn as needed. This supply is softened by lime-soda-sodium aluminate and filtered through excelsior in a vertical steel tank.

CARLIN

A. Springs 1 mile west of Carlin along U S 40, flow 250 g.p.m. Flow is from a 40' x 50' collecting basin with an average 4' depth to a 5' x 6' r.w. box 6' out in the water and 4' deep, thence through an 8" c.i. pipe to the power house where it is zeolite treated, chlorinated and

pumped by Fairbanks-Morse steam pump to a 300,000 gal. concrete storage tank. Inlet pipe is protected by $\frac{1}{4}$ " mesh screen. A deep drainage ditch surrounds the padlocked 8' high board fence protecting the spring area. Soil is sandy loam.

B. A 22' deep, 14" diameter, wood lined, dug well with 5' of standing water is located at the S. P. roundhouse. The well is fully housed. It is dug in sandy soil with 10" of water bearing gravels. Water is pumped through a 6" w.i. pipe to a zeolite tank. Following the zeolite treatment tank, this water is chlorinated then steam-pumped to the storage tank. Well cribbing in good condition and housing has been repaired.

Fairbanks-Morse steam pumps are used and Wallace and Tiernan chlorinator. 250,000 gallons of water is treated daily with backwash of zeolite filters twice a day.

An electrically operated centrifugal pump takes water from the discharge side of the pump, supplying water under constant pressure to the chlorinator.

CARSON CITY

Water for this community is from three sources: the city supply, Kings Canyon; the State supply, from Vesie Canyon and Marlette Lake, and the Virginia and Truckee supply, from Ash Canyon. These waters are from springs and creeks west of town. Water is collected in earthen reservoirs (State is concrete), thence by gravity to town. All reservoirs are fenced and the watershed reasonably free of trespass, although chlorination should be applied to each system for minimum protection. The use of water from all sources varies from 0.4 to 0.6 m.g.d. During dry seasons there is a water shortage.

State Supply. The State supply comes from two sources, Vesie Canyon and Marlette Lake. Water is collected in a concrete sand trap and then flows through a 6" iron pipe $1\frac{1}{2}$ miles to a 600,000 gallon two-compartment concrete reservoir. The compartments are filled separately, thereby allowing cleaning without closing off the water. From this reservoir it flows through a 6" pipe to the State buildings. The reservoir is entirely fenced and the watershed is controlled by a State caretaker.

City Supply. This supply consists of springs in Ash Canyon and Kings Canyon, and the Quill spring and Premier Mine spring in Taylor Flat. Approximately one mile of 6" iron pipe conveys the water from Kings and Ash Canyons to a 1,000,000 gallon earthen reservoir lined with loose rock. The Quill spring and Premier Mine supplies are also conveyed by 6" iron pipe for approximately 300 ft. and there it is connected to the Kings Canyon line. There are two open boxes along the Premier Mine line. From this reservoir it flows to a 250,000 gal. earthen reservoir, lined with loose rock, and thence through a 12" line to town. This small reservoir is used also as a means of supply when the large one is being cleaned. On inspection it was found that the watershed in Kings and Ash Canyons and Quill spring had been used as a stock range. This possibly explains the reason for the confirmed tests. Recommendations were made to keep stock off the watershed, and seal the open boxes. Both reservoirs are fenced and about three-fourths of the watershed is controlled by the water company.

Virginia and Truckee R. R. Supply. Supply consists of a spring

three miles west of town in Ash Canyon. Water is collected in a wood sand trap and then flows through 5 in. steel pipe $\frac{1}{2}$ mile to a 1,000,000 gallon earthen reservoir lined with loose rock. From this reservoir it flows through a 4 in. line to town. There is a small earthen reservoir which is used while the large reservoir is being cleaned. Both reservoirs are fenced and the watershed is partly controlled by the railroad company and the town of Carson City. This supply is subjected to contamination by grazing on the watershed.

DAYTON

Water is obtained from the Carson River through the Rose ditch. A 4" pipe line conveys water from said ditch to a small reservoir.

ELKO

There are four sources of supply in this system.

A. *Kittridge Canyon.* A number of springs in Kittridge Canyon are piped from approximately 6 miles northeast of Elko to two reservoirs at northeast edge of town. Water at the springs has been developed by 8 tunnels 100' to 300' in length penetrating a conglomerate formation. These adits are all padlocked. Water is collected in a central, concrete, metal covered, locked, junction box and conveyed 6 miles through a 6" cast iron pipe to a 29,300 cu. ft. (No. 1) concrete reservoir. A stand-by line leads from this reservoir to the distribution mains and is used in case of fire and when cleaning. The overflow from here flows by gravity to a 74,200 cu. ft. (No. 2) concrete lined reservoir. This reservoir is connected to distribution mains and also receives the surplus from the pumps on Wells No. 10, and No. 12, not used in the mains. Both reservoirs are enclosed by 8' board fences with padlocked gates. The reservoirs are drained and cleaned manually twice yearly. This supply is not being obtained at present. A new pipe line is partly laid and will probably be completed this summer at which time Kittridge Canyon water will again be utilized.

B. This supply is from well No. 10 and a new well, No. 12; all pumping direct to the mains with storage of surplus in reservoir No. 2. These are turned on as consumption increases to more than can be supplied by Kittridge Canyon springs (200,000 g.p.d.) Peak consumption is in July, 2 m.g.p.d.

Well No. 10. Located east of town along U S 40. This is a gravel envelope well, 397' deep, cased with 120' of 14" and balance 12" casing. Peerless deep-well pump with pump bowls to 120' depth and 60 hp. electrical motor is used delivering 550 g.p.m.

Well No. 11. Located east of town along U S 40, about 400' east of well No. 10. This well was drilled to 278' in 1936 and deepened to 403' in 1938. 25 hp. Byron-Jackson *electrically* driven pump.

Well No. 12. Located east of Elko along U S 40, and near Highway maintenance station. Drilled January-March 1937. Put in operation August 1937. This well is 570' deep, cased with 42' of 15" unperforated 10 ga. double stovepipe casing: 384' of 12" 10 ga. double stovepipe casing perforated with $\frac{1}{8}$ " x 2" slots at 50' x 55' and 57' x 74' depths, 144' of 10" standard casing with welded joints, and 8 rows of $\frac{1}{8}$ " x 6" perforations. A 75 h.p. electrically driven Peerless pump is reported to pump about 500 g.p.m.

Well No. 13. Located east of town along U S 40, about 350' east of

well No. 12. Well drilled in April 1945 to a depth of 495', but had not been put into production as of November 14, 1945; however, on that date the well had a test pump mounted on it and is probably under production at present.

Well No. 14. Located east of town along U. S. Highway No. 40 about 300' east of well No. 11. Well was drilled in January 1942 to a depth of 488'. Well has a 100-horsepower electrically driven Peerless pump which yields 600 g.p.m. The above listed wells are pumped alternately. Wells Nos. 9, 5, and 1 are no longer used.

All deep wells pass through an impervious clay strata about 75' deep to a water-bearing gravel. They are housed in good brick buildings with cement floors. Tops of casings are sealed.

ELY

A number of springs in Murray Canyon, 1½ miles south of Ely and an auxiliary supply in the bottom lands north of East Ely comprise the water supply of the Ely Water Company.

Supply A—Springs in Murray Canyon. The springs are grouped on land owned by the company and the entire spring area is enclosed and covered with concrete, the water being conveyed to the junction reservoir in steel pipe. Some of the springs occur in two open ditches near the south corner of the area, drainage from which is into the junction reservoir. These ditches are enclosed in 8-strand 6' barbwire fences until they enter the area in which the junction reservoir is located. There are certain springs in the floor of this reservoir. The junction reservoir is of irregular shape, of approximately 90,000-gallon capacity with concrete side walls on all but two of the irregular sides, fenced completely around on an average of 6' from the reservoir with an 8' board fence with the entrance gate locked. The outlet works from this reservoir into the distribution system, consisting of a short canal in which are located 3 sizes of screens varying from ¾" to ⅛" and a connecting steel pipe to a surge chamber in which is located a screen of approximately sixteenth mesh. Flow to the distribution system is through 12" and 16" steel and c.i. pipe down Murray Street. The original supply through an earth ditch, unprotected save for a 3-strand barbwire fence leading to a 75,000-gallon concrete-lined reservoir on the hill just out of town is no longer used, though diverted through this ditch to the reservoir for use in the power house. At the present time this supply is by-passed from the power house to waste in the drainage ditch passing through town but is available for fire protection, a cross-connection being provided through the tailrace of the power house. The reservoir in this supply is fenced with an 8' board fence and locked gate. Wood stave pipe which formed the original outlet from this reservoir to the distribution system has been abandoned.

The auxiliary supply located on the bottom lands north of East Ely is a spring which has been developed into a kind of a well with sides only lined with concrete, forming a reservoir of approximately 355,000-gallon capacity and from which it is possible, when needed, to pump through a 3" line into the mains at East Ely. This well has been developed through gravel and blue clay, into an under-lying water-bearing gravel strata. The reservoir is fenced with a woven wire

fence, approximately 6' away from the edge of the concrete lining and except, as hereinafter noted, is fairly free from contaminating surroundings. The pump house is located at the east end of the reservoir. An electric-driven pump located in this pit pumps the water into the main approximately 1' above the floor of the reservoir. This was used twice in 1940.

EUREKA

The water supply is from fifteen springs located about one-half mile southerly from town. The original water company known as the Eureka Water Works was started in 1869 when about \$100,000 was spent in developing water and constructing water mains and reservoirs. Later the Ruby Hill Water Company was taken over by the Eureka Water Works. The nine springs furnishing water to the original company were Summit, Prospect, Silver, Sunberg, Morgan, Lani, Big, Deep, and Fred Tunnel. The springs furnishing water to the Ruby Hill Water Company were South, Middle, East, Hardrock, Gillen, and Clark System. All of the springs were developed by tunnels. There are some thirty miles of pipe line in the system and six storage tanks and reservoirs. The company is owned by A. C. Florio and managed by Mel Fletcher.

FALLON

Two 330' drilled wells equipped with turbine pumps are located about a mile northeast of town. Well No. 1 has its pump column sealed to the casing with three layers of painted canvas. This probably is not a perfect seal. The sump of this well is drained into another deeper sump outside the pump house, which in turn is drained by an automatic pump. This combination is not fool-proof as in case of pump damage or sudden flood there is a possibility of well contamination. Well No. 2 is sealed properly and is drained by gravity. It is said that well No. 1 provides the best tasting water and that No. 2 has a very slight sulphur taste. The flow of these wells is pumped about a mile and a quarter to a million gallon concrete reservoir. A part of the pipe line which passes under an old city dump is of welded steel pipe. The reservoir is in a fairly inaccessible location on Rattlesnake Hill and is completely covered with galvanized iron and kept locked. There was no algae in the water at the time of inspection and only a film of dust and insects on the surface. Some water is still stored in an old 440,000-gallon redwood reservoir nearby, which supplies the Indian Village. Very few private wells are in use in Fallon, as the shallow well water there is highly mineralized.

A new well drilled in 1942 on North Main B Street now supplies most of the town needs. This is one of the finest water supplies in Nevada. The well is 507' deep with a 22" cut-off casing to 444', and with 500' of 14" open-end pipe with 40' of perforations on the bottom end. Static water level is 33' with a 6' drawdown at 1,250 g.p.m. The supply from this well is pumped direct into the distribution system.

FERNLEY

In 1920 pipe lines were installed to convey domestic water from the Truckee-Carson Canal to the farms under the Truckee-Carson Irrigation District. When the town of Fernley came into existence the town was served from these same pipe lines. In about 1940 the Truckee-Carson Irrigation District installed a 12" pipe line $1\frac{1}{2}$ miles long to

convey water from the canal to Fernley. The water is of very poor quality.

GABBS

Water furnished by Defense Plant Corporation from an 8" drilled well 285 feet deep equipped with pump and electric motor and pumped through 5,770 feet of 6" pipe to storage tanks, then distributed through a system of 4" pipe lines to houses and camp.

GARDNERVILLE

The Gardnerville water supply is provided by 2 wells located at the eastern edge of town. Well No. 1, the chief source, located in a cow pasture about 75' from the caretaker's residence, is drilled 230' deep, has a 12" water-tight casing constructed of heavy gauge sheet iron extending down the first 50'. A 10" perforated casing extends the remaining 180'. The casing extends about 3" above the concrete floor of the pump house which is almost flush with the surrounding ground. Upon this concrete floor rests a turbine deep-well pump. There is some doubt as to how the pump is sealed to the casing or as to how well it is sealed, although the caretaker states that it is sealed. An 8" suction line extends 60' into the well and is provided with a 5' screen. The pump runs almost continuously, discharging water direct to the mains and the surplus into two 60,000 gal. steel pressure tanks located in the basement of the caretaker's house. The well and pump are housed in a brick building that is well roofed, but the door is not kept locked.

Well No. 2, the reserve source, is located in the 3' deep basement of the caretaker's residence. It is drilled 160' deep, and has a 4" maleable iron casing extending 4" above the concrete floor of the basement and is not sealed against surface water contamination which will stand on the basement floor when the outside pasture is irrigated. Water is pumped by a gasoline driven suction pump and discharges directly into two 60,000 gal. steel pressure tanks and then into the mains.

The water supply is municipally owned and the water is untreated.

GERLACH

Water for Gerlach is furnished by the Western Pacific Railroad Company from Garden Springs located about 10½ miles in a north-westerly direction from Gerlach and from Granite Springs located about 7½ miles northwesterly from Gerlach. From Garden Springs water is conveyed through 2,190 feet of 4" pipe and 35,605 feet of 6" pipe where junction is made with the 14,400 foot pipe-line from Granite Springs. Thence the water is conveyed through 35,853 feet of 8" pipe and 8,772 feet of 6" pipe-line to two sixty-thousand gallon tanks in Gerlach. Thence the water is distributed through a system of pipe-lines to places of use in Gerlach.

GOLCONDA

Golconda is served with water mainly through small privately owned wells. The Southern Pacific station and yards obtain water from a spring located about six miles from town. The Western Pacific obtains water from a shallow dug well. Water is also piped into the hotel from the Golconda warm springs located about one-half mile from town.

GOLDFIELD

The water supply at Goldfield is now coming from springs and wells immediately west of town. Considerable improvement has been made in the system and the supply can be considered reasonably safe. Rabbit Springs, southwest of town, includes one spring, a 150 ft. tunnel with a wooden door, concrete collecting dam and a wire fence over the entire area. This spring supplies approximately 3,000 gallons per day by gravity to town. In the same area there is a rock-cribbed, metal-covered 90 ft. deep well, equipped with a Crane deep-well, cylinder pump, supplying 4,000 gallons per day.

The Clark well is along the highway southwest of town, is drilled, and cased with 6" screw joint pipe for 160 ft. The static water level is 75 ft. There is a rock pit with metal cover and the area is fenced. Equipment consists of a Crane pump, float operated switch. This unit operates continually, supplying 4,000 gallons per day.

The Fayhen well is a dug well, rock-cribbed with a metal cover. The well is 58 ft. deep with a static water level of 28 ft. The usual Crane pump unit is used, furnishing 7,000 gallons per day.

The Dalstrom well is on the edge of town, several hundred feet east of the Fayhen well, has the same Crane equipment and is dug 54 ft. deep with a static water level of 12 ft. and supplies 7,000 gallons per day.

Water from wells and the spring is conveyed to two covered tanks, one of these, used for fire protection, has a capacity of 84,000 gallons; the other 72,000 gallons. The system was completed in 1937 when the Lida pipe line froze and collapsed.

GOLDPOINT

The town of Goldpoint obtains its water supply from two privately owned mining companies. Water is furnished by the Ohio Mines Corporation from a 55 ft. well located about 9½ miles in a southeasterly direction from Goldpoint. Water is pumped from said well through 10½ miles of 4" pipe line to a small tank, thence through pipe lines to mill and camp.

The Nevada Gold Incorporated pipe water from a spring located on the south slope of Mt. McGruder about six miles southwest from town. Both companies provide the residents with all water necessary for domestic purposes without charge.

GOODSPRINGS

Water supply is from privately owned dug wells. The wells are all shallow and the water has high chemical content. The Yellow Pine Mining Company has its own well for company houses.

HAWTHORNE

U. S. Naval Supply. The source of water supply is two reservoirs, one located in Cat Creek canyon and the other in an off-stream reservoir on Rose Creek. The Rose Creek reservoir dam is an earth-fill structure with gunited fill. Capacity of reservoir is 40 million gallons. The Cat Creek reservoir dam is a concrete arch dam 100 feet high with crest length of about 250 feet. Capacity is about 50 million gallons.

Water from Squaw Creek canyon is diverted into the system which is also supplemented by water from deep wells and elevated storage. The deep well supplies are mineralized with two of the wells furnishing hot water.

Hawthorne. This system was instituted in 1929 with the expenditure of \$90,000. The water is from Corey Canyon. A road is maintained in the canyon by the Navy, following the stream draining the watershed, which, during the war, has been a restricted area. Water is first picked up by a 4" pipe line at Eagle's Nest nine miles from Hawthorne.

In this line it is carried two miles down stream and discharged into the canyon. Water is again picked up by a concrete catch basin three miles below Eagle's Nest and conducted through a 4" steel pipe line to a dam in the lower end of Corey Canyon. The dam, built in 1939, is a concrete core, earthfill structure in the canyon, having a capacity of approximately 2 million gallons. The outlet from this dam is a 6" welded steel pipe, reduced immediately below the dam to 4" welded and wrapped steel pipe which makes up the 4-mile line from the dam to the town reservoir. This line is being replaced by 5, 6 and 7-inch pipe, as it has not the needed capacity and is in a badly corroded condition.

The town reservoir, located a mile south and 137 feet above the southern boundary of the town, is of underground, concrete construction with a capacity of 240,000 gallons. It is divided into two compartments to facilitate cleaning and repair.

In November 1945, the old 7" main from the reservoir to town was replaced by a 10", 8-gauge welded and tarred pipeline, and a manifold of the same size and material was laid across the southern end of the town. This is connected to one 7" main and several four inch mains laid in the alleys, lengthwise of the town.

In 1943 a deep well was drilled at the southwest corner of the town and equipped with an electrically driven Lane-Bowler deep-well centrifugal pump with a free capacity of 480 g.p.m. This pump is discharged into the 10-inch main and is used to supplement the natural water supply during shortage in the summer months. This installation was made under the F. W. A. grant.

The average metered consumption of water in Hawthorne in 1945 was approximately 6.4 million gallons per month. This does not include institutions on a flat rate, such as the County Hospital, Courthouse, and the schools, all of which use considerable water for irrigation. In December 1945 there were 629 metered connections in the town.

The old water tunnel, located at the lower end of Corey Canyon, has just been cleaned out and put in good shape, and its 22 gallons per minute is being piped into the hospital for irrigation, conserving the Corey Canyon water for use in the system.

HENDERSON

Water is obtained from Lake Mead through about 15 miles of 40" welded steel pipe. Intake pumps consist of six Peerless deep-well turbine pumps, powered by 400 h.p. 4,150 volt General Electric motors. The booster station reservoir has a capacity of one million gallons.

Main booster pumps consist of six Byron-Jackson 2 stage, horizontal, centrifugal pumps powered by 1,250 h.p. 4,150 volt Westinghouse synchronous motors. Water is pumped to two terminal reservoirs with a combined capacity of 31,517,600 gallons. A 40-inch pipe-line discharges water from the bottom of each of the two reservoirs to the water-treatment plant with a designed capacity of twenty million gallons per day. The maximum capacity of the pipe line varies between 48 c.f.s. and 69 c.f.s. depending on the elevation of the water in Lake Mead.

This system was constructed for the purpose of furnishing water to the Basic Magnesium Plant and community.

IMLAY

Seven Springs in Prince Royal Canyon. Concrete head box with iron cover at each spring, 1½" and 3" pipe from various springs to main 6" c.i. line. Main 6" line is 9 miles long—gravity flow to town distribution system. A 2" branch line runs along main-line track from which water is available for watering coaches; surplus water flows into a 350,000 gal. elevated steel tank which, with supply from spring-fed creek in Star Creek Canyon, through 3 miles 8" c.i. and 12 miles 6" to said tank, furnishes supply for engines. All water entering storage tank is zeolite treated. The springs for the domestic supply range from 4' to 12' deep, are rocked up sides to within 2' to 4' of surface. The concrete box is then constructed on this rock wall. Outlet averages 6" from bottom of spring in each instance. The water-bearing formation is principally lime with some porphyry. System seems to be free from contamination, but is questionable because of recreational use of Star Creek.

KIMBERLY (See Ruth)

LAMOILLE

Water is piped from Lamoille Creek from a point about one-half mile above town and conveyed to homes and business houses by a distribution system. System operated by the Lamoille Water Company being a privately owned company.

LAS VEGAS

The Las Vegas water production system located on U. P. R. R. ground 17/8 miles west of the city consists of 11 artesian wells, two springs, a 2½ million gallon reservoir, and two settling basins. The production is potentially 19 million gallons per day, of which 80 percent is used by the city and the remaining 20 percent by the railroad company.

The distribution system, operated by the Las Vegas Land and Water Co., consists of 228,980 feet of distribution mains (as of December 31, 1945), in addition to 32,495 feet of transmission mains between the production field and the city. There are 5,632 service connections and all water is sold on a flat rate basis, no meters being used. Construction of an additional reservoir, settling basin and transmission main along Charleston is now underway.

LOVELOCK

Water is collected in Pole, Horse, and Wright Canyons west of Lovelock. Pole and Horse Canyon waters are collected in 4" vitrified pipe, the main supply is from Wright Canyon through 11 miles of 8" and 2 miles of 6" pipe to the intake then through 2 miles of 6" to the 2-section covered million gallon reservoir.

The most reliable source of supply is from two gravel envelope wells above Oreana, developing 400 gallon per minute each. One well is 350 ft. deep with a 40 hp. motor and pump, the other 380 ft. deep with a 50 hp. motor and pump. The wells cannot be used at the same time as transformers and switches were not installed large enough to carry more than enough current for one motor.

Storage is in a rectangular concrete tank in two sections, partly below ground and covered. There is 0.5 million gallons in each side. From here water is taken through 12" cast iron pipe to an elevated 30,000 gallon metal tank, 105 ft. high in town.

Maximum use of water is 0.5 million gallons per day, minimum 0.25 million gallons per day. Fishermen use Wright Canyon for recreation; this supply should be chlorinated.

LUNING

The Luning water system is made up of a 140-foot dug well located in the center of town just east of the S. P. R. tracks. Water is pumped by an automatic, electrically driven deep-well piston pump to a small wooden supply tank mounted on a tower over the well. From the tank the town is supplied by a distribution system of 3- and 2-inch pipes.

This water system is very much in need of overhauling and the Board of County Commissioners is considering acquiring the deep drilled well of the F. P. H. A. project at the junction of U S 95 and Nevada 23 highways, and piping the water to Luning a distance of about $\frac{3}{8}$ mile. It appears that the well will be abandoned in the very near future.

MANHATTAN

Water supply from springs located about one mile northeasterly from Manhattan. Sufficient water available to supply a population of 500 people.

MASON

Supply A. A dug well on the sidehill directly above town timbered its full depth. The well is 145' deep with normal water level 112-115 ft., depending on usage. The formations penetrated are limestone and granite with source of the water being granite crevices. A 6" Gould triplex pump, operated by a 10 hp. General Electric motor is located in the well at the 110 ft. level on a timber platform. Oil drip pans are provided, but the well is not fully protected as attendant frequently enters the well. It is well housed in a locked, frame building. Water is pumped to a 50,000 gal. redwood storage tank on the hill above the well. Flow by gravity from this tank to the mains. This source has been adequate for the town needs for some time.

Supply B. A drilled well 180' deep, 8" cased, located below town near the Walker River. Pumping equipment is Fairbanks-Morse duplex pump and 15 hp. motor in a 6 ft. concrete sump. Static head

of the water is 6" below the top of the casing. The casing is sealed with concrete. Equipment is housed in a frame building. Strata penetrated are sand and gravel. Water is pumped direct to the mains with the 50,000 gallon storage tank on the hill riding the line.

McDERMITT

The water supply is from individual privately owned wells.

McGILL

The principal source of supply is the Duck Creek Valley watershed 9 miles northeast of McGill. Water is used for generation of hydroelectric power on Bird and Berry Creeks. These waters, as well as those of Timber and Duck Creeks, flow through natural channel and riveted, slip-joint, steel pipe over gravel areas where seepage would be excessive, to the Main Duck Creek Reservoir (8,000,000 gals.). From here the water flows to McGill in the next valley through a 37" aluminum-asphalted steel siphon. Below the reservoir is a 35' deep shaft with a drift across the valley to pick up subsurface flow. This is pumped by a centrifugal pump, electrically driven motor, direct to the 37" main. An 8" riveted steel pipe carrying water from East Creek flows to a 15" riveted steel pipe from North Creek and the North Creek shaft, thence direct to the 37" main. The North Creek shaft, 5' x 9' and 100' deep with 300 ft. of collecting tunnels, is equipped with an electrically driven centrifugal pump.

At McGill, water is chlorinated with a W. & T. fully automatic, duplicate unit. About 5 pounds Cl. is used per 24 hours. The duplicate chlorinator is in need of attention. When necessary, water can be treated with sodium aluminate and filtered through three horizontal type 8' x 16'-3" Permutit filters, with a capacity of 300 gals. per minute each.

A secondary supply is developed in McGill below the main offices from a 5' x 9' x 100' shaft with 300 ft. of drift. This is the domestic supply and the result of developing an original warm spring. From the shaft, water is pumped by Byron-Jackson vertical deep-well pumps to a 6' diameter concrete sump, then picked up, chlorinated, and pumped to two covered steel tanks above the offices in the smelter yards. One tank is 65,000 gals., the other 130,000 gals., both are aluminum painted. A Wallace and Tiernan pulsating type chlorinator is used.

The entire district is of limestone.

MESQUITE

(See Bunkerville)

MINDEN

Supply consists of two wells.

Well No. 1. Beneath the pump house, is drilled 340' with 4" casing tight to the bottom, sealed on top by a flange. A 6 hp. Alpha gas engine with belt drive to a Gould triplex suction pump. A 3" suction pipe extends 30' in the 4" casing, discharge is to an 8,000 gal. steel pressure tank in the pump house. Well is properly sealed against contamination. This is used as a reserve supply.

Well No. 2. Located behind the pump house is 400' deep, gravel envelope, has 12" casing of which the lower 300' is perforated. Casing extends 12" above sump floor and is surrounded by a 2' x 2' concrete block on which is set a vertical type deep-well pump and electric motor. An 8" suction pipe extends 80' into the well, with discharge direct to mains, surplus to an 8,000 gal. steel pressure tank in the pump house. Well is sealed properly and surroundings good. Both wells are artesian.

MINA

This water supply consists of two springs in the foothills some three miles north of Mina, a drilled well below the Southern Pacific tracks, near the elevated storage tanks, and another spring about 8 miles southeast of the town. The above are described as follows:

S. P. Spring. Water in the S. P. spring is developed by a 70-foot tunnel. Water flows by gravity from a concrete collecting box in tunnel through a 2-inch welded iron pipe to the storage tank in Mina, which has a 60,000 gallon capacity. Water here is found in a stratum of clean washed gravel.

Mina Springs. These supplies are operated under the Mina Water System.

The Mina or Rastler spring is located about 3 miles northeast of town. This project was provided as a P. W. A. undertaking. The spring is located in the side of a hill some distance to the north of the S. P. spring. Originally, two drifts were run into the gravel strata. Since that time a dragline was used, opening up this gravel body in order to gain a greater flow, which, however, was not appreciably affected by the work done. At present the seepage areas are timbered in and the structure is locked. The catch basin in this tunnel is drained by a six-inch steel pipe to a locked, well-constructed concrete headbox, and from there to the town of Mina is carried by gravity through 400 feet of 6-inch and 25,100 feet of 4-inch welded and wrapped steel pipe to two 25,000 gallon enclosed redwood storage tanks located on the hillside above Mina. From the tanks there is an 8-inch welded and wrapped steel pipe line 3,150 feet long supplying the distribution system by gravity. The storage tanks are interconnected.

Spearmint Spring. In 1944 Mineral County purchased the water line of the Nevada-Massachusetts Mining Company and the water title to Spearmint Spring on Pilot Mountain east of Sodaville. The 4-inch line from the mouth of Spearmint Canyon to Sodaville was reclaimed and laid as part of the 4-inch line to Mina, being replaced by a 2-inch line to furnish residents of Sodaville with domestic water at the rate of one gallon per minute. A concrete diversion box was placed at the mouth of the canyon for that purpose. The Spearmint pipe line is 4-inch welded and wrapped steel and enters the town at its southern boundary, being connected to and valved at the town distribution main at that point. Surplus water is stored in the two redwood tanks mentioned before.

The total flow of the Rastler and Spearmint springs amounts to approximately 77 g.p.m. at present flow—35 gallons at Rastler and 42 gallons at Spearmint.

During December 1945, there were 116 metered connections in Mina.

MONTELLO

This supply is from two widely separated spring areas.

Supply A. In Montello Canyon from 11 springs $7\frac{1}{2}$ miles north of Montello. Area is sandstone. Springs are developed to bedrock, drained with 4" tile and Cl. drains to 8 concrete and 3 wood collecting boxes 4' x 4' and carried from bedrock to 2' above ground. These boxes have steel covers and padlocks. From the junction boxes water flows through $5\frac{1}{2}$ miles of 6" Madison steel pipe and 1 mile 6" Cl pipe to an elevated tank on the lower side of the roundhouse.

Supply B. From 16 springs on Browning and Killian ranches and at Cove spring. These are 16 miles south of Montello. Springs are developed to bedrock, as deep as 22 ft., 4' x 4' concrete boxed, carried well above ground. Two inch and 3" galvanized iron and 4" c.i. collecting pipe is used. From collecting box, water flows through $13\frac{1}{2}$ miles 8" c.i. and $1\frac{1}{2}$ miles 6" c. i. pipe. Limestone areas.

Flow is by gravity to 350,000 gallon elevated steel tank in Montello. Pressure is 35 pounds. Tank is biturine enameled inside. Collecting boxes are above surrounding ground, sloped, and have padlocked covers. Each spring area is fenced with 4 strands barbwire. The total is 300,000-360,000 gals. per day.

The springs cannot furnish all the water required by the 300 people and railroad. Engine use in dry season is supplemented by hauling.

MOUNTAIN CITY

Water is diverted from two springs located about one-quarter mile northeasterly from town and conveyed to a concrete tank $49\frac{1}{2}$ feet long by 9 feet wide by 5 feet deep and also to a cistern 8 feet in diameter by 14 feet deep, from where it is pumped through a pipe line to the school buildings. Water for general domestic purposes is obtained from private wells.

NIXON

A 30-foot deep, dug well, equipped with automatic electric motor and pump, and two 12,500 gal. capacity gravity storage tanks, which supplies domestic water for some residences, day school, and garage.

NORTH LAS VEGAS

Water supply obtained from six deep wells in the Las Vegas artesian basin. Water is pumped into a steel storage tank of about 141,000 gallon capacity and thence into the municipal distribution. Mains consisting of 3,500 feet of 6-inch iron pipe and 20,000 feet of 4-inch pipe.

PANACA

The Panaca Farmstead Water Association is an incorporated non-profit group. The association was incorporated in March 1945. The first officers elected by the members are as follows:

Grant Lee, President; William A. Adair, Secretary-Treasurer; Harold E. Quick, Vice President; Amos Phillips, Director; Charles Hansen, Director.

The association applied to the Farm Security Administration for a water facilities loan of \$23,000. This application was received and approved in the spring of 1945. In addition to the \$23,000 loaned by F. S. A., the individual members and the two schools, located in the

town of Panaca, contributed an additional \$8,100 toward the cost of the project.

The loan from F. S. A. is repayable within a 20-year period at 3 percent interest. The project consisted of the construction of a storage tank and distribution system to serve not less than 100 members of the association. Water from the system is to be obtained from a well previously drilled by the Soil Conservation Service.

The construction of the principal portion of the project was done under contract with the association. The prices of the contracted work was \$29,800. The construction contract was let in October 1945, and contract construction was virtually complete on January 31, 1946.

The project, as planned, will provide the members of the Association with an adequate sanitary supply of farmstead water at an estimated cost of \$2.25 per month per family.

The Farm Security Administration assisted the association to draw up construction and engineering plans and has supervised the construction of the project. This planning construction supervision is furnished to the association at no additional cost.

PIOCHE

This water supply is from a spring in the Highland Range through a 7-mile 6-in. line to eight 25,000 gal. covered tanks on the hill above town. Water pressure is 60 to 150 lbs. per sq. in. Rates are 50 cents per 1,000 gallons, with a minimum \$2 per month for a residence. The springs flowing 60 gals. per minute are fenced and the tunnels are locked.

A 570-ft. deep well below town serves as an auxiliary supply. This was drilled in 1935, used for 2 years, then with electricity from Boulder Dam replacing steam, the need for quantities of water was decreased. Casing is 8 in. standard pipe in solid rock. Water is at the 460 ft. level, pumped with an electric-powered turbine pump to the surface, then direct to the town mains by triplex plunger pump to storage. Deep well pumps are rated at 100 g.p.m. The well can supply 40 g.p.m.

Domestic water is also supplied to the combined metals reduction company at Caselton and the Federal Housing Authority houses at Caselton.

PITTMAN

The town of Pittman is served from private wells having a very poor quality of water.

REIPTOWN (See Euth)

RENO-SPARKS

The water supply for Reno and Sparks is furnished by the Sierra Pacific Power Company and is adequate for a considerable increased population. The supply is from Hunter Creek, Highland reservoir from the Truckee River, Idlewild Park reservoir from the Truckee River, a well on East Fourth Street and a well on South Virginia Street. Their No. 1 well located on East Fourth Street is 590 feet deep and equipped with a 400 hp. electric motor, with a reported maximum yield of 4,500,000 gallons per day. Well No. 2 on South Virginia Street, has a depth of 400 feet and equipped with a 300 hp.

electric motor with a reported maximum yield of 4,250,000 gallons per day. Well No. 1 is generally used in the summer months to supplement the Truckee River supply.

ROUND MOUNTAIN

The water supply is from springs located about 4 miles northeasterly from the town and is piped into Round Mountain.

RUTH

Water for Ruth is taken from springs in Ely and from Ward Mountain tunnels. Water from Murray springs in Ely is chlorinated in Ely and then pumped to the steel storage tanks at Ruth where it mixes with Ward Mountain water. A stabilizer (Nelco) is added before the water enters the two 60,000-gallon steel tanks on the hill above town. These tanks are interconnected to two small 60,000 gallon steel tanks in town. Water is filtered in three 80" and one 72" horizontal type sand-pressure filters. These units operate under 90 lbs. pressure, are back-washed daily, using approximately 100,000 gallons per day for back-washing. The use of water in Ruth is half a million gallons per day, but increases to 0.9 million gallons per day in summer. There are two 1,000,000 gallon storage tanks on the hill near the filters and two 60,000 gallon tanks in town. There is one lightening mixer, a Wallace and Tiernan gas feed chlorinator, and an ammoniator. Pumps and chemical equipment is in duplicate. From Ruth, water is taken to Kimberly and Reiptown through a 6" line to a 0.5 million gallon wood tank and 1.75 million gallon steel tank. Water is distributed in 4" lines to Kimberly. There are two supplementary 25,000 gallon and one 50,000 gallon tanks back of the offices.

SCHURZ

Dug well, 20 feet deep, cased with 24" corrugated metal casing. Equipped with automatic electric motor and pump and one 12,000-gallon capacity gravity storage tank. Supplies domestic water for 12 residences, hospital, and day school.

SILVER PEAK

The town of Silver Peak has no regular water system. Individual wells are used by the residents.

SPARKS (See Reno)

STEWART

Six-inch drilled well, 170 feet deep, cased, and equipped with 500 g.p.m. capacity Kimbal turbine pump, and 15 hp. General Electric motor, automatically controlled. One 75,000 gal. capacity, gravity storage tank. Supplies water for about 65 residences, school with 500 students, four school dormitories, employees club, two hospitals, two garages, shops, etc.

TONOPAH

Present supply is from 7 wells at Rye Patch in Ralson Valley. There were originally 20 wells, all being equipped, requiring only stringing of wire to put them in service. The area is fenced with four-strand barbwire. Water from the wells is collected in a 30,000 gal.

wood tank, from which it is taken under pressure (head in tank) to suction of a Deane Triplex pump, belt driven from a 40 hp. Westinghouse motor; thence through 10 miles of 8" steel riveted pipe to a 250,000 gal. wood covered two-compartment concrete storage reservoir 4 miles north of Tonopah. In addition to the Deane pump which operated 10-16 hrs. per day, there are two Worthington pumps, one belt driven by a 40 hp. Westinghouse electric; the other plant kept in condition to operate. Flow from the concrete reservoir is by gravity to town and to two 250,000 gallon covered steel tanks on hill south of town. These tanks are being used as a stand-by and fire protection, affording 105 pounds per sq. in. pressure compared to 75 pounds for domestic line.

The water company of Tonopah also furnished water to the Tonopah Army Air Field. From the 30,000 gallon wood tank two parallel pipe lines of 6" and 8" diameter, each 42,000' long conveyed water to the said Tonopah Army Air Field.

VIRGINIA CITY

The water supply is from Marlette Lake on the eastern slope of the Sierra Nevada range of mountains and is conveyed through the Marlette flume a distance of about four miles, thence through a tunnel about $\frac{3}{4}$ of a mile long. From said tunnel water is conveyed through the Hobart Creek flume to "the tanks" at elevation 7,116 feet. From "the tanks" water is conveyed through a high-pressure siphon pipe line about six miles long, the lowest elevation being 5,150 feet to a flume entrance at elevation 6,765 feet. Water is conveyed by gravity through five miles of flume to a reservoir, thence through flume to Virginia City. Water is also furnished to Silver City and Gold Hill.

This project was completed in 1875 at a cost of \$3,000,000. The siphon pipe line has a pressure of 900 pounds per sq. in. where it crosses the Carson City-Reno Highway.

WADSWORTH

The town of Wadsworth is furnished water from the Truckee-Carson Canal through a pipe line installed by the Truckee-Carson Irrigation District.

The town of Wadsworth has its own distribution system and pays a flat rate to the Truckee-Carson Irrigation District for the number of acre-feet of water used.

There are numerous privately owned wells ranging in depth from 50 to 100 feet that furnish excellent water.

WELLS

This supply is from a 212 ft. well located in the northwest corner of town. The floor of the pumphouse is of concrete and is slightly higher than the surrounding ground. The pump rests on some wooden pieces placed on this floor and it could not be determined for sure whether or not the pump is tightly sealed to the casing. Sealing with concrete was recommended to the pump operator.

A turbine pump delivers 450 gals. per min. to a 1,000,000 gallon concrete reservoir located on higher ground near the Western Pacific

Station northeast of town. The reservoir is adequately protected with a high board fence and is kept locked.

WHITNEY

Water is obtained from two wells about 500 feet deep located in the SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 20, T. 21 S., R. 62 E., and conveyed through 2,000 feet of 3" pipe line to a 10,000 gallon storage tank; thence through 3" mains through the town. The water system is owned and operated by the Whitney Water Company.

WINNEMUCCA

A. *Water Canyon.* A gathering system of 2" to 14" steel pipe collects water from approximately eight springs. Each spring is provided with covered wood or concrete head box. Water is collected into rock-lined reservoirs dug to bed rock of approximately one million gallon capacity located at the mouth of Water Canyon. A tight wire and barbed wire fence encloses the reservoir. The road into the water shed is fenced and a locked gate provided, excluding all but employees. A 4-mile penstock 8", 10", 12" riveted steel pipe leads to two 45' x 85' x 8' concrete reservoirs surrounded with board fence 6' high; water thence goes to distribution system. Algae in lower reservoirs is controlled by copper sulphate. Above the two lower reservoirs is located a high pressure fire reservoir of 500,000 gallon capacity, lined with concrete and surrounded with an 8' board fence. All gates were locked at time of inspection. This supply was temporarily discontinued in May.

B. *Well, Bridge and First Streets.* 140' deep 16" diameter well casing, 50' length of 18" outer casing to seal out surface water. Top effectually sealed and protected with concrete. Byron-Jackson 13 stage deep well centrifugal pump located on concrete top of well. Entire well gravel strata, static water level 40' from surface.

C. *Well, Bridge Street.* 300' North First on south side Humboldt River, 80' deep, 8" well casing from sump, rock wall around sump, top of sump covered with concrete. Gravel strata, static water level 10' from surface. Gould triplex pump located directly over sump. Well water pumped directly to distribution system or to lower reservoirs, if necessary. This supply is used only in an emergency and, it is said, has not been used for several years. Pressure on line 60-65 lbs. per sq. in. pH is 7.2.

D. This artesian well was completed in September 1937. It is located between the overpass and Western Pacific depot near the Humboldt River. It is cased solid for 525' as follows: 99'-16", 103'-12" and 28' open bore 6". This 6" open bore is through lava strata containing open water-bearing pockets. As none of the casing is perforated it is the conclusion that artesian and pumped supplies are from 497-525' lava rock strata. Artesian flow when well was brought in was 600-800 g.p.m. Present flow is 300 g.p.m. Three-day test with a 6" pump shows discharge of 1,500 g.p.m. Pump bowls are set at concrete pump foundation with 15' suction. Pumping lowered water level 10', but this immediately returned to artesian flow when pumping ceased. Water temperature 60° F. pH 7.2. Water is pumped

through an 8" main at 80 lbs. per sq. in. pressure at 800-1,000 g. p. m. Pump is a Peerless serial U4028 three stage, direct connected vertically to a General Electric 60 hp. type K1, 2,200 volt, 3 phase, 60 cycle motor operating at 1,750 rpm. The unit is mounted on a concrete foundation over a fully enclosed concrete sump with a float controlled pump unit for drainage.

YERINGTON

This water supply consists of 7 closely grouped wells of varying depths, located on the southeastern edge of town. The construction is the same on each well and the depths are 90 ft., 125 ft., (3) 150 ft., 160 ft., and 260 ft. Four wells located close to the four corners of the pump house were constructed in 1912, the remaining three are located about 100 ft. north of the pump house and were drilled in 1920. The wells are drilled, having an 8" steel casing which extends approximately 2 ft. above the surface of the ground. The tops of the casings are capped with galvanized tin caps which are slipped over the top of them. The suction pipes penetrate the casing about 6 ft. below the top, and extend from 30 to 60 ft. into the wells. The seven wells are connected together to one main. A 4" Kimball-Krough centrifugal pump is used to pump the water. The water is discharged directly into the mains, and the surplus into a 75,000 gal. elevated steel tank. This tank is well covered by a peaked roof. Wells are also connected up to an emergency gas driven plunger pump. Point of entrance of suction pipes into casings, and connection of same to pump, are properly sealed with concrete, thus affording adequate protection from external contamination.

In 1940 the city of Yerington constructed a new well to augment the present supply. This well is located near the center of town. It is a 380 ft. drilled well and cased the entire depth with a 12" wrought iron casing. It is equipped with a Pomona deep well centrifugal pump taking the water through 60 ft. of 8" water column, and pumping it directly into the mains. The flow is approximately 1,200 gallons per minute. The well, pump and other equipment is adequately protected from any surface drainage or other contamination.

CHAPTER VII

Nevada Ground Water Program

By HUGH A. SHAMBERGER

Adequate long-range planning for the development of the State's water resources in order that these resources may be properly safeguarded and brought to high beneficial use should require our immediate consideration and best thought. Especially is this true if we are to develop the latent agricultural resources of our State and keep pace with such development elsewhere.

Nevada is the most arid State in the Nation, the average annual precipitation is about 9.6 inches, of which more than half falls in the four months from December to March, and over three-fourths in the seven months from November to May. The limiting factor in the development of the agricultural area in Nevada is WATER. We have thousands of acres of good land that could raise fine crops if water were available in proper quantity. In other words, water, not land, sets the limits.

SURFACE AND GROUND WATER

The source of our ground water is the same as our surface water, both being a part of the earth's endless and complex water cycle, through which water moves between the sea, the skies, and the land. The three steps of this cycle are as follows:

1. Water enters the atmosphere by means of evaporation from open bodies of water, such as oceans, lakes, and rivers, also from land when the moisture in the soil reaches within a few feet of the land surface. Water is also drawn from the ground and enters the atmosphere by transpiration, that is, by plants, trees, and all vegetation.

2. Precipitation in the form of rain and snow. In this cycle, the air masses laden with moisture sometimes travel long distances before cool air currents are encountered which cause the moisture to condense and fall as rain or snow.

3. After the precipitated water comes in contact with the ground it follows a downward course by various routes. Some of the water runs off on the surface to form creeks, rivers and lakes and some is evaporated. An appreciable quantity sinks into the ground. A certain part of this water, as it sinks into the ground, is retained in the soil and held there until withdrawn by plant life. The remainder of the water moves downward to underground aquifers (strata of permeable soil or rock), into the zone of saturation. The water moving through these underground aquifers, is called GROUND WATER, and the top of the zone of saturation is known as the water table.

Thus, the only difference between surface water and ground water is that in the former, the water flows on the surface and in the latter, the water flows underground.

USE OF GROUND WATER

According to Government figures in 1920, in the 17 Western States, water was pumped for irrigation from 34,790 wells. By 1930, the number of irrigation wells had increased to over 58,000. The 1940



First Metal Parshall Flume installed in Nevada, Manse Ranch, Pahrump Valley, Nye County, 1946.

figures indicate the total number of irrigation wells as being in excess of 79,000.¹

This increase has been and is being stimulated by a number of forces in addition to the natural tendency for developing new lands. These forces may be listed for Nevada as follows:

1. Improvement of pumping equipment. The development of effective deep-well turbines and other types of pumps has made possible the economical pumping of water from depths heretofore thought impossible.

2. More efficient and dependable power units, such as small Diesel and semi-Diesel motors. In southern Nevada, cheap Boulder Dam power has opened up new pumping projects in the Panaca and Pahranaagat Valleys.

3. The drought of the 1930's stimulated ground-water development. The lesson learned then was that a dependable supplemental water source was good insurance against crop failures.

4. The surface waters of Nevada have, with the exception of upstream storage, been almost fully appropriated.

5. Incentive to farm in areas where there are no surface waters but where underground water is available.

In its natural state, before wells extract a part of the supply, ground water in an area or basin is usually in natural balance. This means that the outflow from springs and seeps together with losses by evaporation and transpiration, is equal to the inflow into the aquifer by means of snow and rain falling on the recharge areas. Development by means of wells consists of diverting the flow from the original or natural outlet into another which offers less resistance to the flow of water. Pumping is equivalent to providing a new and better outlet with a consequent freer flow of the water to the pump than to the outlet.

Hence, when wells are drilled into the water table and water pumped therefrom, the natural balance is upset and readjustments must take place. The water table is lowered and a new balance is obtained between inflow and outflow. The amount of the decline is dependent upon the amount of water pumped, and if the pumping is excessive, the water table will lower until pumping no longer is economical.

In the case of a reservoir above ground, if more water is withdrawn than is replaced by inflow, the reservoir will go dry. The underground waters may be considered as being in underground reservoirs and a failing supply is evidenced by a falling water table.

In an area where underground water development is being made, careful consideration must be given to the supply and the rate of recharge in relation to the water to be pumped. This will result in establishing a new balance, by stabilization of the water at a lower level, but yet within economic limits. If this is done, pumping can continue through the years without endangering the water supply. If it is not done and more water is pumped out than is added each year, the water table will fall below any economical lift and failure will result. Already such failures have taken place in several western States. In Nevada we are trying to profit from these examples and to avoid such failures.

¹U. S. Department of Agriculture, Miscellaneous Publication No. 504.

UNDERGROUND WATER IN NEVADA

It is known that Nevada has great underground water resources, but specific information is indefinite and inconclusive. Considerable underground development has taken place in the Las Vegas, Pahrump, Fish Lake, Pahranaagat, and Panaca Valleys, each of large area. Studies by the United States Geological Survey have indicated large volumes of underground water in the vast Big Smokey and Steptoe Valleys. Conditions for the accumulation of underground water is favorable over a large part of Nevada. The comparatively narrow, flat valleys are filled with deep, loose sediments and bordered by barren, precipitous mountains, and afford ideal conditions for the catchment of a large part of the run-off.

The State Engineer has long felt the need of a comprehensive program for a detailed study of our underground water resources. This need was also felt by our forward-looking Legislature with the following results:

1st. The passage of the 1939 Underground Water Law and subsequent amendments in 1943.

2d. The passage of legislation and the appropriation of money that made it possible to enter into a cooperative program with the United States Geological Survey for underground water studies.

ENABLING ACT

CHAP. 117—*An Act authorizing the state engineer to enter into cooperative agreements with federal and state agencies for investigation of the water resources of Nevada, and repealing acts in conflict herewith.*

[Approved March 22, 1945]

The People of the State of Nevada, represented in Senate and Assembly, do enact as follows:

SECTION 1. The state engineer, for and on behalf of the State of Nevada, with the approval of the governor, is authorized to enter into agreements with the United States geological survey; the United States soil conservation service; and any state agency, subdivision, or institution having jurisdiction in such matters, for cooperation in making stream measurements, underground water studies, snow surveys, or any investigations related to the development and use of the water resources of Nevada; *provided*, that the expenses of such investigations and surveys shall be divided between the parties upon an equitable basis.

SEC. 2. This act shall be effective immediately upon its passage and approval.

SEC. 3. An act entitled "An act to provide for the measurement of streams, the survey of reservoir sites, the determination of the irrigation possibilities and of the best method of controlling and utilizing the water resources of the State of Nevada, in cooperation with the United geological survey and the United States department of agriculture and the Nevada experiment station," approved March 16, 1901, and all other acts and parts of acts in conflict herewith, are hereby repealed.

During the same legislative session an appropriation of \$35,000 was

provided in the General Appropriation Bill for this program for the biennium period, July 1, 1945, to July 1, 1947, the money to be matched by an equal sum from the Federal Government.

STATE AND FEDERAL COOPERATION

On October 26, 1944, the State Engineer called together all of the Federal and State agencies concerned with land and water for the purpose of discussing the proposed ground water study and to obtain suggestions as to procedure. The following personnel were present:

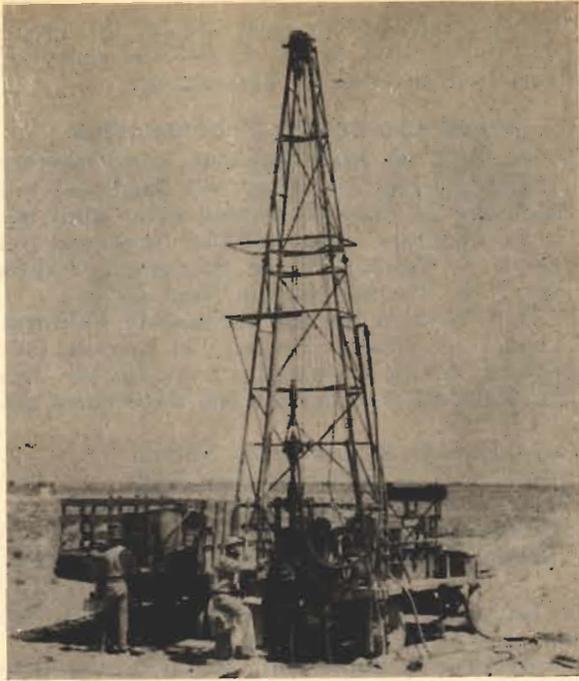
- R. W. Gerdel, U. S. Weather Bureau, Sacramento, California.
- G. L. Prucha, U. S. Weather Bureau, Reno, Nevada.
- A. S. Codd, U. S. Weather Bureau, Sacramento, California.
- Burt S. Barnes, U. S. Weather Bureau, Los Angeles, California.
- H. P. Boardman, Nevada Cooperative Snow Survey, Reno, Nevada.
- J. E. Church, Meteorologist, Agricultural Experiment Station, Reno, Nevada.
- George Maxey, U. S. G. S., Las Vegas, Nevada.
- P. E. Dennis, U. S. G. S., Salt Lake City, Utah.
- H. V. Peterson, U. S. G. S., Los Angeles, California.
- Ralph Wooly, Senior Engineer, U. S. G. S., Salt Lake City, Utah.
- Robert J. Smart, Field Examiner, General Land Office, Salt Lake City, Utah.
- Nic Monte, Regional Grazier, U. S. Grazing Service, Reno, Nevada.
- A. E. Briggs, Forest Supervisor, Ely, Nevada.
- Fred Kennedy, Forest Supervisor, Mono-Toiyabe District, Reno, Nevada.
- Ralph Gelvin, Carson Indian Agency, Stewart, Nevada.
- Robert A. Allen, State Highway Engineer and Chairman of State Planning Board, Carson City, Nevada.
- E. W. McLeod, Surveyor General, Carson City, Nevada.
- Edmund Muth, Deputy State Engineer.
- Hugh A. Shamberger, Assistant State Engineer.
- A. M. Smith, State Engineer.
- Mr. George Hardman, State Conservationist, Mr. Cecil Creel, Director Extension Service, and Mr. E. O. Larson, Regional Director, Bureau of Reclamation were unable to be present.

All present went on record as supporting the proposed program and offered the cooperation of their agency or department in carrying out this study. The office of State Engineer is greatly indebted to the assistance rendered by the Federal and State people since the start of the cooperative program.

COOPERATIVE PROGRAM

A cooperative program and contract between the State of Nevada and the United States Geological Survey, Ground Water Division, effective July 1, 1945, has been entered into. Mr. Thomas W. Robinson, for many years associated with the U. S. Geological Survey, has been appointed District Engineer for Nevada and the work under this program will be under his immediate direction, working in direct cooperation with the office of State Engineer.

On July 1, 1944, a cooperative program was entered into with the U. S. Geological Survey, Division of Ground Water, for a study of the



State-Owned Rotary Well Rig



Artesian Well No. 434, Las Vegas Basin

Las Vegas and Pahrump Valleys. The money used was obtained by taxation of real property within the designated artesian basins pursuant to section 5 of the 1939 Underground Water Law. Mr. George Maxey, Associate Geologist of the U. S. G. S. was placed in charge and under his direction a great deal of valuable data has been obtained and completed. Upon the inauguration of the State-wide program on July 1, 1945, the Las Vegas and Pahrump investigations were included therein.

It is evident that this program will extend over a long period of time as the State is large and has many ground water basins. Then, too, when the major underground water basins have been studied and the many facts pertaining to them are known, the problem of safeguarding these waters intelligently so that use can be made of them continually through the generations is one that requires continuous study and observation.

We are, as stated, already aware of the presence of ground water in many basins and substantial development has already been carried out by private agencies in several areas. The fact that ground water is available in sufficient quantity and at depths from which pumping is economically feasible is important to know, but not so important as to know the average annual inflow to the basin and the amount of water that can be withdrawn without lowering the water table below the economical pumping lift.

The work of the U. S. Geological Survey in the cooperative program will include geological and hydrological studies of the ground water basin, drilling of test holes to determine the character and water-yielding ability of the underlying formation, observations of water level in selected wells, permeability studies of the aquifers, pumping tests of wells, surface stream measurements, geophysical studies and other studies necessary for the proper solution of ground water problems.

A Failing Rotary Drill Rig, Model 314, has been purchased from Surplus Property, Department of Commerce. This rig, capable of drilling to a depth of 1,200 feet, will be used only for drilling test and exploratory holes and in no event will it be used for commercial purposes.

INVESTIGATIONS

Las Vegas Artesian Basin—Clark County

Intensive ground water studies were started in this area on July 1, 1944. At that time a cooperative program between the United States Geological Survey, Ground Water Division, and the office of State Engineer was started. Mr. George Maxey, Associate Geologist of the U. S. Geological Survey was placed in charge of the program and was assisted by Mr. Harry Jameson, Las Vegas Artesian Well Supervisor.

In 1937 the office of State Engineer became cognizant of the fact that a study of the ground water supply there was of vital necessity. An answer to the questions as to how much water could be taken from the aquifers without endangering the supply must be determined and as the Las Vegas Valley expanded with added industry and population just how soon must a supplemental source be developed. In the succeeding years, the members of the State Engineer's office carried

on a great deal of work there, wells were located and mapped; logs of wells were obtained and under the 1939 underground water law, a program of conservation was carried on.

In 1938 with the aid of the city of Las Vegas, county of Clark, and the Las Vegas Land and Water Company, a cooperative program was set up with the Ground Water Division of the U. S. Geological Survey to make a well leakage study. Mr. Penn Livingston, engineer with the U. S. Geological Survey was assigned this job which was carried out between August 11 and September 13, 1938. The results of his studies are set forth in the Geological Survey Water Supply paper, 849-D.

In March 1945 a report written by George B. Maxey and C. H. Jameson was released. This report known as Water Resources Bulletin No. 1, and titled "Progress Report on the Ground Water Resources of the Las Vegas Artesian Basin, Nevada," is available for distribution.

Water Resources Bulletin No. 3 titled "Water Levels and Artesian Pressures in Wells in Nevada, 1924-1945" and dated April 1946, gives information on water levels and artesian pressure for most of the wells in the Las Vegas Artesian Basin as well as others in the State.

Another publication titled "Well Data for Las Vegas Valley" and listed as Water Resources Bulletin No. 4 was published during June 1946. This publication lists the available well data, including depth, casing, yield, and logs of nearly all the wells in the Las Vegas Artesian Basin.

The final publication covering the Las Vegas Artesian Basin and known as Water Resources Bulletin No. 5 will be published during the fall of 1946. This bulletin will be titled "Geology and Water Resources of Las Vegas Valley, Nevada."

Indications are that the safe yield of the Las Vegas Valley has about been reached and the office of State Engineer is urging the people of Las Vegas Valley to take immediate steps to acquire a supplemental supply of water in order that their community growth may not be retarded.

Lovelock Domestic Supply—Pershing County

As the result of a request by the city officials of Lovelock to the State Engineer, a study was made by the U. S. Geological Survey, Ground Water Division, on the ground water resources of Lovelock Valley and potential water supplies for municipal purposes. The report of this study by T. W. Robinson and J. C. Fredericks, has been published in bulletin form and titled "Ground Water Resources of Lovelock Valley, Water Resources Bulletin No. 2."

Panaca Valley—Lincoln County

An intensive study of the ground water resources of Panaca Valley was started in March 1946 by Mr. David Phoenix, geologist with the U. S. Geological Survey. It is expected that the results of this study will be available in bulletin form before the end of 1946.

Panaca Valley is one of the outstanding valleys in Nevada in the development of ground water for irrigation purposes.

Pahranagat Valley—Lincoln County

Ground water studies are being carried on in this area by Mr. Dave Phoenix in conjunction with his more intensive study in the Panaca area.

Pahrump Valley—Nye County

Pahrump Valley has developed some of the largest artesian flows in the west. Studies in this area were started at the same time as in the Las Vegas Valley by George B. Maxey and C. H. Jameson. A separate bulletin will be prepared in 1947 covering the water resources of this valley.

Argenta Swamp Area—Lander County

This area lies on the Humboldt River a few miles north of Battle Mountain. Several thousand acres of land were purchased by the Government in connection with the Bureau of Reclamation project at Rye Patch and Lovelock. The water appurtenant to the Argenta area was transferred down stream for use in Lovelock Valley, leaving many hundreds of acres of good land upstream without an appurtenant water right. Leading citizens in the Battle Mountain area, together with the office of State Engineer felt that a study should be made of the ground water resources in this area to determine if water were available to irrigate some of this land without interfering with the stream flow of the Humboldt River to the detriment of lower users. Accordingly, a program was worked out between the United States Geological Survey, Surface and Ground Water Divisions, Bureau of Reclamation, Region 3, and this office for such a study.

Stream gaging stations were installed by the U. S. Geological Survey Surface Water Division, both above and below the Argenta area on the Humboldt River and on Rock Creek, a tributary of the Humboldt. The installation of the gaging stations was a part of the State's cooperative program with the Surface Water Division of the U. S. Geological Survey. Financial assistance was also rendered by the Bureau of Reclamation and the Ground Water cooperative program.

In the spring of 1946 several shallow test wells were drilled for water level observation purposes and other existing wells also were located and will be used for observation purposes. This study which will be rather complex due to the many factors involved, will be carried on as part of the ground water program.

Grass Valley—Humboldt County

Ground water studies were commenced in the Grass Valley area in May 1946 by Thomas W. Robinson and J. C. Fredericks. This valley which lies just south of Winnemucca contains several good wells that have been used for irrigation purposes.

In addition to these studies, a great deal of preliminary work has been accomplished in the Truckee Meadows, Eagle and Carson Valleys.

A State-wide system of observation wells has been started and will be expanded to include one or more wells on each of the ground water basins of the State. These wells which will be observed periodically are of paramount importance in the ground water studies.

Studies will be commenced within the next few months in other valleys in Nevada, notably Big Smokey in Nye and Lander Counties, Railroad Valley in Nye County, Quinn River Valley in Humboldt County, Steptoe and White River Valleys in White Pine County, Ruby and Clover Valley in Elko County, Dixie Valley in Churchill County, Diamond Valley in Eureka County, Smith Valley in Lyon County, Gabbs Valley in Mineral County, and Fish Lake Valley in Esmeralda County.

Several communities have requested the Geological Survey, through the State Engineer's office to assist in locating a better domestic supply. In addition, requests are coming in weekly from farmers asking for assistance in locating wells for irrigation purposes.

The well drillers throughout the State have been very cooperative in furnishing information to the Geological Survey.

The personnel of the U. S. Geological Survey staff engaged in this program with the State of Nevada is as follows:

Thomas W. Robinson, District Engineer; George B. Maxey, Geologist; John C. Fredericks, Geologist; Omar Loeltz, Engineer; David A. Phoenix, Geologist; Harry Jameson, Las Vegas Artesian Well Supervisor.

CHAPTER VIII

Litigation Affecting Water Rights

The following is a brief summary of court cases filed or heard during the past biennium that involve water and water rights:

BASSET CREEK CASE

Case No. 4404 in the Seventh Judicial District Court, and No. 3406 in the Supreme Court of the State of Nevada. The Bassett Creek case came before the courts through a statutory adjudication of the waters of Bassett Creek and its tributaries. Objections were filed to the State Engineer's Order of Determination by one of the claimants. These objections were sustained by the District Court. An appeal from the decision of the District Court was taken before the Supreme Court of the State of Nevada. The Supreme Court reversed the decision of the District Court and upheld the Order of Determination of the State Engineer. The Supreme Court denied a petition for a rehearing of the case, and on May 4, 1945, the litigation came to an end.

BAKER LEHMAN CREEK

George T. Baker v. Smith et al. substituted for August Runking et ux. The case number in the Seventh Judicial District Court in and for the county of White Pine is not known.

This is a suit to quiet title to certain decreed water of Baker Lehman Creek in White Pine County, Nevada.

On August 14 and 15, 1944, this matter came before the court and was heard. To date this office has no knowledge of any decision having been given in this matter. The case is still pending.

LITTLE HUMBOLDT RIVER

"Cathcart-Gondra Case." Case Nos. 4026 and 4027 in the Sixth Judicial District Court in and for the County of Humboldt.

These cases involved the use of channels by the State Engineer for conveying water to lower users having early priority rights. The case was expanded in court and the issue of rotation and cumulation of water became one of the principal points in controversy.

The case of Elmer and Mabel Cathcart and Ernest and Ellen Gondra v. Alfred Merritt Smith as State Engineer with H. D. and Mabel Johnson, Archie E. Corberri and Mame Corberri, and Lafayette J. Smallpage and Winifred A. Smallpage as intervenors, were joined and tried together.

These cases were filed on June 3, 1944. On October 30, 1944, the intervenors filed a petition for intervention in both suits.

On May 28, 1945, Judge T. J. D. Salter filed his opinion and decision in favor of the plaintiffs, and ordered that Findings of Fact, Conclusions of Law, and Judgment and Decree be entered in accordance with his decision.

On June 16, 1945, both the defendant and the intervenors filed their intentions to move for a new trial.

No Findings of Fact, Conclusions of Law and Judgment and Decree

have been prepared by the plaintiff's attorneys and the case stands incomplete.

"McCleary Cases." Case No. 3157 in the Sixth Judicial District Court, in and for the County of Humboldt.

Two complaints for criminal contempt were filed by the State of Nevada, one against Frank McCleary and one against Frank McCleary, Gose McCleary, Diego Gurrirdi, and Dimas Alzola. The alleged contempt was of the so-called "Carville Decree," Case No. 3157, in the Matter of the Determination of the Relative Rights in and to the Waters of the Little Humboldt River and its Tributaries.

Defendant's attorney demurred to the complaints, and hearings were held on the demurrers.

On May 28, 1945, Judge T. J. D. Salter of the Sixth Judicial District court ruled on the demurrers and sustained them.

The State of Nevada petitioned the Supreme Court for a writ of certiorari. In the Supreme Court this action was entitled "State of Nevada ex rel, Alfred Merritt Smith, State Engineer, v. The Sixth Judicial District Court et al." On March 30, 1946, the Supreme Court gave a decision on this matter and denied the petition.

The following memorandum brings out some of the issues involved:

State of Nevada ex rel. Alfred Merritt Smith, State Engineer, v. the Sixth Judicial Court et al.

On March 30, 1946, the Supreme Court rendered a decision in the above-entitled matter which was then pending in the court on petition for writ of certiorari, which petition was brought by Alfred M. Smith, State Engineer, against the Sixth Judicial District Court in and for the county of Humboldt, and Thomas J. D. Salter, judge of said court. The case arose over certain alleged contemptuous acts on the part of Frank McCleary and others who were alleged to have interfered with the State Engineer and his water commissioners in the distribution of the waters of the Little Humboldt River. The defendants demurred to the complaints for contempt upon the ground that the complaints did not state facts sufficient to constitute contempt of court. Judge Salter in ruling on the demurrers held that the Carville Decree adjudicating the water rights of the Little Humboldt River system was faulty and uncertain and lacking in certain particulars and that, therefore, the complaints did not state facts sufficient to constitute contempt.

The State Engineer sought certiorari in the Supreme Court upon the ground that the lower court had exceeded its jurisdiction in ruling on the Carville decree.

The Supreme Court in its decision of the matter ruled in strict accordance with its rulings of many year's standing that the only question the Supreme Court will decide on certiorari is whether the lower court had the jurisdiction to make the ruling it did make, and this notwithstanding whether the lower court's ruling was correct in law or not. That is to say, the lower court had the power to rule and its ruling would be final even though erroneous.

The Supreme Court in its recent decision decided no matters pertaining to the merits of the controversy. It did not decide whether the Carville decree was erroneous or not. It did not decide any of the rights of the parties involved, and as to the merits of the controversy

they are still open for future hearings and trials in the district court.

In ending its opinion the Supreme Court said.

"Nothing that has been said in this opinion is to be understood as expressing approval of the rulings made by the district court. And the court does not decide whether secs. 7940, 7942, 7943, and 7968 N. C. L., 1929, or any of them, constitute plain, speedy, and adequate remedies within the meaning of sec. 9231 N. C. L., 1929; nor do we determine what remedies other water users on the Little Humboldt River stream system may have against respondents for injuries growing out of their allegedly wrongful conduct."

It remains clear that the water controversy between the parties involved in the foregoing proceeding have not been decided by the Supreme Court.

CHAPTER IX

Stream and Reservoir Gaging Stations

There are 45 river and reservoir gaging stations located in and adjacent to Nevada which are of particular value in showing the water resources available to the State. Thirty of these, financed by State-Federal cooperative funds and seven by Federal noncooperative funds are maintained and operated by the Water Resources Branch of the United States Geological Survey. This work has been under the direct supervision of Mr. M. T. Wilson, District Engineer, 303 Federal Building, Salt Lake City, Utah. The field work has been accomplished by Resident Engineer Wilson McConkie, with headquarters at Elko.

The gaging station on Salmon Falls Creek in northern Elko County is under the supervision of the U. S. G. S. District Engineer T. R. Newell of Boise, Idaho. The records from this station are furnished by the Salmon River Canal Co., Ltd., of Twin Falls, Idaho. The two gaging stations on the Colorado River are operated on a cooperative agreement between the Bureau of Reclamation and the U. S. G. S. office at Tucson, Arizona, in charge of District Engineer John Gardner. Gaging station No. 1 in the Virgin River Basin at Littlefield, Arizona, is also under the supervision of Mr. Gardner. Records from gaging stations Nos. 1, 3, and 4 in the Pyramid and Winnemucca Lake Basin and being located on the Truckee River and Donner Creek are furnished by H. C. Dukes, Federal Court Watermaster. Records for gaging station No. 4 on the Carson River at Fort Churchill are furnished by the Newlands Project. The accompanying map shows the location of the forty-five stations which are herewith listed.

SALMON FALLS CREEK BASIN

1. Salmon Falls Creek near Jacinto, Nevada.

OWYHEE RIVER BASIN

1. Wild Horse Reservoir near Gold Creek.
2. Owyhee River near Gold Creek.
3. Owyhee River at Mountain City.
4. Owyhee River near Owyhee.

HUMBOLDT RIVER BASIN

1. Marys River.
2. Lamoille Creek.
3. North Fork Humboldt River at Devil's Gate.
4. Humboldt River near Elko.
5. South Fork Humboldt River near Elko.
6. South Fork Humboldt River near Lee.
7. Humboldt River near Carlin.
8. Humboldt River at Palisade.
9. Pine Creek near Palisade.
10. Humboldt River near Argenta.
11. Rock Creek near Battle Mountain.
12. Humboldt River at Battle Mountain.

13. Humboldt River at Comus.
14. Humboldt River near Imlay.
15. Humboldt-Lovelock Irrigation Feeder Canal near Mill City.
16. Rye Patch Reservoir near Rye Patch.
17. Humboldt River near Rye Patch.
18. Cottonwood Creek at Paradise Valley.
19. Martin Creek near Paradise Valley.
20. Little Humboldt River near Paradise Valley.
21. Little Humboldt River at Chimney Dam Site.

PYRAMID AND WINNEMUCCA LAKE BASIN

1. Truckee River at Tahoe, California.
2. Truckee River near Truckee, California.
3. Donner Creek near Truckee, California.
4. Truckee River at Farad, California.
5. Pyramid Lake near Nixon.

CARSON RIVER BASIN

1. West Fork Carson River at Woodfords.
2. East Fork Carson River near Gardnerville.
3. Carson River near Carson City.
4. Carson River near Fort Churchill.

WALKER LAKE BASIN

1. East Fork West Walker near Bridgeport, California.
2. West Walker River below East Fork, near Coleville, California.
3. Topaz Reservoir, near Topaz, California.
4. Bridgeport Reservoir near Bridgeport, California.
5. East Walker River near Bridgeport, California.
6. Walker Lake near Hawthorne.

VIRGIN RIVER BASIN

1. Virgin River at Littlefield, Arizona.
2. Meadow Valley Wash near Panaca.

COLORADO RIVER MAIN STEM

1. Lake Mead at Boulder Dam.
2. Colorado River below Boulder Dam.

1945 STATION DESCRIPTIONS

SALMON FALLS CREEK BASIN

Salmon Falls Creek near San Jacinto, Nevada

Location—Water-stage recorder, lat. $41^{\circ}57'$, long. $114^{\circ}42'$, in sec. 23, T. 47 N., R. 64 E., in canyon 200 yards downstream from highway bridge, 250 yards downstream from Shoshone Creek, and 5 miles north of San Jacinto.

Records Available — September 1909 to September 1916, October 1918 to September 1945.

Average discharge — 31 years (1910–1916, 1919–1920, 1921–1945, 125 second-feet.

Extremes—Maximum discharge during year, 950 second-feet May 8

(gage height, 6.50 feet); minimum, 15 second-feet September 13 (gage height, 2.41 feet). 1909-1916, 1918-1945: Maximum recorded discharge, between 2,060 and 2,420 second-feet February 24, 1943 (gage height exceeded range of recorder, 10.20 feet, but was not more than 1.2 feet higher), from rating curve extended above 1,400 second-feet; minimum, 5.3 second-feet August 17, 1940 (gage height, 2.16 feet).

Remarks—Records excellent except those September 7-11, which are fair. Many diversions above station for irrigation. Salmon Dam of Salmon River Canal Co., Ltd., 15 miles below station, forms a reservoir having a capacity of about 180,000 acre-feet.

OWYHEE RIVER BASIN

Wild Horse Reservoir near Gold Creek, Nevada

Location—Reference point on Wild Horse Dam on Owyhee River, lat. $41^{\circ}41'10''$, long. $115^{\circ}51'20''$, in NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 25, T. 44 N., R. 54 E., 8 miles west of Gold Creek. Datum of gage is 6,109.18 feet above mean sea level (levels by Office of Indian Affairs).

Drainage area—209 square miles.

Records available—March 1938 to September 1945.

Extremes—Maximum contents observed during year, 33,770 acre-feet May 24 (gage height, 80.58 feet); minimum observed, 9,340 acre-feet October 17, 1938-1945: Maximum contents observed, 34,460 acre-feet April 18, 1942 (gage height, 80.95 feet); no contents at times during each year 1938-1941.

Remarks—Reservoir is formed by concrete-arch dam; storage began March 18, 1938. Capacity, 32,690 acre-feet between gage height 20.0 feet (sill of outlet gate) and 80.0 feet (spillway crest). No dead storage. Water is used for irrigation on the Duck Valley project.

Cooperation—Gage-height record and base data for capacity table furnished by Office of Indian Affairs.

Owyhee River near Gold Creek, Nevada

Location—Water-stage recorder, lat. $41^{\circ}41'10''$, long. $115^{\circ}51'30''$, in NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 25, T. 44 N., R. 54 E., 500 feet downstream from Wild Horse Dam and 8 miles west of Gold Creek. Altitude, 6,130 feet (from topographic map).

Drainage area—209 square miles.

Records available—March 1916 to September 1925, October 1936 to September 1945.

Average discharge — 16 years (1917-1921, 1922-1925, 1936-1945) 42.0 second-feet.

Extremes—Maximum discharge during year, 572 second-feet (regulated) May 6 (gage height, 5.09 feet); minimum discharge observed, 0.8 second foot January 24, discharge measurement. 1916-1925, 1936-1945: Maximum discharge, 1,810 second-feet May 5, 1922 (gage-height, 10.11 feet, site and datum then in use), from rating curve extended above 400 second-feet; practically no flow at times when reservoir gates were closed.

Remarks—Records excellent except those for period of no gage-height record, which are fair. Small diversions above station for irrigation. Flow regulated by Wild Horse Reservoir.

Owyhee River at Mountain City, Nevada

Location—Water-stage recorder, lat. $41^{\circ}50'$, long. $115^{\circ}59'$, in SE $\frac{1}{4}$

sec. 36, T. 46 N., R. 53 E., at Mountain City, 1 mile downstream from California Creek.

Drainage area—350 square miles.

Records available—May to December 1913, November 1926 to September 1945.

Average discharge—19 years (1926–1945), 97.8 second-feet.

Extremes—Maximum discharge during year, 1,360 second-feet (regulated) May 1 (gage-height, 6.89 feet); minimum recorded, 3.4 second-feet, October 29, but may have been less during periods of ice effect (no gage height record most of time). 1913, 1927–1945: Maximum discharge, 1,830 second feet April 20, 1936 (gage height, 7.6 feet); no flow July 29 to September 15, 1931, July 21 to September 12, 1934.

Remarks—Records good except those for periods of ice effect or no gage-height record, which are fair. Diversions above station for irrigation. Flow partly regulated by Wild Horse Reservoir (see p. 64).

Owyhee River above China Diversion Dam, near Owyhee, Nevada

Location—Water stage recorder, lat. $41^{\circ}55'$, long. $116^{\circ}05'$, in NW $\frac{1}{4}$ sec. 6, T. 46 N., R. 53 E., 1,000 feet down stream from Skull Creek, 1 mile upstream from the China diversion dam, and $2\frac{1}{2}$ miles southeast of Owyhee.

Drainage area—458 square miles.

Records available—March 1939 to September 1945.

Extremes (regulated) — Maximum discharge during year, 1,850 second-feet May 6 (gage height, 9.18 feet); minimum, 9.8 second-feet October 30, but may have been less during period of ice effect. 1939–1945: Maximum discharge, that of May 6, 1945; minimum daily, 2 second-feet September 15–18, 1940.

Remarks—Records good except those for periods of ice effect, which are fair. Diversions above station for irrigation. Flow partly regulated by Wild Horse Reservoir (see p. 64).

HUMBOLDT RIVER BASIN

Marys River below Hot Springs Creek, near Deeth, Nevada

Location—Water-stage recorder, lat. $41^{\circ}14'$, long. $115^{\circ}17'$, in NW $\frac{1}{4}$ sec. 25, T. 39 N., R. 59 E., 300 feet downstream from Hot Springs Creek, $7\frac{1}{4}$ miles north of Cross ranch, and $13\frac{1}{4}$ miles north of Deeth.

Drainage area—415 square miles.

Records available—October 1943 to September 1945. November 1902 to July 1903, January 1912 to June 1928 at site 8 miles upstream published as Marys River near Deeth.

Extremes—Maximum discharge during year, 676 second-feet May 9 (gage-height, 5.99 feet); minimum, 0.9 second-foot October 1. Flood in January 1943 reached a stage of 7.2 feet, from floodmarks (discharge, 1,030 second-feet by slope-area method).

Remarks—Records good except those for periods of ice effect or no gage-height record, which are fair. Several diversions above station for irrigation.

Lamoille Creek near Lamoille, Nevada

Location—Water-stage recorder, lat. $40^{\circ}41'30''$, long. $115^{\circ}28'30''$, in NE $\frac{1}{4}$ sec. 6, T. 32 N., R. 58 E., at Lamoille Creek bridge at mouth of canyon, 300 feet downstream from Elko-Lamoille power plant and 3 miles south of Lamoille.

Drainage area—25 square miles.

Records available—May 1915 to June 1923, October 1943 to September 1945.

Extremes—Maximum discharge during year, 486 second-feet June 23; minimum not determined, occurred during period of no gage-height record. 1915–1923, 1943–1945: Maximum discharge, probably exceeded 500 second-feet in June 1917 when gage was washed out; minimum, 1 second-foot January 24, 1918.

Remarks—Records good except those for periods of ice effect or no gage-height record, which are fair. Records include flow of McDermott ditch which diverts about 200 feet upstream from gage. Elko-Lamoille power plant diverts about 6 miles upstream but flow is returned to channel at power plant 300 feet upstream from station.

North Fork Humboldt River at Devils Gate, near Halleck, Nevada

Location—Water-stage recorder, lat. $41^{\circ}11'$, long. $115^{\circ}29'$, in SE $\frac{1}{4}$ sec. 13, T. 38 N., R. 57 E., 3 miles north of Devil's Gate Ranch, 16 miles north of Halleck, and 26 miles upstream from mouth.

Drainage area—830 square miles.

Records available—November 1913 to September 1921, October 1943 to September 1945.

Extremes—Maximum discharge during year, 615 second-feet March 13 (gage height, 4.82 feet); minimum, 5.8 second-feet September 11, 12. 1913–1921, 1942–1945: Maximum discharge, 1,600 second-feet March 2 or 3, 1921; minimum 1 second-foot, August 20–28, September 30, 1913.

Remarks—Records good except those for periods of ice effect or no gage-height record, which are fair. Many diversions above and below station.

Humboldt River near Elko, Nevada

Location — Water-stage recorder, lat. $40^{\circ}56'$, long. $115^{\circ}38'$ in SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 11, T. 35 N., R. 56 E., 1 mile southeast of Ryndon, 6 miles downstream from North Fork and 10 miles northeast of Elko. Staff gage at site 11 miles downstream prior to October 11, 1902, at different datum.

Records available—October 1944 to September 1945. June 1895 to October 1902 at site 11 miles downstream.

Extremes—Maximum discharge during year, 2,530 second-feet June 9 (gage height, 8.96 feet); minimum not determined, occurred during period of no gage-height record. 1895–1902, 1944–1945: Maximum discharge, that of June 9, 1945; minimum observed, 0.5 second-foot several days in August and September 1901.

Remarks—Records excellent except those for periods of ice effect or no gage-height record, which are fair. Diversions above station for irrigation.

South Fork Humboldt River near Elko, Nevada

Location—Water-stage recorder, lat. $40^{\circ}43'15''$, long. $115^{\circ}49'50''$, in NW $\frac{1}{4}$ sec. 30, T. 33 N., R. 55 E., a quarter of a mile upstream from head of canyon, 1.5 miles downstream from highway bridge, 9 miles upstream from mouth, and 10 miles southwest of Elko.

Drainage area—1,150 square miles.

Records available—August 1896 to September 1922, October 1923 to September 1932, October 1936 to September 1945.

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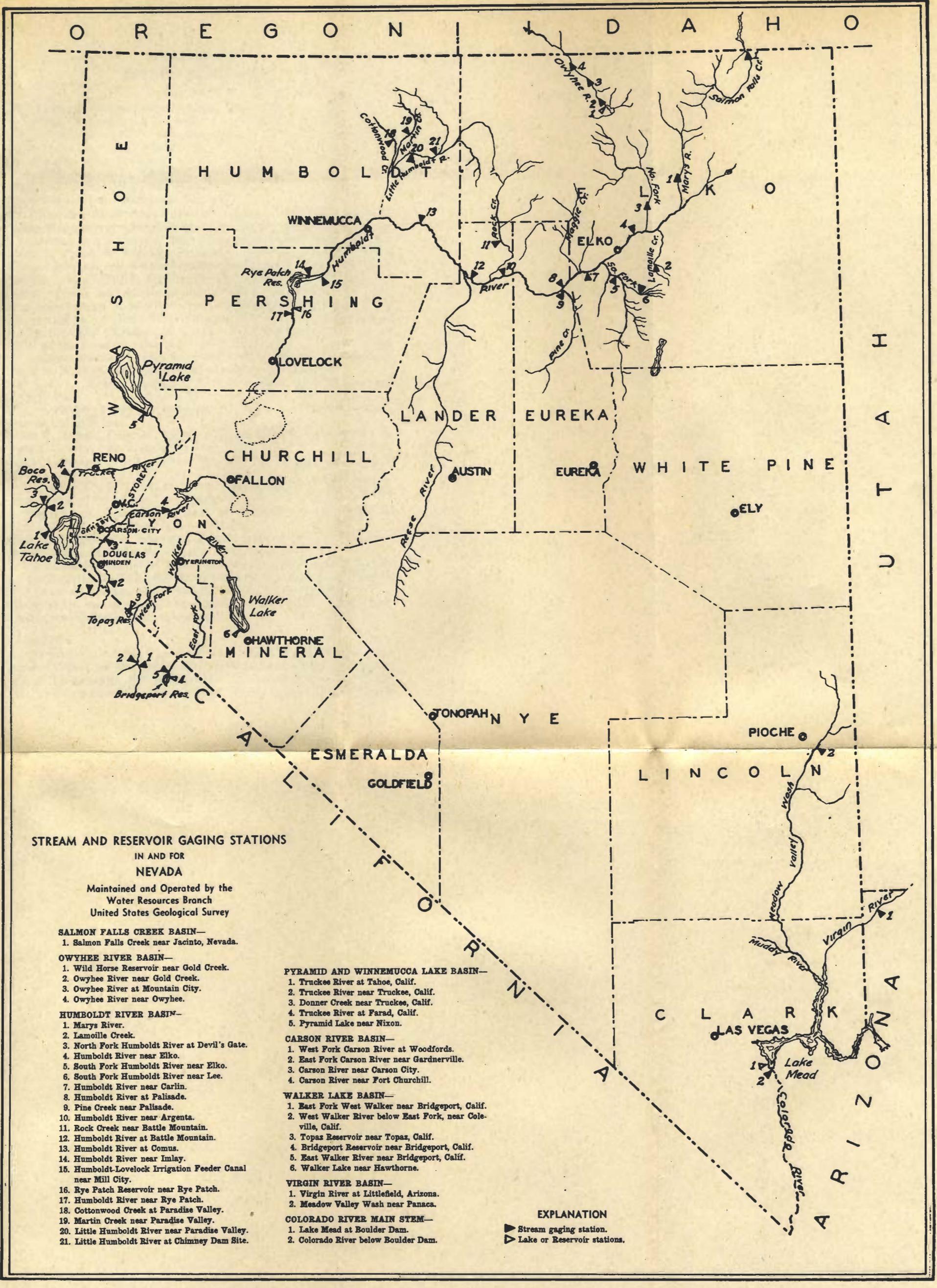
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STREAM AND RESERVOIR GAGING STATIONS
IN AND FOR
NEVADA

Maintained and Operated by the
Water Resources Branch
United States Geological Survey

SALMON FALLS CREEK BASIN—
1. Salmon Falls Creek near Jacinto, Nevada.

- OWYHEE RIVER BASIN—**
1. Wild Horse Reservoir near Gold Creek.
2. Owyhee River near Gold Creek.
3. Owyhee River at Mountain City.
4. Owyhee River near Owyhee.

- HUMBOLDT RIVER BASIN—**
1. Marys River.
2. Lamoille Creek.
3. North Fork Humboldt River at Devil's Gate.
4. Humboldt River near Elko.
5. South Fork Humboldt River near Elko.
6. South Fork Humboldt River near Lee.
7. Humboldt River near Carlin.
8. Humboldt River at Palisade.
9. Pine Creek near Palisade.
10. Humboldt River near Argenta.
11. Rock Creek near Battle Mountain.
12. Humboldt River at Battle Mountain.
13. Humboldt River at Comus.
14. Humboldt River near Imlay.
15. Humboldt-Lovelock Irrigation Feeder Canal near Mill City.
16. Rye Patch Reservoir near Rye Patch.
17. Humboldt River near Rye Patch.
18. Cottonwood Creek at Paradise Valley.
19. Martin Creek near Paradise Valley.
20. Little Humboldt River near Paradise Valley.
21. Little Humboldt River at Chimney Dam Site.

- PYRAMID AND WINNEMUCCA LAKE BASIN—**
1. Truckee River at Tahoe, Calif.
2. Truckee River near Truckee, Calif.
3. Donner Creek near Truckee, Calif.
4. Truckee River at Farad, Calif.
5. Pyramid Lake near Nixon.

- CARSON RIVER BASIN—**
1. West Fork Carson River at Woodfords.
2. East Fork Carson River near Gardnerville.
3. Carson River near Carson City.
4. Carson River near Fort Churchill.

- WALKER LAKE BASIN—**
1. East Fork West Walker near Bridgeport, Calif.
2. West Walker River below East Fork, near Colville, Calif.
3. Topaz Reservoir near Topaz, Calif.
4. Bridgeport Reservoir near Bridgeport, Calif.
5. East Walker River near Bridgeport, Calif.
6. Walker Lake near Hawthorne.

- VIRGIN RIVER BASIN—**
1. Virgin River at Littlefield, Arizona.
2. Meadow Valley Wash near Panaca.

- COLORADO RIVER MAIN STEM—**
1. Lake Mead at Boulder Dam.
2. Colorado River below Boulder Dam.

EXPLANATION

- ▶ Stream gaging station.
▽ Lake or Reservoir stations.

Average discharge — 37 years (1896–1903, 1904–1909, 1910–1918, 1923–1926, 1927–1932, 1936–1945) 134 second-feet.

Extremes—Maximum discharge during year, 1,440 second-feet May 11 (gage height, 5.33 feet); minimum daily, 7.4 second-feet October 8, 1896–1922, 1923–1932, 1936–1945: Maximum discharge, 2,400 second-feet January 26, 1914, from rating curve extended above 1,200 second-feet; practically no flow during some periods in nearly every year since 1915.

Records—Records good except those for period of ice effect, which are fair. Many diversions above station for irrigation. Station is below all diversions except those of Hunter & Banks ranch, 3 miles downstream.

South Fork Humboldt River near Lee, Nevada

Location—Water-stage recorder, lat. $40^{\circ}34'$, long. $115^{\circ}33'$, in SE $\frac{1}{4}$ sec. 16, T. 31 N., R. 57 E., 400 feet downstream from Kleckner Creek and $2\frac{1}{2}$ miles east of Lee.

Drainage area—54 square miles.

Records available—February to September 1945.

Extremes—Maximum discharge during period, 815 second-feet June 23 (gage-height, 3.70 feet); minimum daily, 9.2 second-feet February 4.

Remarks—Records good except those for periods of ice effect or no gage-height record, which are fair. A few small diversions above station for irrigation.

Humboldt River near Carlin, Nevada

Location—Water-stage recorder, lat. $40^{\circ}43'$, long. $116^{\circ}00'$, in sec. 28, T. 33 N., R. 53 E., $4\frac{1}{2}$ miles southwest of Moleen, 5 miles upstream from Susie Creek, $5\frac{1}{2}$ miles east of Carlin, and 15 miles southwest of Elko.

Drainage area—4,310 square miles.

Records available—October 1943 to September 1945.

Extremes—Maximum discharge during year, 3,640 second-feet June 10 (gage height, 7.78 feet); minimum, 13 second-feet several days in October. 1943–1945: Maximum discharge, that of June 10, 1945; minimum daily, 10 second-feet October 1–7, 1943. High water of February 1943 reached a stage of 9.8 feet (discharge, 5,900 second-feet, by slope-area method).

Remarks—Records excellent except those for periods of ice effect or no gage-height record, which are fair. Many diversions above station for irrigation.

Humboldt River at Palisade, Nevada

Location—Water-stage recorder, lat. $40^{\circ}38'$, long. $116^{\circ}12'$, in sec. 36, T. 32 N., R. 51 E., a quarter of a mile downstream from Southern Pacific Railroad bridge, half a mile downstream from Palisade, and three-quarters of a mile upstream from Pine Creek.

Drainage area—5,010 square miles.

Records available November 1902 to October 1906; July 1911 to September 1945.

Average discharge—37 years (1903–1906, 1911–1945), 365 second-feet.

Extremes—Maximum discharge during year, 3,780 second-feet June 11 (gage height, 7.59 feet); minimum daily, 20 second feet October 1.

1902-1906, 1911-1945: Maximum discharge, 6,250 second-feet February 26, 1943 (gage height, 9.92 feet); minimum, 2 second-feet August 25-28, 1931.

Remarks—Records excellent except those periods of ice effect, which are fair. Diversion above station for irrigation of about 150,000 acres of hay and pasture lands.

Pine Creek near Palisade, Nevada

Location—Water-stage recorder, lat. $40^{\circ}35'30''$, long. $116^{\circ}10'20''$, in SW $\frac{1}{4}$ sec. 1, T. 31 N., R. 51 E., one mile upstream from mouth and $1\frac{1}{2}$ miles southeast of Palisade.

Records available—November 1902 to December 1904, January 1912 to September 1914.

Remarks—Many diversions above station for irrigation.

Humboldt River near Argenta, Nevada

Established January 11, 1946

Location—Water-stage recorder, lat. $40^{\circ}41'$, long. $116^{\circ}40'$, in T. 32 N., R. 47 E., Mount Diablo meridian, $2\frac{1}{2}$ miles east of Argenta and $15\frac{1}{2}$ miles east of Battle Mountain.

Cooperation—State of Nevada.

Rock Creek near Battle Mountain, Nevada

Location—Water-stage recorder, lat. $40^{\circ}51'$, long. $116^{\circ}36'$, in NE $\frac{1}{4}$ sec. 17, T. 34 N., R. 48 E., at mouth of canyon, and 22 miles northeast of Battle Mountain.

Records available—March 1918 to September 1923; 1924, 1925, and 1927-1929 fragmentary.

Extremes—1918-1929: Maximum discharge, 2,240 second-feet February 11, 1921; no flow at times during October, July, August, and September nearly every year.

Remarks—Station is below all diversions in Boulder Flat and is below all tributaries. Flow slightly affected by small reservoir in Squaw Valley, 30 miles upstream.

Humboldt River at Battle Mountain, Nevada

Location—Water-stage recorder, lat. $40^{\circ}39'$, long. $116^{\circ}56'$, in SE $\frac{1}{4}$ sec. 8, T. 32 N., R. 45 E., one mile northeast of Battle Mountain.

Records available—July 1896 to December 1897 (gage heights only) March 1921 to April 1924.

Extremes—1921-1924: Maximum discharge recorded, 1,560 second-feet July 19, 20, 1921 and May 11-13, 1922; minimum observed, 7 second-feet September 30, 1921.

Remarks—Many diversions above stations for irrigation.

Humboldt River at Comus, Nevada

Location—Water-stage recorder, lat. $41^{\circ}00'$, long. $117^{\circ}19'$, in NW $\frac{1}{4}$ sec. 14, T. 36 N., R. 41 E., at Comus, and 10 miles east of Golconda.

Records available—September 1917 to June 1923, May 1925 to May 1926.

Extremes—1917-1926: Maximum discharge, 2,700 second-feet June 24-26, 1921; no flow during periods in 1918, 1919, 1920, and 1924.

Remarks—Many diversions above station.

Humboldt River near Imlay, Nevada

Location—Water-stage recorder, lat. $40^{\circ}21'20''$, long $118^{\circ}12'55''$, in SW $\frac{1}{4}$ sec. 25, T. 33 N., R. 33 E., 600 feet upstream from old Calahan dam and 4 miles northwest of Imlay.

Drainage area—13,500 square miles.

Records available—June 1935 to September 1941, May to September 1945.

Extremes—1935–1941: Maximum daily discharge 558 second-feet July 8, 1941; no flow during same period in 1935, 1937–1941.

Remarks—Humboldt, Lovelock Irrigation, Light & Power Co.'s feeder canal diverts water from river above station to the Humboldt reservoirs. This water is ordinarily released during the irrigation season through Rye Patch reservoir to the Humboldt River for irrigation in the Lovelock district. Flow also affected by many diversions above station for irrigation.

Humboldt-Lovelock Irrigation, Light & Power Company's Feeder canal near Mill City, Nevada

Location—Water-stage recorder, lat. $40^{\circ}42'05''$, long. $118^{\circ}04'40''$, in SW $\frac{1}{4}$ sec. 29, T. 33 N., R. 35 E., a quarter of a mile below head of canal and 2 miles north of Mill City.

Records available — February 1914 to September 1931, January 1937 to September 1938.

Remarks—Flow regulated by head gates. This canal diverts water from Humboldt River in NW $\frac{1}{4}$ sec. 29, T. 33 N., R. 35 E., for storage in Humboldt reservoirs near Humboldt. Water is released, during irrigation season, about 3 miles west of Humboldt, and conveyed through Humboldt-Lovelock Irrigation, Light & Power Co.'s outlet canal to Rye Patch Reservoir, from which it is later released and carried in natural river channel to Lovelock district for use in irrigation.

Rye Patch Reservoir near Rye Patch, Nevada

Location—Mercury indicating gage, lat. $40^{\circ}28'15''$, long. $118^{\circ}18'20''$, in NE $\frac{1}{4}$ sec. 18, T. 30 N., R. 33 E., at control works at left end of Rye Patch dam, 2 miles northwest of Rye Patch. Datum of gage is at mean sea level (Southern Pacific Railroad datum).

Drainage area—13,700 square miles.

Records available—February 1936 to September 1945.

Extremes—Maximum contents during year, 189,500 acre-feet June 10 (elevation, 4,133.95 feet); minimum, 157,200 acre-feet May 13 (elevation 4,130.92 feet). 1936–1945: Maximum contents, that of June 10, 1945; minimum since operation began, 1,760 acre-feet October 15, 1937.

Remarks—Reservoir is formed by earth-fill, rock-faced dam; storage began February 20, 1936. Capacity, 179,100 acre-feet (revised) between elevations 4,072.5 (sill of trash-rack structure) and 4,133.0 feet (top of spillway gates) above mean sea level. Dead storage negligible. Elevation of spillway (gage sill) is 4,116 feet. Water is used for irrigation on Humboldt project.

Humboldt River near Rye Patch, Nevada

Location—Water-stage recorder, lat. $40^{\circ}27'30''$, long. $118^{\circ}18'30''$, in NE $\frac{1}{4}$ sec. 18, T. 30 N., R. 33 E., 1,000 feet downstream from Rye Patch

dam, $1\frac{1}{2}$ miles northwest of Rye Patch, and 22 miles northeast of Lovelock.

Drainage area—13,700 square miles.

Records available—April to September 1945. January 1896 to December 1909, September 1910 to September 1922, and September 1924 to September 1932 (fragmentary) at site near Oreana, 7 miles downstream (published as Humboldt River near Oreana, Nevada) October 1935 to September 1941.

Extremes—1896–1922, 1924–1932, 1935–1941: Maximum discharge 3,050 second-feet May 12, 1897 (gage height, 12.0 feet site and datum then in use); practically no flow during same period in 1905, 1915, 1918–1920, 1931–1932, 1935–1941.

Remarks—Flow completely regulated by Rye Patch Reservoir since February 1936 and slightly regulated by Humboldt (Taylor-Pitt) Reservoirs. Many diversions above station for irrigation.

Cottonwood Creek at Paradise Valley, Nevada

Location—Water-stage recorder, lat. $41^{\circ}31'00''$, long. $117^{\circ}32'30''$, in NW $\frac{1}{4}$ sec. 25, T. 42 N., R. 39 E., at highway bridge, 300 feet west of Paradise Valley Post Office.

Drainage area—62 square miles.

Records available—October 1944 to September 1945.

Extremes—Maximum discharge during year, 253 second-feet February 14 (gage height, 2.16 feet); minimum not determined, probably occurred during period of no gage-height record.

Remarks—Records good except those for period of ice effect or no gage-height record, which are fair. Several diversions above and below station for irrigation.

Martin Creek near Paradise Valley, Nevada

Location—Water-stage recorder, lat. $41^{\circ}32'00''$, long. $117^{\circ}25'40''$, in NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 12, T. 42 N., R. 40 E., 0.6 mile upstream from Humboldt County Fish Hatchery and 7 miles northeast of Paradise Valley.

Drainage area—172 square miles.

Records available—October 1921 to September 1945.

Average discharge—23 years (1921–1926, 1927–1945), 28.1 second-feet.

Extremes—Maximum discharge during year, 2,200 second-feet February 2 (gage height, 5.00 feet) from rating curve extended above 250 second-feet; minimum, 1.5 second-feet February 6, 1921–1945: Maximum discharge, 9,000 second-feet, January 21, 1943 (gage height, 11.1 feet, datum then in use), by slope area method; minimum, that of February 6, 1945.

Remarks—Records good. No diversions above station.

Little Humboldt River near Paradise Valley, Nevada

Location—Water-stage recorder, lat. $41^{\circ}25'$, long. $117^{\circ}24'$, in NE $\frac{1}{4}$ sec. 19, T. 41 N., R. 41 E., 300 feet south of Humboldt Hot Spring, $4\frac{1}{2}$ miles downstream from Bullshead ranch, and $8\frac{1}{2}$ miles southeast of Paradise Valley.

Drainage area—1,030 square miles.

Records available—October 1921 to June 1928 (fragmentary); October 1943 to September 1945.

Extremes—Maximum discharge during year, 250 second-feet February 2 (gage height, 9.31 feet); minimum daily, 5.7 second-feet October 8. 1921–1928, 1943–1945: Maximum discharge, 500 second-feet February 23, 1927 (gage height, 12.1 feet, datum then in use), from rating curve extended above 150 second-feet; minimum, 5 second-feet December 28, 1924.

Remarks—Records good except those for period of no gage-height record, which are fair. Bullshead ranch diverts water for irrigation above station. Station is above all diversions in Paradise Valley.

Little Humboldt River at Chimney Dam Site, near Paradise Valley, Nevada

Location—Water-gage recorder, lat. $41^{\circ}24'$, long. $117^{\circ}11'$, in NE $\frac{1}{4}$ sec. 36, T. 41 N., R. 42 E., at Chimney dam site, 300 feet downstream from confluence of North and South Forks and 25 miles east of Paradise Valley.

Records available—October 1941 to September 1945.

Extremes—Maximum discharge during year, 560 second-feet February 2 (gage height, 9.65 feet); no flow September 8–10. 1942–1945: Maximum discharge, 4,000 second-feet about January 22, 1943 (gage height, 14.4 feet, from flood marks) by slope-area method; no flow September 8–10, 1945.

Remarks—Records good except those for periods of ice effect or no gage-height record, which are fair. Several small diversions above and below station for irrigation.

PYRAMID AND WINNEMUCCA LAKES BASIN

Truckee River at Tahoe, California

Location—Water-gage recorder, lat. $39^{\circ}09'55''$, long. $120^{\circ}08'45''$, in NW $\frac{1}{4}$ sec. 7, T. 15 N., R. 17 E., at Tahoe, just below dam at outlet of Lake Tahoe. Datum of gage is 6,219.01 feet above mean sea level, datum of 1929.

Drainage area—519 square miles.

Records available—July 1895 to February 1896, June 1900 to September 1943.

Average discharge—43 years (1900–1943), 248 second-feet.

Extremes—Maximum daily discharge during year, 1,819 second-feet (regulated) January 30; no flow November 19–22. 1895–1896; 1900–1943: Maximum daily discharge, that of January 30, 1943; no flow during parts of 1900, 1901, 1914, 1918–1943.

Remarks—Flow regulated by Lake Tahoe and occasionally by pumping from the Lake.

Cooperation—Record of daily discharge furnished by H. C. Dukes, Federal Court Watermaster.

Truckee River near Truckee, California

Location—Water-stage recorder, lat. $39^{\circ}17'30''$, long. $120^{\circ}12'30''$, in SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 28, T. 17 N., R. 16 E., 1.4 miles upstream from Donner Creek and $2\frac{1}{2}$ miles southwest of Truckee, California.

Drainage area—548 square miles.

Records available—December 1944 to September 1945.

Extremes (regulated)—Maximum discharge during period, 1,110 second-feet February 2 (gage height, 3.34 feet); minimum daily, 49 second-feet January 19.

Remarks—Records good. Flow regulated at Lake Tahoe.

Donner Creek near Truckee, California

Location—Water-stage recorder, lat. $39^{\circ}19'15''$, long. $120^{\circ}12'10''$, in SE $\frac{1}{4}$ sec. 16, T. 17 N., R. 16 E., 1 mile downstream from Cold Creek, $1\frac{1}{2}$ miles southwest of Truckee, and 2 miles downstream from Donner Lake. Altitude of gage, about 5,800 feet (from topographic map).

Drainage area—30 square miles.

Records available—October 1902 to September 1915, March 1928 to September 1943.

Average discharge—14 years (1928–1935, 1936–1943), 64.5 second-feet.

Extremes—1941–1942: Maximum discharge during water year, 519 second-feet April 25, May 25 (gage height, 3.34 feet); minimum, 3 second-feet October 1–7, 22–31. 1942–1943: Maximum discharge during water year, 463 second-feet May 1 (gage height, 3.18 feet); minimum, 3 second-feet August 18 to September 2. 1902–1915; 1928–1943: Maximum discharge 1,800 second-feet December 11, 1937 (gage height, 6.2 feet on outside gage); minimum, less than 1 second-foot during many summers.

Remarks—Flow regulated by Donner Lake.

Cooperation—Record of daily discharge furnished by H. S. Dukes, Federal Court Watermaster.

Truckee River at Farad, California

Location—Water-stage recorder, lat. $39^{\circ}26'$, long. $120^{\circ}02'$, in NE $\frac{1}{4}$ sec. 12, T. 18 N., R. 17 E., 0.5 mile downstream from Farad power plant, 3 miles downstream from Bronco Creek, and $3\frac{1}{2}$ miles north of Iceland. Altitude of gage, about 5,200 feet (from topographic map).

Drainage area—940 square miles.

Records available—January 1938 to September 1943. September 1899 to August 1912 at Nevada-California State line, 5 miles downstream. August 1912 to December 1937 at Iceland, $3\frac{1}{2}$ miles upstream.

Average discharge—31 years (1912–1943), 678 second-feet.

Extremes—Maximum discharge during year, 6,260 second-feet January 22 (gage height, 7.40 feet); minimum, 358 second-feet December 8. 1938–1943: Maximum daily discharge, 6,770 second-feet May 15, 1938; minimum daily, 290 second feet November 16, 1939.

Remarks—Flow regulated by Lake Tahoe, Donner, Independence, and Weber, and since December 1938 by Boca reservoir.

Cooperation—Record of daily discharge furnished by H. C. Dukes, Federal Court Watermaster.

Pyramid Lake near Nixon, Nevada

Location—Bench mark N 21 of U. S. Coast and Geodetic Survey, lat. $39^{\circ}50'30''$, long. $119^{\circ}28'00''$, in SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 24, T. 23 N., R. 22 E., at southwest corner of concrete bridge No. 296B, 150 feet southwest of milepost 297, 11.5 miles south along Southern Pacific Railroad from station at Sutcliffe and 6 miles west of Nixon. Elevation of bench mark is 3,940.04 feet above mean sea level, datum of 1929.

Records available—1867 to 1925 (occasional elevations in some years). June 1926 to September 1945. Elevations prior to January 1934 referred to adjustment of 1912, datum of which is 0.57 foot above that of datum of 1929.

Extremes—1926–1945: Maximum elevation observed, 3,847.35 feet,

datum of 1929, June 1926; minimum observed, 3,815.10 feet December 9, 1941.

Cooperation—Records furnished by Office of Indian Affairs.

CARSON RIVER BASIN

West Fork Carson River at Woodford's, California

Location—Water-stage recorder, lat. $38^{\circ}46'00''$, long. $119^{\circ}50'00''$, in SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 34, T. 11 N., R. 19 E., 0.3 mile downstream from bridge on State Highway No. 8, 0.8 mile west of Woodford's, and $3\frac{1}{4}$ miles downstream from Willow Creek.

Drainage area—68 square miles.

Records available—October 1900 to May 1907, 1910–1911 (fragmentary), and October 1938 to September 1945. April 1890 to March 1892, June 1907 to September 1920, at site 0.7 mile downstream and below three diversions for irrigation.

Average discharge — 22 years (1901–1903, 1905–1915, 1916–1920, 1939–1945), 133 second-feet.

Extremes—Maximum discharge during year, 975 second-feet May 10 (gage height, 5.26 feet); minimum 14 second-feet October 5–7, 1900–1920, 1938–1945: Maximum discharge, 1,570 second-feet May 9, 10, 1906 (gage height, 6.8 feet, datum then in use); minimum (1900–1907, 1938–1945) 9 second-feet December 11, 1940. Maximum discharge known, 3,500 second-feet December 11, 1937 (gage height, 9.0 feet, present datum, from floodmarks), by slope-area method.

Remarks—Records good. One small diversion above station for irrigation. Flow slightly regulated by several small reservoirs (total capacity, about 1,500 acre-feet).

East Fork Carson River near Gardnerville, Nevada

Location—Water-stage recorder, lat. $38^{\circ}51'30''$, long. $119^{\circ}41'50''$, in NE $\frac{1}{4}$ sec. 2, T. 11 N., R. 20 E., 2 miles east of Mud Lake Reservoir, 3 miles downstream from Leviathan Creek, and 7 miles southeast of Gardnerville.

Drainage area—360 square miles.

Records available—May 1939 to September 1945. April 1890 to December 1893, October 1900 to December 1906, June to October 1917, December 1924 to September 1929, October 1935 to December 1937 to site 2 miles downstream, March 1908 to December 1910 at site one-half mile upstream.

Average discharge — 18 years (1890–1893, 1901–1903, 1908–1910, 1925–1928, 1935–1937, 1939–1945), 428 second-feet.

Extremes—Maximum discharge during year, 4,110 second-feet February 2 (gage height, 5.57 feet); minimum, 44 second-feet October 7, 1890–1893, 1900–1906, 1908–1910, 1917, 1924–1929, 1935–1937, 1939–1945: Maximum discharge, 12,000 second-feet December 11, 1937 (gage destroyed by flood) computed on basis of slope-area determinations of flow of tributaries, 14 miles upstream; minimum discharge observed, 8 second-feet December 4–10, 19–23, 1904.

Remarks—Records good except those for periods of ice effect or no gage-height record, which are fair. Station is above all diversions in Carson Valley. Diversions above station for irrigation. Flow slightly regulated by several small reservoirs (total capacity, about 5,000 acre-feet).

Carson River near Carson City, Nevada

Location—Water-stage recorder, lat. $39^{\circ}06'30''$, long. $119^{\circ}42'30''$, in NW $\frac{1}{4}$ sec. 2, T. 14 N., R. 20 E., 2 miles downstream from Clear Creek, 2 $\frac{1}{4}$ miles upstream from bridge on road to Mexican Dam, and 5 miles southeast of Carson City.

Records available—May 1939 to September 1945.

Extremes—Maximum discharge during year, 3,860 second-feet February 3 (gage height, 5.61 feet); minimum, 22 second-feet October 1, 1939–1945: Maximum discharge, 8,500 second-feet January 22, 1943 (gage height, 8.40 feet), by slope-area method; minimum daily, 4 second-feet (estimated) August 17, 1939.

Remarks—Records good except those for period of ice effect or no gage-height record, which are fair. Many diversions above station for irrigation. Flow slightly regulated by several small reservoirs on tributaries.

Carson River near Fort Churchill, Nevada

Location—Water-stage recorder, lat. $39^{\circ}17'$, long. $119^{\circ}18'$, in SE $\frac{1}{4}$ sec. 32, T. 17 N., R. 24 E., 2 miles west of Fort Churchill and 6 miles east of Clifton.

Drainage area—1,450 square miles.

Records available—January 1934 to September 1944. April 1911 to December 1933 at site 8 miles upstream.

Average discharge—33 years (1911–1944), 366 second-feet.

Extremes—Maximum daily discharge during year, 1,190 second-feet May 11; no flow October 1–6, July 19 to September 30. 1911–1944: Maximum discharge, 6,300 second-feet January 24, 1943; no flow during some periods in nearly every year since 1923.

Remarks—Records good. Several diversions above station for irrigation, including diversions for irrigation of 720 acres between present site and the one used prior to January 1, 1934. Practically entire flow is diverted during late irrigation season.

Cooperation—Records of daily discharge furnished by Truckee-Carson Irrigation Districts.

WALKER LAKE BASIN**East Fork West Walker near Bridgeport, California**

Location—Water-stage recorder, lat. $38^{\circ}21'30''$, long. $119^{\circ}26'30''$, in NW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 22, T. 6 N., R. 23 E., three-fourths of a mile north of Sonora Junction, 1 $\frac{1}{2}$ miles upstream from mouth and 14 miles northwest of Bridgeport. Prior to August 1910, staff gage at site 1 mile upstream at different datum.

Drainage area—63 square miles.

Records available—October 1944 to September 1945. April to August 1910 at a site 1 $\frac{1}{2}$ miles upstream. Records equivalent.

Extremes—Maximum discharge during the year 660 second-feet February 2 (gage height, 2.69 feet) from rating curve extended above 270 second-feet on basis of velocity-area study; minimum daily, 16 second-feet March 2–7. 1910, 1945: Maximum discharge recorded, that of February 2, 1945. Minimum, that of March 2–7, 1945.

Remarks—Records good except October to March, which are fair. Small diversions above station.

West Walker River below East Fork, near Coleville, California

Location—Water-stage recorder, lat. $38^{\circ}22'45''$, long. $119^{\circ}27'00''$, in SE $\frac{1}{4}$ sec. 9, T. 6 N., R. 23 E., 75 feet downstream from East Fork, 200 feet upstream from bridge on U. S. Highway 395, and 13 miles south-east of Coleville.

Drainage area—182 square miles.

Records available—April 1938 to September 1945. October 1902 to July 1908 at site 9 $\frac{1}{2}$ miles downstream; March 1909 to August 1910 and June 1915 to March 1938 at site 10 miles downstream, published as West Walker River near Coleville, California.

Extremes—Maximum discharge during year, 1,880 second-feet June 22 (gage height, 5.03 feet); minimum daily, 31 second-feet October 27, 28, 30. 1938–1945: Maximum discharge, 2,490 second-feet June 9, 1938 (gage height, 4.90 feet, site and datum then in use), from rating curve extended above 1,600 second-feet; minimum, 6 second-feet December 10, 1940. Maximum discharge known, 5,800 second-feet December 11, 1937, by slope-area method.

Remarks—Records good except those for periods of ice effect, which are fair. Station is above diversions except a few small ranch ditches. Flow very slightly regulated by Poor Lake Reservoir (capacity unknown), 7 miles upstream.

Topaz Reservoir near Topaz, California

Location—Float and staff gages at outlet works of Topaz Reservoir, lat. $38^{\circ}41'$, long. $119^{\circ}31'$, in sec. 28, T. 10 N., R. 22 E., 6 miles north of Topaz. Datum of gage is at mean sea level (levels by Walker River Irrigation District).

Records available—October 1931 to September 1945.

Extremes—Maximum contents observed during year, 60,220 acre-feet July 21, 22 (elevation, 6,005.34 feet); minimum, 14,510 acre-feet October 22–27 (elevation, 4,981.46 feet). 1931–1945: Maximum contents observed, 60,240 acre-feet June 30, 1941 (elevation 5,005.35 feet); minimum observed, 505 acre-feet October 22–25, 1931 (elevation, 4,972.63).

Remarks—Topaz Reservoir, formerly known as Alkali Lake, was formed by the diversion of water from West Walker River through a feeder canal and the construction of an outlet tunnel through a low saddle in rim of lake. Storage began January 30, 1922. Usable capacity, 59,440 acre-feet between elevations 4,972.3 feet (lowest practical elevation for diversion through tunnel, bottom of outlet tunnel at elevation 4,970 feet), and 5,005 feet (3 feet below top of levee) above mean sea level. Capacity of reservoir increased from about 45,000 acre-feet to 59,440 acre-feet in October 1937 by an earthfill, rock-faced levee at south end. Water is used for irrigation in Walker River Irrigation District.

Cooperation—Elevations furnished by the Walker River Irrigation District.

Bridgeport Reservoir near Bridgeport, California

Location—Float gage, lat. $38^{\circ}19'30''$, long. $119^{\circ}12'50''$, in SE $\frac{1}{4}$ sec. 34 T. 6 N., R. 25 E., at Bridgeport dam on East Walker River and 4 $\frac{1}{2}$ miles north of Bridgeport. Datum of gage is at mean sea level.

Drainage area—362 square miles.

Records available—October 1931 to September 1945 in reports of Geological Survey. March 1926 to September 1945 in files of Walker River Irrigation District.

Extremes—Maximum contents during year, 43,670 acre-feet May 3, 4, 7, 8, 10, 12, 14 (elevation, 6,460.4 feet); minimum, 10,260 acre-feet October 10, 11 (elevation, 6,444.05 feet). 1926–1945: Maximum contents, 44,580 acre-feet June 12, 1938 (elevation, 6,460.7 feet); no storage during fall of 1929, 1930.

Remarks—Reservoir is formed by earth-fill, rock-faced dam; storage began December 8, 1923; dam completed in November 1924. Capacity, 42,460 acre-feet between elevations 6,412 feet (sill of outlet gate) and 6,460 feet (crest of spillway). No dead storage. Water is used for irrigation in Walker River Irrigation District. Contents correspond to gage reading made about 8 a. m. daily.

Cooperation—Elevations and capacity table furnished by Walker River Irrigation District.

East Walker River near Bridgeport, California

Location—Water-stage recorder, lat. $38^{\circ}19'40''$, long. $119^{\circ}12'50''$, in SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 34, T. 6 N., R. 25 E., 1,500 feet downstream from Bridgeport Reservoir, 5 miles north of Bridgeport, and 10 miles upstream from Sweetwater Creek.

Drainage area—362 square miles.

Records available—October 1921 to September 1945. July 1911 to September 1914 at site $1\frac{1}{2}$ miles upstream (gage heights only).

Average discharge—22 years (1922–1924, 1925–1945), 130 second-feet.

Extremes (regulated)—Maximum daily discharge during year, 809 second-feet July 11; minimum daily, 1.8 second-feet November 20–24, 1921–1945: Maximum discharge, 1,240 second-feet January 22, 1943 (gage height, 4.5 feet); minimum daily recorded, that of November 20–24, 1944.

Remarks—Records good. Diversions for irrigation of meadow and pasture lands near Bridgeport. Flow regulated by Bridgeport Reservoir (see preceding page).

Walker Lake near Hawthorne, Nevada

Location—Bench mark at United States Naval Ammunition Depot, lat. $38^{\circ}35'$, long. $118^{\circ}42'$, in NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 2, T. 8 N., R. 29 E., 3 miles northwest of Hawthorne. Bench mark is 4,053.41 feet above mean sea level, adjustment of 1912.

Records available—August 1928 to September 1945. Occasional readings prior to August 1928.

Extremes—1928–1945: Maximum elevation observed, 4,051.8 feet March 13, 1928 (Indian Service); minimum observed, 4,013.0 feet January 12, 1945. An elevation of 4,078.0 feet, adjustment of 1912, was observed September 27, 1908, by Geological Survey.

Remarks—Elevations determined by spirit leveling.

Cooperation—Records furnished by U. S. Navy Department.

VIRGIN RIVER BASIN

Virgin River at Littlefield, Arizona

Location — Water - stage recorder, lat. $36^{\circ}53'$, long. $113^{\circ}56'$, in SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 4, T. 40 N., R. 15 W., three-eighths of a mile downstream

from Beaverdam Wash, three-eighths of a mile upstream from Littlefield, and 36 miles upstream from water line of Lake Mead at elevation 1,221 feet above mean sea level. Datum of gage is 1,763.68 feet above mean sat level, datum of 1929.

Drainage area—5,090 square miles.

Records available—October 1929 to September 1945.

Average discharge—16 years, 274 second-feet.

Extremes—Maximum discharge during year, 4,170 second-feet February 3 (gage height, 6.57 feet); minimum, 57 second-feet July 13 (gage height, 2.24 feet). 1929–1945: Maximum discharge, 22,000 second-feet March 3, 1938 (gage height, 12.8 feet, present datum, from floodmarks), by slope-area method; minimum observed, about 50 second-feet on many days in several years, resulting from nearby fairly uniform spring inflow.

Remarks—Records good except those above 500 second-feet in February, August, and September, which are fair. Many diversions for irrigation above station and several below.

Meadow Valley Wash near Panaca, Nevada

Location—Water-stage recorder, lat. $37^{\circ}52'$, long. $114^{\circ}19'$, in sec. 13, T. 1 S., R. 68 E., 200 feet downstream from road bridge at Delmues ranch, 6 miles northeast of Panaca, and 9 miles southeast of Pioche.

Records available—November 1944 to September 1945.

Extremes — Maximum discharge during period, 720 second-feet August 2, from slope-area measurement; minimum, 0.1 second-foot July 3, 4.

Remarks—Diversions above station for irrigation.

COLORADO RIVER MAIN STEM

Lake Mead at Boulder Dam, Arizona-Nevada

Location—Water-stage indicator, lat. $36^{\circ}00'59''$, long. $114^{\circ}44'10''$, in SW $\frac{1}{4}$ sec. 3, T. 30 N., R. 23 W., Gila and Salt River meridian, in center of Boulder Dam on Colorado River. Datum of gage is at mean sea level, adjustment of 1912, or 0.21 foot above mean sea level, datum of 1929. Elevations given herein are referred to adjustment of 1912.

Drainage area—167,800 square miles.

Records available—February 1935 to September 1945.

Extremes — Maximum contents during year, 22,850,000 acre-feet October 1 (elevation, 1,187.00 feet); minimum, 17,670,000 acre-feet April 25, 26 (elevation, 1,146.55 feet). 1935–1945: Maximum contents, 27,790,000 acre-feet July 29, 30, 1941 (elevation, 1,220.45 feet); minimum (since 1940), that of April 25, 26, 1945.

Remarks—Reservoir is formed by concrete arch-gravity type dam; storage began February 1, 1935; dam completed March 1, 1936. Total capacity, 32,359,000 acre-feet, consisting of the following: dead storage, 3,207,000 acre-feet below elevation 895.0 feet (gate sills in outlet towers); usable contents, 27,935,000 acre-feet between elevations 895.0 feet and 1,221.4 feet (top of automatic spillway gates in raised position); and uncontrolled storage, 1,217,000 acre-feet between elevations 1,221.4 feet and 1,229.0 feet. Reservoir is used to store water for irrigation, municipal water supply, power development, and for flood control. Figures given herein represent usable contents.

Cooperation—Records collected and prepared in cooperation with Bureau of Reclamation.

Colorado River below Boulder Dam, Arizona-Nevada

Location—Water-stage recorder, lat. $36^{\circ}00'15''$, long. $114^{\circ}44'35''$, in SW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 10, T. 30. N., R. 23 W., Gila and Salt River meridian, or NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 32, T. 22 S., R. 65 E., Mount Diablo meridian, 1 mile downstream from Boulder dam. Datum of gage is 599.96 feet above mean sea level, datum of 1929, used locally as 600.00 feet as originally determined.

Drainage area—167,800 square miles at Boulder dam.

Records available—April 1934 to September 1945. - Record of diversions to Boulder City-Las Vegas, Nevada, industrial area, April 1942 to September 1945.

Average discharge—10 years (1935-1945), 14,340 second-feet (regulated, but not adjusted for storage in Lake Mead).

Extremes (regulated) — Maximum discharge during year, 28,600 second-feet June 19 (gage height, 48.85 feet); minimum, 4,920 second-feet July 9 (gage height, 39.50 feet); minimum daily, 7,130 second-feet September 9. 1935-1945: Maximum discharge, 51,200 second-feet February 13, 1939 (gage height, 54.96 feet); no flow February 10, 1935.

Remarks—Records excellent. Discharge regulated at Boulder Dam since February 1, 1935 (see preceding page). Diversions above station for irrigation and industrial uses. Diversions by pumping from Lake Mead six miles above Boulder dam to Boulder City-Las Vegas, Nevada, industrial area, for municipal and industrial use began April 7, 1942.

Cooperation — Record of diversions to Boulder City-Las Vegas, Nevada, industrial area furnished by Bureau of Reclamation.

CHAPTER X

Humboldt River Board

PERSONNEL

J. W. Boynton, Winnemucca, Nevada, Chairman.
Phil Tobin, Winnemucca, Nevada.
Frank Cloud, Lovelock, Nevada, Secretary.
George Hay, Lovelock, Nevada.
Wm. Wright, Elko, Nevada.
Edward Murphy, Elko, Nevada.
Elmer Hill, Battle Mountain, Nevada.
Myron Doyle, Battle Mountain, Nevada.

The Humboldt River Board was organized at a meeting called by the State Engineer at Elko, Nevada, August 22, 1945, where it was held under the auspices of the Elko Chamber of Commerce under the direction of Frank E. Walters, President. Over fifty persons representing agricultural and business enterprises along the Humboldt River and in the towns of Elko, Battle Mountain, Winnemucca, and Lovelock were present, and also representatives of all Federal and State organizations having to do with use of water and flood control. Prior to the meeting an excellent dinner was served to the large number of guests by the Elko Chamber of Commerce at the Commercial Hotel.

Seated at the speakers table were the following, each of whom made highly informative short talks of much interest during the meeting.

Frank E. Walters, Secretary, Elko Chamber of Commerce.

E. O. Larson, Director, Region 4, U. S. Bureau of Reclamation, Salt Lake City, Utah.

F. G. Christian, Principal Engineer, U. S. Army Engineer Office, Sacramento, California.

Milton T. Wilson, District Engineer, Surface Water Division, U. S. Geological Survey, Salt Lake City, Utah.

George Hardman, Soil Conservationist, U. S. Department of Agriculture.

Dr. George D. Clyde, Chief, Division of Irrigation of U. S. Soil Conservation Service, Salt Lake City, Utah.

Dr. Cecil Creel, Dean, Department of Agriculture, University of Nevada.

Hugh A. Shamberger, Assistant Nevada State Engineer in charge of ground water development, Carson City, Nevada.

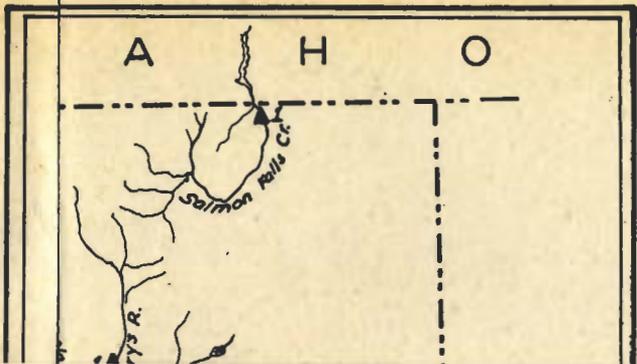
A. V. Tallman, Humboldt County State Senator, former Supervisory Commissioner, Humboldt River System, Winnemucca, Nevada.

Rene Lemaire, Nevada State Senator, Battle Mountain, Nevada.

Following are excerpts from the addresses of a number of the speakers taken from the reported proceedings:

E. O. Larson:

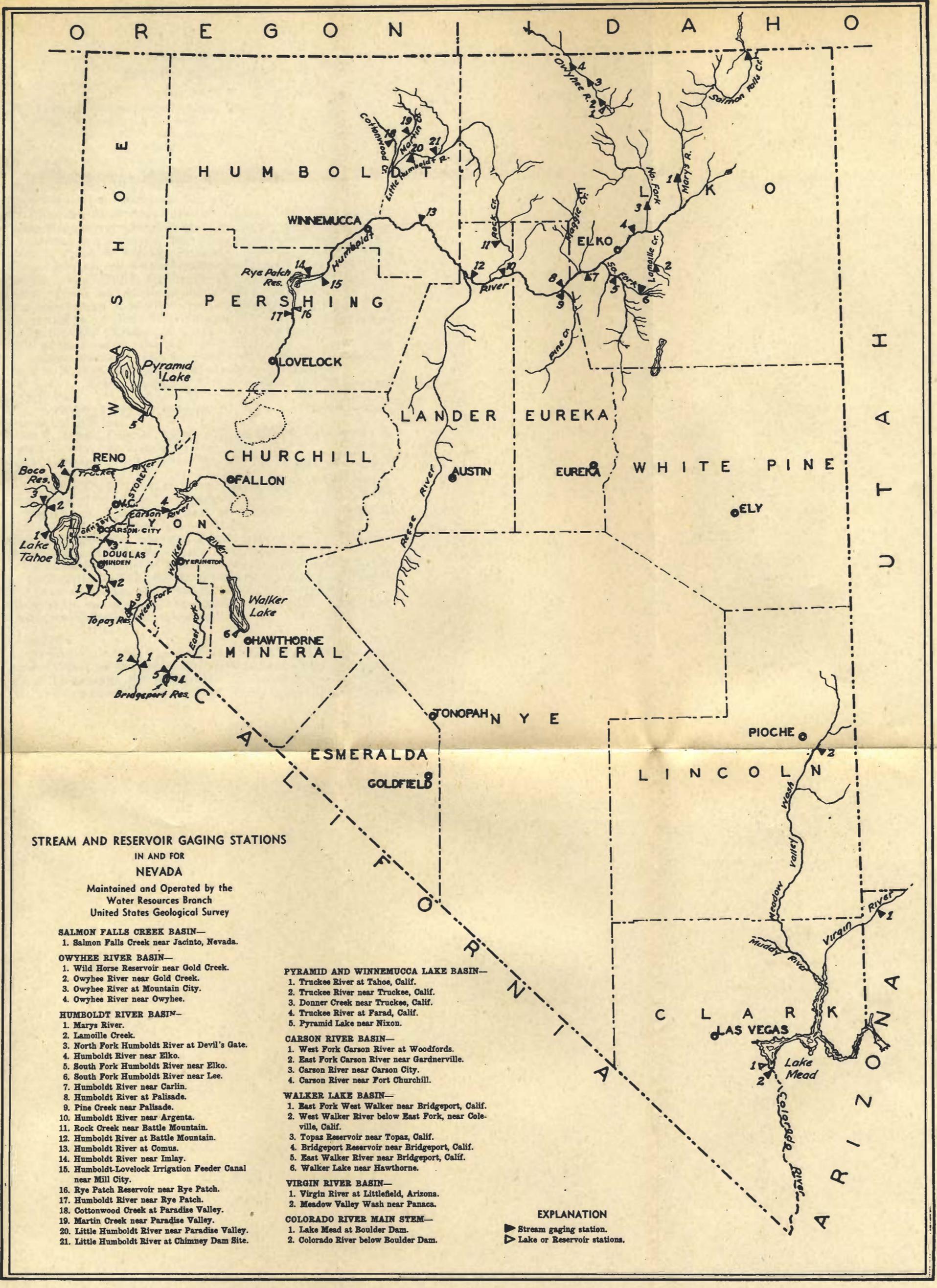
"At the present time the Bureau of Reclamation is preparing a comprehensive report on the potential irrigation and power projects in Nevada on the Carson, the Walker, the Truckee, and the Humboldt Rivers. This report will be submitted to Congress to apprise Congress



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STREAM AND RESERVOIR GAGING STATIONS

IN AND FOR
NEVADA

Maintained and Operated by the
Water Resources Branch
United States Geological Survey

SALMON FALLS CREEK BASIN—

- 1. Salmon Falls Creek near Jacinto, Nevada.

OWYHEE RIVER BASIN—

- 1. Wild Horse Reservoir near Gold Creek.
- 2. Owyhee River near Gold Creek.
- 3. Owyhee River at Mountain City.
- 4. Owyhee River near Owyhee.

HUMBOLDT RIVER BASIN—

- 1. Marys River.
- 2. Lamoille Creek.
- 3. North Fork Humboldt River at Devil's Gate.
- 4. Humboldt River near Elko.
- 5. South Fork Humboldt River near Elko.
- 6. South Fork Humboldt River near Lee.
- 7. Humboldt River near Carlin.
- 8. Humboldt River at Palisade.
- 9. Pine Creek near Palisade.
- 10. Humboldt River near Argenta.
- 11. Rock Creek near Battle Mountain.
- 12. Humboldt River at Battle Mountain.
- 13. Humboldt River at Comus.
- 14. Humboldt River near Imlay.
- 15. Humboldt-Lovelock Irrigation Feeder Canal near Mill City.
- 16. Rye Patch Reservoir near Rye Patch.
- 17. Humboldt River near Rye Patch.
- 18. Cottonwood Creek at Paradise Valley.
- 19. Martin Creek near Paradise Valley.
- 20. Little Humboldt River near Paradise Valley.
- 21. Little Humboldt River at Chimney Dam Site.

PYRAMID AND WINNEMUCCA LAKE BASIN—

- 1. Truckee River at Tahoe, Calif.
- 2. Truckee River near Truckee, Calif.
- 3. Donner Creek near Truckee, Calif.
- 4. Truckee River at Farad, Calif.
- 5. Pyramid Lake near Nixon.

CARSON RIVER BASIN—

- 1. West Fork Carson River at Woodfords.
- 2. East Fork Carson River near Gardnerville.
- 3. Carson River near Carson City.
- 4. Carson River near Fort Churchill.

WALKER LAKE BASIN—

- 1. East Fork West Walker near Bridgeport, Calif.
- 2. West Walker River below East Fork, near Colville, Calif.
- 3. Topaz Reservoir near Topaz, Calif.
- 4. Bridgeport Reservoir near Bridgeport, Calif.
- 5. East Walker River near Bridgeport, Calif.
- 6. Walker Lake near Hawthorne.

VIRGIN RIVER BASIN—

- 1. Virgin River at Littlefield, Arizona.
- 2. Meadow Valley Wash near Panaca.

COLORADO RIVER MAIN STEM—

- 1. Lake Mead at Boulder Dam.
- 2. Colorado River below Boulder Dam.

EXPLANATION

- ▶ Stream gaging station.
- ▽ Lake or Reservoir stations.

of the potentialities in Nevada. The report is near completion at the present time, and will come back to the States for consideration, after that it will finally go to Congress, that is, after it is submitted to the Commissioner and Secretary of the Interior, and other departments for review, the Department of Agriculture, and so on. Our plan is to get detailed information as to feasibility, distribution and costs and benefits, etc.

We have plans worked out for carrying these detailed investigations on, and that includes the Humboldt River.

Now, we, of course, don't know what can be done on the Humboldt River, and I don't think anyone else does until more information is obtained. The bureau has made investigations here before, and coming out of that investigation was the construction of the Rye Patch Dam. At that time storage on the upstream sites were thought too expensive. Now things have changed altogether. The Army has also made studies of flood control. They will speak for themselves, of course, and some work has been carried on by them. As the world changes so do conditions, and so do the feasibility of certain projects.

We have a lot of problems on the Humboldt River. You have a long river traversing a lot of territory. Some places have too much water, some places not enough, and I might say rather poor stream regulation. What can be worked out at all we don't know yet. We don't know the answer, but we are willing to come in and help and try to find it.

We are working very closely with the Army Engineers in Nevada and intend to work with them on this problem. We have been in conference with them on several occasions in the past few months, and it is our purpose to work together with them in their flood control studies, and we in our irrigation studies so we don't duplicate any work and so we get the best thoughts of engineers on both lines of endeavor. I think that is one good way to solve problems on a thing of this kind.

I think you folks know your stream better than I do. I have looked over some of the records of the U. S. G. S. over a long period of years, and I find the average runoff at Palisade of the Humboldt River from 1896 to 1941 was about 226,000 acre feet. You had five good years in a row, or four good years since 1941, which brings that average up to about, I had better check that to be sure, about 256,000 acre feet. Now, your stream is very, very erratic. In 1934 you only had 25,000 acre feet for the whole year at Palisade. In 1931 you only had 37,000 acre feet. In 1910 your highest year of record, you had 620,000 acre feet pass Palisade, and this year about 593,000, which is the next highest year. Out of the last thirty-four years you have had about thirteen years with more than 75,000 acre feet in any one month passing Palisade. Ten years that occurred in June; ten years it exceeded that amount in May; and eight years in April, and I believe one year when it exceeded that in March. Now, out of these thirteen years when you had more than an average at Palisade of 75,000 acre feet, out of those thirteen years four of them have been since 1941, the past four of five years, so that you can see that your stream is very erratic, and flood water stored means a long period of hold-over.

You are fortunate in having two good reservoir sites, one on the North Fork which will hold nearly 100,000 acre feet and one on the South Fork which will hold considerably more than that. Those sites

were investigated a short time ago by the geologists of the Army Engineers and our geologists and both were impressed with the sites, but we feel before we go to drilling sites or do anything at all there should be an over-all examination of the water supply. That would be the first thing in order, which we should do this coming winter. As I said, before, we work closely with the Army engineers so that we can get the best answer to what can be done for irrigation, flood control, channel revision and etc. You have other complications such as tight dams in the river; I believe you have over one hundred. There are further considerations; if storage is provided, will it get to the people who must pay for it? There are many problems, and we hope you people realize they have all got to be studied very carefully.

Of course, there is no question but what a greater use of your water can be made on the Humboldt system, because if the water can be kept off of some of the lands where they are now under water, for instance, three feet deep, certainly you can raise more hay, or at least a better quality of hay. That is true on a lot of your hay lands. Just how that can be worked out, I don't know. One possibility is, of course, leveling out your water a little more, but in doing all these things we must take into consideration, and above all not take water that goes to present rights. We can't take away water that goes to irrigate the valley lower down. It must be considered how this can be done without interfering with present rights."

F. G. Christian:

"As Mr. Smith has stated, in the preliminary report or examination just before the war, that report was authorized by Congress in the 1938 Flood Control Act, and a public hearing on the matter which was held in September of that year, and a short time thereafter in January, 1939, a preliminary report was submitted to our Washington office, and as a result of that preliminary examination our head office in Washington authorized the making of a survey or detailed report.

Before we were able to get going on that report the war came along, and the Bureau of the Budget in Washington froze that report, as well as a number of others, in order to save personnel for war activities. A few weeks ago, five or six weeks ago, something like that, the Bureau of the Budget released the freeze on completing the Humboldt report, as well as several others, so now we are planning on starting again, or rather on beginning the detailed studies of the Humboldt Basin.

As Mr. Larson has just stated there are many problems in the Humboldt Basin, and complications there that are going to make solution somewhat difficult. However, as engineers, that makes the problem just that much more interesting, because we all like to have something that tests our mettle a little bit.

There isn't a whole lot of basic information available for the Humboldt Basin, and that means that we will have to collect a good deal of information. In some of the other basins that we have been studying in the past few years, thinking particularly of California, we had a wealth of available data. The State there had collected an enormous amount, and it made the solution of those problems there much easier because we had something in the way of basic data to begin with. On the Humboldt, as I just stated, we are going to have to collect a lot of

basic data. We do not have good data. There is not too much water supply information, but we hope to be able to take what is available, and by studying it and collecting additional data make a solution, or at least work out a feasible plan for taking care of the problems. How successful we will be, of course, is a little hard to say now, but I think that the Bureau of Reclamation and the Army engineers together will certainly do the best that can possibly be done with this situation.

The Army engineers, of course, are primarily interested, by Congressional directive, from the flood control standpoint, but we are also required by law to take into account all other uses, and to develop projects which will utilize the water to the best advantage. The Bureau of Reclamation, I know, works along the same lines. They are approaching it, of course, from the irrigation standpoint. We are both working together. We exchange basic data in order to avoid duplication of work. Sometimes one of us will make a survey of a dam site, and perhaps the other agency will build that same dam there, or perhaps we will build it, and we will swap the information on a particular site, and they will furnish us information they have on another site. That process results in getting the work done for the least cost of public funds. Then I think the approach to the solution of the problem from, you might say, two separate viewpoints and collaborating with each other in developing a project which will attempt to solve both irrigation and flood control and other problems, I think it brings about the best solution. It insures that the stream will be developed in the way that is best for all concerned, because we will take what we figure is best for flood control, and the bureau will take what they figure is the best for irrigation and we will get together, and see how the solution of each agency fits in with the other, and will try that way to iron out the 'bugs.'

We expect shortly to work out a program for further field work. This program can be worked out in cooperation with the Bureau of Reclamation so that the information that we collect will be information that can be used by both agencies, so that each of us won't be attempting to collect the same thing."

Milton T. Wilson:

"As has been stated by Mr. Larson and Mr. Christian, before plans can be made for an irrigation project, flood control dam built, or a hydro-electric plant designed, it is absolutely necessary that we collect and have reliable and accurate records of our stream flow. It is not enough to know that we have a storage site on the South Fork of the Humboldt, but we must have records at that site covering several years in order to determine the diurnal fluctuations, the yearly variations in flow, and the variations between wet and dry cycles. That is where the Geological Survey fits into the picture of river basin development. The survey is the authorized Federal agency for cooperating with the States and other Federal agencies in making topographical maps, river profile maps, gauging the streams, making ground water investigations, and preliminary reports on feasible projects.

Several years ago profile maps were made of all the major tributaries of the Humboldt River. Those maps show location of reservoir sites

and give a rough idea of the capacity of those sites. Our stream gauging program and ground water investigation are not so well advanced. In fact, two years ago we were only maintaining four gauging stations in the Humboldt River Basin under the State Geological Survey cooperative stream gauging program, and two of those were located in the Little Humboldt River Basin near Paradise Valley.

Thanks to the ingenuity and foresight of our State Engineer's Office and Humboldt River water users that program has been enlarged. Two years ago this fall gauging stations were placed on Lamoille Creek above the town of Lamoille, one on Mary's River, Cabin Field above Deeth, one on the North Fork, at Devil's Gate dam site, one on the Humboldt River between here and Carlin down Moline Canyon, and one on the Little Humboldt River. That expansion of program was continued again last fall and gauging stations were placed. One gauging station was placed in the upper South Fork area at Bolton's Ranch above Lee. Another station was placed on the Humboldt River below the North Fork and ten miles above Elko. A former gauging station above Rye Patch reservoir that was washed out by high water a few years ago was rehabilitated and placed in operation. A gauging station was installed on Cottonwood Creek Paradise Valley. It is proposed that we continue that expansion this year. Four or five more additional gauging stations will be installed.

This program, this increased stream gauging program, was launched during the war emergency when we were facing manpower shortages, material shortages, and the possibility of some criticism because the work was not all connected directly with the war. It is a fine thought we should prepare for war in time of peace, but we should also remember that we should prepare for the postwar period during time of war, and I think that our launching of the increased stream gauging program was very wise and very practical because that information is absolutely necessary before detailed plans can be made on any project.

You have a wonderful possible agricultural area in Argenta area. This tract is near Battle Mountain, and it is not only possible but very probable that the ground water supply in that area with the water that is now being lost by evaporation and transpiration will be sufficient for an excellent irrigation project without decreasing the whole flow of the Humboldt River or interfering with lower rights. To determine that possibility we need new gauging stations above and below the Argenta area, and a very detailed study of ground water possibilities. Rock Creek, one of the major tributaries of the Humboldt River, enters in the Argenta area, and we need a gauging station to show the contribution of Rock Creek, to the Humboldt River. There are also reservoir sites on Rock Creek.

In addition to the reservoir site on the Humboldt at the Devil's Gate there is another site upstream on the North Fork. We need to determine the water supply at that location in order to determine the most feasible and most economical location for a reservoir on the North Fork. On Mary's River our river profile map shows several possible reservoir sites, three on the main stream and one on Hanks' Creek. Very little or practically nothing is known on distribution of water supply in that area. Some additional gauging stations are needed.

Two years ago the Geological Survey started a cooperative program

in the Las Vegas area. That program is being continued, and in addition your State Legislature last winter appropriated some funds for cooperative work on a statewide basis. That work is just getting under way. Mr. Thomas W. Robinson, of our Ground Water Division, is now located in Carson and will make detailed investigations for several basins in the State and keep records of water levels throughout the State on a Statewide basis.

Many of you are familiar, I believe, as noted by Mr. Larson, with the fact that the Humboldt River for the past few years has had a very excellent water supply, considerably above normal. As was noted, the average flow of the Humboldt at Palisade over a period of thirty-six years was 226,000 acre feet.

It is fortunate that we have a long-time record at this given point on the Humboldt River at Palisade, as water supply studies can be made by correlating records of short periods at possible reservoir sites with this long-time record in order to determine the water supply through wet and dry cycles. This year we have already had over a half a million acre feet pass the Palisade station. By the end of the water year it will have exceeded 600,000 acre feet. Much of that water has gone to waste this year. Over a half million acre feet in the Rye Patch reservoir has gone into the Humboldt sink, where it will be evaporated without economic benefit to the Commonwealth of Nevada. That water if stored upstream would not only be a good supply to hold over for dry years and the later irrigation season, but would also decrease or practically eliminate the flood damages.

This year large acres of pasture and hay land in the Humboldt River Basin were flooded for several weeks and the hay produced is not as satisfactory, not as good as if that water had been on the land for a shorter period. Too, as has been mentioned, flood damages occurred in the Lower Lovelock Valley. We thank the Army engineers for entering that area and assisting the Pershing County Water Conservation District in preparing their dikes and making drains. As the County Commissioners said after the work had been completed, there was probably in excess of \$350,000,000 in profits saved.

We are pleased to have representatives of the Geological Survey here at this meeting, and our desire is to assist wherever we can for the most practical and most economical development of the water resources within the Humboldt River Basin and throughout the State of Nevada."

Dr. Geo. D. Clyde:

"I really came down here tonight at the invitation of Mr. Smith to listen and to get more information pertaining to this resource of the State of Nevada. On my way down I ran into some of this sagebrush that is in bloom, and you know what that does to some people.

I have not too much direct experience on the Humboldt River, but over the past twenty years, nearly twenty-five years, I have had the opportunity to work with Dr. Church of your experimental station in the study of mountain hydrology, in which the objective is to determine the major need, the characteristics of flow for the purpose of predicting in advance the wealth that you are going to get in any one season. Now, that is a big order.

You have a resource here about which little is known, and as pointed out by Mr. Larson, Mr. Christian and Mr. Wilson, before we can hope to harness that resource and make it serve man, we must know more about it, and these men and their agencies are engaged in the determination of the characteristics of that resource. But we must go further. After we get water, what are we going to do with it? We are living in an arid region in which water and land are limiting, or limited resources, and those two resources will limit the agriculture of that region. I think all of you are interested in the utilization of those resources in such a way that we can establish and maintain a profitable agriculture, because after all is said and done, we are interested in the thing from a profit motive. You men are interested in how much feed you can raise. You are interested in making a profit, making a living, and if we can't make a profit we can't be expected to continue.

Now, Mr. Larson, I think, pointed out that the entire philosophy of national reclamation has changed during the past forty years. Formerly the farmer was expected to pay the entire cost of development of water supplies. I think most people now accept the philosophy that the farmers are not the only ones who benefit from the development of those resources, but the doctor and the lawyer and the engineer and the groceryman and these communities all benefit. There are flood control benefits; there are national benefits; state benefits; county benefits, and I think the philosophy is now gradually coming around to this point of view, that the farmer should be required to pay only a portion of the cost of such development and that the Government is justified in subsidizing the development of these resources wherever they will result in an increased national wealth, and whenever you build an irrigation project, a successful irrigation project, you increase the national wealth, and, therefore, I think we should not stop as they did after they built the Rye Patch Dam, and say, "There are no more projects on the Humboldt that are feasible. They cost too much." I think we should look into all of the aspects from the time the water falls on the water shed, where that runs down through the channels into a control works constructed by the Federal Government, the State Government and the people, to the point at which it enters the soil and through the soil into the plant root, and through the plant into a cow which produces the beef which you people sell. In other words, it is not a single idea, it is a multitude of ideas. This river must be developed as a multiple-use proposition, and if it is developed as a multiple-use proposition we can benefit from those resources, land and water, to the ultimate.

The first problem is to get the water and to get it under control. Now, that means what? It means adequate works, it means adequate storage, either above ground or underground. It means adequate distribution system. It means adequate control structures on the farms, but it means to develop that supply, harness it, make it obey the wishes of man, and put it into plants, make it available to those plants when the plants need it in order that we might produce a greater amount of crop.

Now, there is some danger attached to that, because I think all of you will agree that you can destroy a farm by overirrigation just as

effectively as you can destroy it by taking all of the water off of it, and therefore we should consider how we are going to use this water after we get it to the farmer's headgate. We have irrigated for some eighty to one hundred years in the West, and yet we do not know the answers as to how to apply this water, how much to apply and when to apply it to get the best results. Neither do we know which crops should be planted which will give the best response in feed value or in crop return. Much remains to be done. Whose job is it to determine those things? After all the only justification of these Federal and State agencies is to serve the people, to help them solve the problems that must be solved to enable them to utilize these resources to the best advantage. You have your State Experiment Station, you have the research division of the Soil Conservation Service, two agencies which have been charged with the responsibility of studying these problems in an effort to determine how to best use this water so we might maintain a profitable agriculture.

I am frank in saying, gentlemen, the answers are not yet available in all categories. More work is necessary, because if we get that water supply down to the farm and then don't use it properly we have failed in the ultimate thing that we have set out to do. Therefore, we must follow this through. The Irrigation Division of the Soil Conservation Service is at your service, is at your disposal, working with your experiment station to help solve these problems, because we feel, and I am sure you feel, that much needs to be done, for example, in the field of crop adaptation in the Humboldt Valley. What kind of grasses should you plant to get the greatest return with the particular type of water supply that you have or will have? We are finding, for example, in Utah, in some valleys, which are very similar to this, where they cover their pastures with water for six weeks or two months and then they drain it off, a great deal of the wild hay which they get, which is largely watergrass, has little value as far as food content goes, and they are getting a very small return. We are convinced that they could use very much less water with a different kind of a grass or a different kind of forage and their net return would be many, many times the net return that they now get. They could supplement that water program with a greater return to the owner of that right.

They agree that these rights must be protected, but at the same time I am sure every man who owns a water right is interested in seeing that that water yields the greatest returns to the people, to him and to the people of his community.

Mr. Smith, I am very much appreciative of the opportunity of coming down and meeting these men, and I hope to help solve some of these problems on the Humboldt River."

Dr. Cecil W. Creel:

"I am very happy to be here with you tonight as a representative of our university, and also bring you the greetings of our president, Dr. Moseley, who assured me he would have been very happy to have been here with me tonight if he had not had another previous engagement. He felt it was quite important and agreed with me that our university be represented here at this meeting as an indication of our interest in your problems.

I think we have had some very fine presentations here tonight of the

problems confronting us and the need for exploratory work. I am happy to see Dr. George Clyde here. Dr. Clyde, in addition to his work over at Utah State College, has made a national contribution through land grant college work, and we regard him as a real leader in problems of western agriculture and western irrigation. The Department of Agriculture is very fortunate in having secured his services.

Just in the way of reminiscence, shortly after I graduated from the Department of Agriculture at the University of Nevada, Governor Oddie, that great agricultural leader in western reclamation, Senator Newlands, and myself were delegates to the National Reclamation Association meeting in Salt Lake City. Hotel Utah had just been recently finished at that time, and I recollect the Senator took me down there after the meeting for a little after-dinner snack and refreshments, and we got to talking over some of the problems of the West. At that time I was temporarily employed by the Department of the Interior in Washington, D. C. He said to me, "Young man, I hope you get back to Nevada and have an opportunity to do something on what I think is an opportunity for the greatest development in our State and perhaps in the West. That is developing the agriculture and the resources of the Humboldt River." He said, "I think it has great potentialities." He said, "I have lived in our own State now for about a quarter of a century." This was thirty-three years ago, folks, when he said that. He had been a resident of Nevada for about twenty-five years. He said, "That is a great old river and we have hardly scratched the surface, and if we do we are going to have an agricultural empire, and it is up to you as a Nevada University graduate and every other graduate to render a great service and have a great and fine career."

It has only been indirectly through my work in the extension service of the University of Nevada that I have been connected with it, but I have had a great interest in the Humboldt through all these years.

The problems have been pretty well outlined, I think, by all these men. We have got a great agricultural area here. We have got a resource, particularly here in the upper reaches of the stream which, if it is fully utilized and fully developed can go far toward developing our agriculture in this State. Of course, we are interested in general farming, and for dairy production and poultry and all that, but fundamentally I think everyone of us here in the room that lives in Nevada knows that the resources of this stream are going largely toward making our livestock industry fully effective and fully productive, particularly in these upper regions, but all the way down the river. It is just natural from the start of the stream right down to where it ends in the Humboldt Sink. It fits right in with our cattle picture, in particular the development of our cattle industry and the marketing and fattening of our beef. I say from the standpoint of the University of Nevada, with the development of this stream there is a great opportunity to develop our agricultural resources here in Nevada.

Dr. Clyde has mentioned the work that our experiment station can do in cooperation with the Department of Agriculture in assisting with some of these problems, and I think it vitally important that we do develop facts regarding this stream and get information. We certainly need that type of information if we are going to go into the development of structures, and if a public works program should be

thrust upon us here in America as an aftermath of the war, we certainly want to be ready to see that this great resource can be effectively developed upon the basis of sound information. We have also the educational program outlined here for effective use of this water and its best utilization. That is where the extension service, working in cooperation with the county farm bureaus in our State, can render its greatest service. The university can best serve this work in that way.

I think we have a real opportunity to help you, and we want to work with you 100 percent in this program."

George Hardman:

"I just feel kind of lost to know what I could contribute to a meeting of this kind. I know there are some problems on this Humboldt River.

In 1919 I was sent out to pick a site along the river where we might do some experimental work on the use of water. We finally landed down at Battle Mountain and picked a place we thought was fine, nicely controlled irrigation system and pretty good land use, and we thought we had it. We set up a bunch of plots out there on the river and started some measurements. 1919 was a fairly dry year and we got along pretty good, and we thought we were getting places fast. We put in a lot of grasses on the bottom land there and had a grain drill and fixed a place up there. The company was very good and let us have all the land we wanted, and gosh, the grass looked fine. 1920 wasn't a bad year. It wasn't a very wet year either, you know, but was pretty good and things looked fine. 1921 came along and I went out pretty early in the year, and heavens on earth! There was flood water from Battle Mountain, clear across to North Battle Mountain, and all that year I looked through those wide meadows to see if I could find some of the grasses I seeded two years before. I couldn't find any. Well, the upshot was we got tired of that place, trying to work against those conditions, and pulled out.

There were lots of things we didn't know about the Humboldt River before that we found out in these three years but there are still a lot of things we don't know. I agree with Dr. Clyde and others here that there are a tremendous amount of things that we don't know about farming these types of lands. On the other hand, if we use well the information we do have we could do a much better job of farming than we are doing today without changing your water supply or anything else.

It is largely the purpose of the operation section of the Soil Conservation Service to cooperate, along with the other extension services, to try to get into use in the areas you are working those practices that have been pretty well established elsewhere but are not being used in our communities here.

Our operations are conducted almost wholly through soil conservation districts, because Congress has appropriated practically all the funds available to the operation section of the Soil Conservation Service to be used in cooperation with soil conservation districts. If we do work with you fellows in the Elko County area or along the Humboldt River any place, it will be largely through organized Soil Conservation districts. We have nine of these operating in the State today,

and we know that they are doing a pretty good job, and they are not difficult either to set up or to operate. They are just a cooperative need, and I think there are quite a number of things that we do know about farming under present conditions that we could put into effect as matters stand now with great benefit to ourselves. I am sure of it. We have done it, and we are doing it. We have a few demonstration farms around over the county here that are showing results, and I am sure that a number of you know of those places. Others can easily find out about them if you want to.

We are very much interested. We would like to get in on the ground floor here and follow the program through. If you get upstream storage, better control and regulatory dams on the river, we can do a better job. We would like to be in on the ground floor here. I am very glad to have been here tonight and listen to you."

George Ogilvie:

Mr. Ogilvie, President of Nevada Farm Bureau, unable to be present, submitted a written statement which was read by Frank E. Walters, as follows:

Mr. Walters:

"In sponsoring a meeting to discuss upstream storage on the Humboldt River, the Elko Chamber of Commerce is taking the initiative in a movement that may result in one of the most important pieces of construction ever attempted in the State of Nevada. If upstream storage is accomplished, every ranch, every community, every county on the Humboldt River will be directly benefited. In fact, the entire State will be benefited because prosperous communities collectively make a prosperous State.

Everyone along the Humboldt River can remember the dry cycle of years a few years ago. Dry years will come again, and we should be prepared for them in advance before they appear. There is nothing as discouraging to a rancher as seeing his crops burn up through lack of water and no water to keep them growing. We all remember the trouble the Water Commissioner had a few years ago getting a little more water from the tributaries to increase the flow of the Humboldt River for some of the older rights in Humboldt and Pershing Counties. Every rancher on the river remembers the uncertainty of crop production during those years. It was really that uncertainty which decided us to sell our ranch on the South Fork to the Indian Service. Every rancher in the Lovelock and Winnemucca area remembers the anxiety he had in those years waiting for water that did not come.

Whereas the building of the dam at Rye Patch by the ranchers of the Lovelock Valley has relieved the situation a great deal, it did not solve the problem. The storage facilities are not sufficient to store the water in high-water years like the last two or three. Besides, to benefit the entire river reservoirs should be built as high up on the tributaries as sites can be found. Last season every drop of water on both the South Fork and North Fork, with the exception of water needed to irrigate the Hunter and Banks Ranch on the south and the Devil's Gate Ranch on the north fork could have been stored if we had storage facilities on South Fork and at Devil's Gate.

I hope and trust that the construction of reservoirs for upstream storage, which would be of immense value to our communities for generations to come, will not be construed as a movement to eliminate the so-called 'tight dam.' To try to eliminate the tight dams at this time would only complicate the issue and lead to unnecessary controversy which would probably stop the construction of reservoirs. Build the reservoirs first, and then the ranchers who use the tight dams will replace them with regulatory dams of their own free will and accord. Tight dams are used by the ranchers to insure themselves of a crop during short-water years, but if they are insured of a stable supply of water through storage they would have regulatory dams.

Every progressive rancher knows that hay is not a water plant and that the water should be taken off the land periodically during irrigation season to allow the plant to absorb the nitrogen from the air to get a larger production and better quality of hay, so eventually every tight dam would be replaced without any compulsory tactics as it would be to the ranchers' own financial interest to replace them. In the meantime the storage of water in the proposed reservoirs would be of great benefit to the ranchers using tight dams. As it is he does not know whether there will be a 500 or a 2,500 foot flow, so he builds up his dam in the fall of the year in anticipation of a 500 foot flow. Then if there is a 2,500 acre-foot flow it either washes out all around his dam or makes a lake out of his whole ranch like it did this year. If he knew that there would be only a certain amount of water in the river and the balance would be stored, he would have something to guide him when he is building up his dam. Personally I can see no reason whatever of confusing the issue of construction of the proposed reservoirs with the elimination of tight dams.

It is necessary that the Government provide funds immediately to provide work for the unemployed during the reconversion period. The work of the Army Engineers in flood control will be valuable for generations to come and being of a permanent nature any money spent along these lines will be well spent. It means the security of communities from now on for thousands of years."

Paul L. Malone, Humboldt Farm Bureau Agent:

"In the Winnemucca district we get about a half a ton of poor quality hay to the acre, and to my way of thinking it just isn't fair to the businessman, it isn't fair to the other taxpayers of the county for any ranch to be run at just half mast. Water and land in Nevada are kings, and I can't reconcile myself to seeing water wasted and getting only half a ton of hay to the acre. I am not an engineer or even an irrigation specialist, but for Humboldt County I visualize water being utilized more efficiently. Fellows, what should we do with that hay? We ship cattle and lambs out of Elko County and Humboldt County every year. We could round out that entire operation by fattening those cattle in our districts. We are not a vegetable district and we don't grow a lot of vegetables. We can't compete with California and Idaho in vegetables, but we can grow our cattle out on the ranges and complete the operation right there. We can grow grains of all kinds and ensilage. We can distribute our income throughout the year and get our return for those cattle.

As far as the river is concerned, the engineers are going to do it, but through a long period of observation of twenty years' time I have visualized taking the water along the edges of the irrigation land, straightening the river and using the river for drainage, not have the water back up in sloughs and be a source of drowning out the crops and having a lot of mosquitoes and this, that and the other that we do have.

I can't help but believe that in fairness to everyone in the State of Nevada that this stream should be studied thoroughly, and if there is water going to waste, if there is land being used inefficiently that could be used more efficiently, that it certainly should be done."

A. V. Tallman:

"I might explain, this is the first time I ever attended an Elko County meeting on water that there wasn't a tendency on the part of the water users to disagree with me. It is rather unusual occurrence. Mr. Badt well knows, and Senator Robbins remembers what happened here ten or fifteen years ago. I see some of you are smiling because some of you attended those meetings over at the courthouse. Every water user in Elko County was there. I just talked myself out of trouble. Everybody was fighting for water then, now everybody is trying to get rid of it. The situation has reversed itself. It is too bad we can't have some of the surplus water stored for use during the days of starvation.

We are vitally interested in the welfare of the ranchers in our county. We have approximately 40,000 acres of land in Humboldt County on the Humboldt River that gets water from the Humboldt River. We have been through a series of droughts, and one depression. We have been through years of flood. Right now we are starting with years of flood. We are just starting to hay and have the poorest quality of hay we have ever put up in that county. If we don't get that upstream storage I don't know what is going to happen. I predict we are going to have 40,000 acres more of open range. We can't go through thirty more years of year-to-year water supply. Our ranches have been completely covered with water during the past 60 days. Our levees are washing out. Our bridges are washing out. We are in a devil of a fix. What is the remedy? Upstream storage is the only one I know.

There is one thing to keep in mind. I say to these engineers on reclamation, the Army engineers, our ranchers down there, not the members of the Chamber of Commerce that are in business, but the ranchers themselves, don't want an irrigation district, and you couldn't put one across down there under any conditions. We want upstream storage—I say 'we,' the ranchers—providing it is given to us. You couldn't go down and sell those people an acre-foot of water from storage up here at any price.

We would like upstream storage on this river. While highly in favor of it, we want our Army Engineers to do it, we do not want to be forced to pay the entire cost. We all pay for it indirectly, of course. There is no use kidding ourselves, we all pay. As we say down there in our Chamber of Commerce, we all have our hands out for Federal grants of money. Nevada hasn't received much out of these Federal

grants for irrigation development. Idaho receives a lot of money. They have a water users' association in Southern Idaho that secures and uses a yearly fund of \$25,000 to assist in this kind of promotion work. Next year they are raising their fund to \$40,000 and they are also organizing themselves to keep fighting encroachment by Federal bureaus. We are amiss in Nevada in not organizing on the Humboldt River a water users' association.

The ideal situation down there on the Humboldt River would be to have high-line canals, as Mr. Mahoney has said, and use the river as a drain ditch. It would be impossible to get such a plan through with the present land owners. It might be accomplished if we can get a controlled river. We want to produce better crops, better hay, feed our cattle out there instead of letting California feeders make the profit every year. We should have a rounded-out program and the only way we will ever get it is to raise a better quality of feed for our steers. The only way we are going to do that is by having a better controlled water supply.

We do not want our water supply, as decreed to our ranchers by law, interfered with in any way whatsoever. We will fight to the last ditch to keep that from happening, and we do not want an irrigation district. If everybody else is going to get this free and easy money out of Washington, we want some of it on the Humboldt to give us better flood control."

Chairman Smith described a plan for the organization of a provisional board. The Humboldt River system would be divided into four districts, centering respectively in Lovelock, Winnemucca, Battle Mountain and Elko. He suggested that the representative groups caucus and elect two provisional members for each district. The provisional members could then call elections of water users and elect permanent members from each district. He suggested that it be made a paid-service board, rather than a voluntary service organization, saying that most voluntary service organizations require strong leadership to be effective, and in order to carry on any work both time and money must be supplied. He made the following comment:

"This board can be set up as a voluntary free service board, and might function satisfactorily, but that type of a board needs awfully good leadership, and it needs good men who are out in the field to follow up all the time. We have plenty of leaders in Nevada, but these men are fully occupied with their own pursuits and jobs and haven't enough time to devote to problems of this sort. In my opinion we should set up a paid-service board. That is, the members while occupied with meetings should be paid a per diem and traveling expenses. That might be covered by a slight increase in the Humboldt River district water tax. At present you have a water tax that amounts to about two and a half cents per acre foot of decreed water. I don't know just what that would work out in cents per acre as we used to figure on irrigated land, probably around seven cents. That amount of tax brings in \$12,000 or \$13,000 a year. That assessment is computed to meet the wages of the river water commissioners, distribution service and the like. By increasing it slightly, say one cent, or a cent and a half, on the basis of irrigated land, it would create a fund of about

\$3,000, which would probably meet the expenses of the Humboldt River Board, and leave a surplus so that the board could employ engineering help when necessary and do engineering jobs and have engineering advice, in the contracts between the Federal agencies and the water users.

Such a board will serve as an entity or unit through which contacts can be made by Federal agencies and State officials with the whole Humboldt River system, and it will be representative."

Discussion followed, the State Engineer saying that he would determine if such procedure could be legally adopted.

Talks were made by William Wright, Chester Breman, Myron Doyle and other leaders in stock raising and agriculture on the Humboldt. A recess was taken and the four districts elected the following provisional members:

Peter F. Anker and John Froelick, Lovelock.

Ray Persson and A. V. Tallman, Winnemucca.

M. T. Doyle and E. R. Hill, Battle Mountain.

E. C. Murphy and Wm. Wright, Elko.

M. T. Doyle was selected chairman.

During the next few weeks each district met and elected members to the permanent board, as listed at the beginning of this chapter.

The first meeting of the Board was held at Winnemucca, Nevada, on November 1, 1945.

A constitution submitted by State Engineer Smith was discussed, amended, and copies were later distributed to the Board for study before adoption. Following is the principal article as proposed:

PURPOSE OF THE BOARD

This board is an unofficial advisory group organized to protect and safeguard the interests of the water users of the Humboldt River stream system to the fullest extent of its ability and authority; to contact State and Federal agencies on matters of importance to the people dependent upon this stream system for their livelihood and welfare; to formulate and promote passage of legislation for the benefit and security of the water users; to study and to advise upon proposed irrigation flood control, water storage, power and land development projects; to assist in planning ways and means of bringing about the construction of approved projects designed to beneficially use the waters of the Humboldt River system, and so far as possible safeguard and protect the rights of the State to control and administer its water resources, and the rights of individual water users holding water use allotments under laws and court decrees of the State of Nevada.

This association shall not be affiliated with any political party and at all times will avoid political influences designed to secure advantages for any separate district, area, community or individual holding at the expense of or detriment to other similar subdivisions within the system.

The Board shall cooperate with State and Federal agencies in planning the appropriate development and use of the water resources of the Humboldt River System with equity towards all users and interests and partiality towards none. It shall be the duty of the Board to take

prompt and vigorous action to protect the water rights and resources of the water users from infringement by political agencies urging federal control over existing rights.

The board shall cooperate with and support the purposes and objectives of organizations having the approval of the board whether they are on a Statewide, regional, or national basis. The board shall avoid, as far as possible, being influenced by any agencies urging changes in existing water laws on the grounds of expediency. The board shall be guided in its work and purposes by the needs and requirements of the actual users of the waters of the Humboldt River system.

Smith stated that the Attorney General had rendered an opinion that it would be illegal to divert water distribution funds collected by water assessments for the purpose of paying a per diem and expenses of board members when attending meetings. Smith said that pending future legislation to make distribution tax money available, a limited amount of money would be used from the State Engineer's Fund allotted for extra clerical and engineering help, provided it did not run to more than about \$500 per year.

A meeting was held April 2, 1946, at Winnemucca. The formation of a Water Distribution District under present water law that would also include Paradise Valley and the Little Humboldt was proposed by Edmund Muth, Deputy State Engineer, and was approved by the board.

The constitution as amended at the former meeting was formally approved and adopted.

Army Engineers present outlined the flood control work being done by them in Lovelock Valley, and their work was highly commended.

It was decided that the legislative committee confer with the State Engineer prior to the next legislative session and prepare an amendment to the water law which will permit the use of water distribution funds to pay for the services of the board.

CHAPTER XI

Quality of Waters of Lower Virgin River in Nevada

By GEORGE HARDMAN

State Conservationist, Soil Conservation Service

SOURCE OF WATER

The drainage basin of the Virgin River includes an area of high mountains in southern Utah which supplies most of the water for the stream. Summer storms on lower elevations in the western section of the stream basin produce short duration floods in the lower river.

In addition to the surface flows from the Utah area, the stream receives a considerable amount of water from sub-surface flows. A portion of this water rises in a series of thermal springs within the Virgin Narrows and along the south bank of the stream above Littlefield, Arizona, and part appears to rise in the stream bed from Littlefield to Mesquite and Bunkerville. The total volume of this spring and sub-surface flow is considerable and may supply the major portion of the water utilized by Mesquite and Bunkerville for much of the summer season. For varying periods of time from a few days to many weeks, it may constitute the entire available supply.

The matter of adequacy of the water supply is not necessarily pertinent to this discussion, but judging from records and observations, if the total summer season supply could be delivered without interruptions, it would seem to be adequate to meet present needs. Also, since the total area of new lands suitable for irrigation in the Mesquite-Bunkerville area is definitely limited, the water supply would seem to be reasonably adequate to meet the additional need occasioned by the reclamation of new lands. These assumptions are based on the continuation of present conditions on the Virgin River in Utah. Large storage projects on the upper river would undoubtedly modify existing conditions and very probably could adversely affect existing water supplies.

QUALITY OF WATER

The quality of water in this section of the stream varies tremendously with the volume of flow and also seems to vary from year to year somewhat independently of the volume of flow. At best the water is of fair quality only, and at worst is of poor quality. In the following table is given most of the analyses, available in this office, of water in this section of the river. The locations of the various points where samples were taken are shown on the accompanying sketch map of this area.

It would appear that the quality of water in winter, as shown by samples 13 and 14, taken at Bunkerville and Riverside, may not be too good. These samples were taken in 1933 during a drouth period and probably are as poor as could be expected for winter flows. Sample No. 1, from the river at Littlefield, was taken in the late spring of 1932 when the snow melt flood was near its maximum. This sample represents only fair quality of water. Samples 5 to 8 were taken in the late spring and early summer of 1937, which was a season of heavy runoff. These samples indicate a slight improvement in quality of water

ANALISES OF VIRGIN RIVER WATER

Sample No.	Location	Date	Total Solids	Ca	Mg	Na	SO ₄	Cl	CO ₂	MCO ₃	Remarks
1.	River at Littlefield	5/29/32	803	134	30	101	292	121	0	251	Spring flood stage.
2.	River at Riverside bridge	8/19/32	3360	285	150	487	1396	539	0	211	Summer, low flow.
3.	Bunkerville canal at bridge	8/19/32	2260	311	103	305	1133	360	0	211	Summer, low flow.
4.	Mesquite canal at Mesquite	8/19/32	2360	323	109	280	1068	360	0	299	Summer, low flow.
5.	Mesquite-Bunkerville canal intake	4/16/37	617	103	31	52	268	77	7	122	Spring.
6.	Mesquite-Bunkerville canal intake	4/24/37	569	86	30	79	269	95	7	105	Spring.
7.	Bunkerville canal at bridge	4/16/37	624	113	36	33	277	78	7	113	Spring.
8.	River at Bunkerville bridge	4/24/37	592	83	31	70	265	83	7	103	Spring.
9.	River at Narrows	8/19/32	2823	428	123	350	1392	420	0	474	*At Virgin Narrows, flow of springs only.
10.	Springs at Narrows	8/19/32	3002	434	126	332	1275	413	0	505	Average of analyses of 3 springs near Virgin Narrows.
11.	Sub-flow at Riverside bridge	8/19/32	2825	361	101	378	1303	424	0	225	Riverside bridge pier 16' below river bed.
12.	Beaverdam wash	5/29/32	412	74	22	47	102	27	0	288	Beaverdam wash at bridge.
13.	River at Bunkerville bridge	1/26/33	1064	241	73	233	732	287	0	297	Winter, low stage.
14.	River at Riverside bridge	1/26/33	1764	260	85	232	829	302	0	261	Winter, low stage.

*Total flow of springs at entrance to Narrows estimated at 7 to 10 c.f.s. Temperature of spring waters vary between 75° and 80° F. No surface flow in Virgin River above last spring in Narrows. On this day the combined intake at the Mesquite and Bunkerville canals was probably between 30 and 40 c.f.s.

over sample No. 1, but these waters are of fair quality only. They probably represent the highest quality of water ever available for use at Bunkerville and Mesquite.

Samples 2, 3, and 4 were taken in the late summer of 1932 when the lower river was entirely fed from springs and sub-surface flows, and probably represent the water supply at its poorest. The surface flow of the river at Riverside bridge, as shown by sample No. 2, was considerably more concentrated than the surface flow at Bunkerville and Mesquite as shown by samples No. 3 and 4. Sample 11, taken on the same day as the above, was secured at a depth of 16 feet below the river surface when water was being pumped from a cofferdam for a pier at the Riverside bridge on U. S. Highway 91. This sample would seem to indicate that the sub-surface flow water in the river channel has a concentration and chemical composition of salts nearly identical with that of the water from the springs in the Virgin Narrows.

The problem of maintaining the sustained productivity of lands under irrigation with waters of the quality shown for the Virgin River is rather difficult. For considerable periods of time in the summer season, the lands must be irrigated with moderately concentrated water. Not infrequently, the irrigation water comes entirely from the springs and sub-surface flows in the stream channel and as indicated in the analyses cited above, is strongly concentrated. Consequently, an accumulation of salts occurs in the soils irrigated with these waters. At the end of a long season of irrigation from low flows with no dilution from flood flows, the effect on the land from the accumulation of salts is readily noticeable.

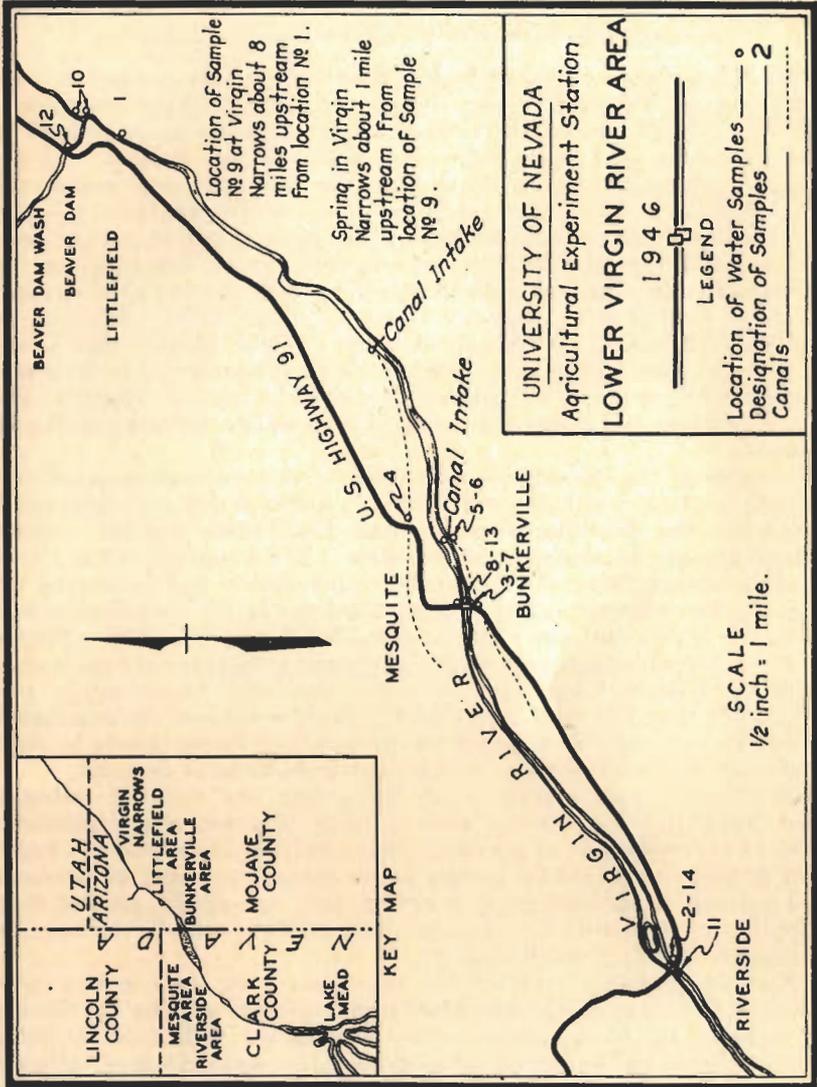
In the past, heavy leaching with better quality water from storm flows and snow melt flows has been utilized to maintain the salt concentration in the soils at a safe point for plant growth. Dilution of waters carrying 2,000 to 3,000 parts per million to a safe concentration requires considerable fresh water. When the waters used to effect dilution contain appreciable quantities of salts, much more water must be used. It would seem from the fragmentary records available that when the stream flow falls below a monthly average of about 50 c.f.s. at Littlefield, the waters at Bunkerville-Mesquite would be approaching a salt content in excess of 2,000 parts per million. Waters of such concentration would need be applied in amounts greatly in excess of the consumptive use by crops, or would need be diluted occasionally with waters of much lower concentration, in order to maintain a desirable salt balance in the soil.

As long as conditions on the entire Virgin River watershed remain about as they are at present, there would seem to be no reason for grave concern about the quality of irrigation water in the Bunkerville-Mesquite area. However, there is the possibility of a flood control irrigation storage program on the upper Virgin River that could change present conditions very greatly. This program has been investigated and is now in the preliminary planning stage. With storage reservoirs large enough to capture the entire flood flows and with the area of irrigated land expanded to utilize the stored waters, the surface flow in the river at the Virgin Narrows could be reduced essentially to seepage and return flows from the irrigated lands in Utah. Under these conditions an increase in the salt content of the waters reaching

the Virgin Narrows could be expected. Just what the concentration of these waters might be, is unknown, but it is assumed that they would have, as a minimum, a salt content of 500 parts per million.

If it should become necessary to use water derived in large part from springs and sub-surface flows arising in the stream channel below Virgin Narrows and drainage waters from the irrigated lands on the upper Virgin River, the problem of maintaining a desirable salt balance in the soils of the Bunkerville-Mesquite area could become difficult. A constant salt content of 700 to 800 parts per million in the irrigation water, approximately the concentration of the waters used in Moapa Valley, makes necessary a very definite program for control of salts in the soil, and any increase in concentration above this amount renders the program more difficult. The top limit of salt concentration where plant growth would be inhibited in this area is not known, but it is believed that difficulties in maintaining continued high yields and economical production would become apparent when the salt concentration of the irrigation water constantly exceed 1,000 to 1,200 parts per million.

The volume of the spring and sub-surface flow waters of the Virgin River in the neighborhood of Bunkerville and Mesquite is estimated at about 50 c.f.s. and the apparent salt content at about 2,000 parts per million. The drainage waters from the upper Virgin River area under conditions of complete control, and use is assured above to have an average salt content of not less than 500 parts per million, and this would be essentially the water available for diluting the spring and subsurface waters in the lower river. To dilute a unit volume of water containing 2,000 parts per million to a concentration of 1,000 parts per million with water containing 500 parts per million would require mixing in the ratio of 1 to 2. Thus, to reduce the salt content of the 50 c.f.s. of water arising in the lower Virgin River from about 2,000 parts per million to a relatively safe concentration of 1,000 parts per million would require a constant flow of 100 c.f.s. of drainage water from the upper Virgin River area. A constant flow of 150 c.f.s. of these waters would be required to lower the concentration of the lower river water to about 875 parts per million.



CHAPTER XII

Cooperative Stream Measurement Work in Nevada

By M. T. WILSON, *District Engineer, Surface Water Division, Water Resources Branch, United States Geological Survey.*

The importance of water to the State of Nevada cannot be over-emphasized. The satisfactory development of all other resources is directly affected and usually limited by the available water supply. It has often been said that water is our most valuable mineral. At first thought, petroleum geologists and mining engineers may regard this statement as a gross exaggeration. Upon careful analysis, however, it is obviously true when considered in the sense that water is the essential mineral for all domestic, agricultural, power development, and manufacturing uses. It is absolutely necessary for the production of all food and other vegetable and animal commodities, including the proper functioning of the human body. Water likewise has a very high dollar value when considered as being fundamental to irrigation and power projects, municipal and industrial supplies, livestock, mining, recreation and many other activities on which the State of Nevada depends.

Because of the importance and value of this natural resource, it is imperative that a reliable and intensive investigation be continued to determine the dependable supply and distribution for the ultimate comprehensive development of the State. The Congress of the United States, in recognition of the Federal responsibility for developing this great natural resource, has appropriated funds for cooperative work with the States and other political subdivisions since 1905. Federal funds for stream gaging, however, are made available only for cooperative work desired by State and local interests. Accordingly, it is important that the work of collecting water resources information be carefully planned and financed for present and future needs by State and local representatives in cooperation with Federal agencies.

Although stream gaging is fundamentally the work of collecting basic data relative to surface water supplies, it is very closely connected with the investigation of ground water resources as covered in chapter VII of this report. Since surface water records are used to determine the recharge to ground water reservoirs and, conversely, ground water supplies are available for supplementing surface run-off, the two programs are closely coordinated.

For the period of this report there has been an ever-increasing demand for water resources information, particularly by the Bureau of Reclamation in connection with its plans for additional irrigation developments and by the Army Engineers in consideration of desirable flood-control projects. The increased stream-gaging program, started during the previous biennium as a result of additional funds being made available by the State Legislature, local water users and Geological Survey, was entirely inadequate to meet current requests. Because of this condition, supplemental funds were furnished by the Army Engineers for the installation and operation of the two gaging stations

in the Truckee and Walker River Basins and the Bureau of Reclamation allotted \$2,000 for the support of stream gaging work in the Humboldt River Basin.

With the total funds thus made available from the State, local water users and Federal agencies, the following additional gaging stations were constructed or reestablished:

- Meadow Valley Wash near Panaca, Nevada.
- Humboldt River, near Elko, Nevada.
- Humboldt River near Argenta, Nevada.
- Humboldt River near Battle Mountain, Nevada.
- Humboldt River at Comus, Nevada.
- Humboldt River near Imlay, Nevada.
- Humboldt River near Rye Patch, Nevada.
- South Fork Humboldt River near Lee, Nevada.
- Pine Creek near Palisade, Nevada.
- Rock Creek near Battle Mountain, Nevada.
- Cottonwood Creek at Paradise Valley, Nevada.
- H. L. I. L. and P. Company's Feeder Canal near Mill City, Nevada.
- East Fork West Walker River near Bridgeport, California.
- Truckee River near Truckee, California.

At fourteen of the locations listed above, galvanized, corrugated pipe gage-house structures were installed with continuous type water-stage recorders. Also, standard cableways for making high water discharge measurements were constructed at eight of the stations. Although this was an excellent improvement in the Nevada stream-gaging program it is still not sufficient to meet the demands of those agencies planning the present and future development of the State's water resources. Current requests are insistent that several new stations should be established, particularly at this time, in the Carson, Truckee, and Walker River Basins.

For the biennium covered by this report surface water supplies varied from fair to excellent. At the key gaging station on the Humboldt River at Palisade, the records show that the discharge for the water years ending September 30, 1944 and 1945, was 125 percent and 255 percent, respectively, of the 37-year normal. The Walker River, however, draining from the Sierra Nevada Mountains was not so fortunate. Run-off from the West Walker River near Coleville was only 68 percent, and 113 percent of its 36-year normal for the same period. These comparisons clearly show the large yearly variations in stream flow that may be expected and emphasizes the necessity of recording run-off information over a long period of time if reliable plans are to be made for the complete development of this resource.

During the spring run-off of 1945 the Humboldt River again provided much more water than could be held in the existing storage reservoirs. Large flows released from the Rye Patch Reservoir to the Carson-Humboldt Sink did considerable damage to agricultural crops in the lower Lovelock Valley in spite of the efficient work of the Corps of Engineers, U. S. Army, and the Pershing County Conservation District in controlling the flood waters. These continuing losses to the citizens of Nevada could be avoided by upstream storage, and retarded flows would be available for irrigation or other valuable uses during the dry seasons.

The detailed information collected as a result of these cooperative investigations are published in the annual water supply papers of the Geological Survey. The published reports are available for consultation at the State Engineer's Office and Public Library at Carson City, also at several district offices of the Survey in addition to many educational institutions and public libraries scattered throughout the States. Current data in advance of publication and information for previous years at individual gaging stations can be furnished in blueprint form upon application to the District Engineer, 303 Federal Building, Salt Lake City 1, Utah. A complete list of the gaging stations now in operation and a map showing their location is given in chapter IX "Stream and Reservoir Gaging Stations" of this report.

CHAPTER XIII

Quality of the Water of the Humboldt River

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The chemical examination of the water of the Humboldt River has been continued during the past two years as part of the studies reported in the two preceding Biennial Reports of the Office of the State Engineer. Since these analyses have shown no marked departures from the results which have already been reported, the detailed tables of analyses and tonnages of salines transported by the river for 1944 and 1945 have been omitted from this brief summary.

In order to form an opinion as to the quality of the water of the Humboldt River in regard to its use for irrigation, Table 1 gives the results obtained compared with standards which have been tentatively set for irrigation water. In the first three columns are to be found the average values for the four months, May, June, July and August for 1943, 1944 and 1945. These averages are a summary of the analyses made during the three years for which we have the most complete record. In the last two columns are given the tentative standards set for Class 1 and Class 2 irrigation waters as published by Magistad and Christensen of the United States Regional Salinity Laboratory.

TABLE 1
Comparison of Water of Ryepatch Release with Tentative Standards

	Ryepatch Release ¹			Tentative Standards ²	
	1943	1944	1945	Class 1	Class 2
Conductance (Kx105 25°C).....	91.9	93.1	95.4	100	100- 300
Saline Content—					
Total, p. p. m.....	600	694	705	700	700-2000
Or, tons per A. F.....	0.89	0.94	0.95	1	1- 3
Sodium percent.....	54.7	59.9	58.8	60	60- 75
Boron, p. p. m.....	0.51	0.52	0.50	0.5	0.5- 2.0

¹Averages for months of May, June, July, August.

²Class 1.—Excellent to good, suitable for most plants under most conditions.

Class 2.—Good to injurious, probably harmful to the more sensitive crops.

As is indicated in Table 1 the water released from Ryepatch reservoir is to be considered as Class 1 water, although the quality begins to approach that of Class 2 water. Considering the soils upon which the water is applied, the water is satisfactory. That this is true is likewise shown by the plant growth in the Lovelock Valley area in general. In many of the soils of the area calcium carbonate, or limestone, is present. This has been precipitated in past years as the soil material was being deposited. The irrigation water, as may be seen from analyses which have been published, has consistently carried over 40 parts per million of calcium in a form (bicarbonate) which may, partly at least, be precipitated in and on the soil when the water is applied. This precipitated calcium carbonate is also undoubtedly of great value in the soil. The general tendency of a water, as the percent sodium increases above

60%, is the replacement of calcium in the soil with sodium with resulting detrimental effects upon the soil texture. With ample amounts of calcium carbonate present in the soil these detrimental effects are to some extent overcome.

The chemical analysis, when the quantity of water for any given period is known, permits the calculation of the total amount of dissolved substances (salines) carried for that period. Table 2 has been prepared from these data and gives values for the quantity of water and the tonnage of salines passing the two points, Palisade and Rye-patch Dam during three years. The average concentrations of salines per acre-feet are given for each year in the last column. Comment on the table is scarcely necessary as it plainly shows to what extent the dissolved matter may increase in the downward course of a river.

TABLE 2
Discharge and Salt Burden of the Humboldt River
at Palisade and Rye-patch Dam

Station and Years	Discharge acre-feet	Tonnage of salines	Tons per A. F.
<i>Palisade—</i>			
October 1942–October 1943.....	559,318	253,692	0.453
October 1943–October 1944.....	291,310	147,966	0.507
October 1944–October 1945.....	592,060	265,465	0.448
<i>Rye-patch Release*</i>			
November 1942–October 1943.....	460,729	455,325	0.988
May 1944–October 1944.....	68,465	64,893	0.947
October 1944–October 1945.....	375,266	374,569	0.998

*No releases, December 1943, January, February 1944. Table does not include 1,936 A. F. for October 1943, and 6,058 A. F. for March, April, 1944.

The Lovelock Valley consists of a depression filled with sediments. The water contained below the surface of the valley results from the inflow of the Humboldt River with minor amounts contributed by run-off from the adjacent mountains. This ground water is impregnated more highly with salines than is the water from either the run-off or the river due to the leaching of salts from adjacent highlands, evaporation from the surface and lack of a suitable subsurface outlet. Detailed studies have not yet been conducted on the constitution of the ground water of the area, but sufficient samples have been examined to indicate the magnitude of its salinity. From these considerations and the data which has been published by the office of the State Engineer there is no reason to assume the presence of fresher water at reasonable depths.

Maximum crop production depends upon many factors and among the more important is efficient drainage in the soil. High water tables indicate lack of suitable drainage and operate to the disadvantage of crop growth. The level of the ground water in the valley is high and the root zone of crops cannot extend beyond this level. Therefore, only the surface layers of the soil can be utilized by the growing plants. The water table may be lowered, as by proper drainage, modification of irrigation practices, and reduction of seepage from canals and the river, thus increasing the available soil for plant growth. Table 2 gives the clue as to the origin of much of the salines of the ground water of the valley, as well as the quality of the water available for removal of excessive soil salines.

Reference to previously published data on the constitution of the river water entering Ryepatch reservoir shows that the present methods of operation of the reservoir are taking advantage of every opportunity for supplying irrigation water of as high a quality as possible during the irrigation season. Chemical analyses have aided as a guide for operation and show that vast tonnages of salines have been removed by flushing from the reservoir at times when the least harm might occur.

CHAPTER XIV

Nevada Cooperative Snow Surveys, 1944-1946

FORECAST COMMITTEE:

GEORGE G. DEVORE,
LEIGH SANFORD,
H. P. BOARDMAN, *Chairman*,
DR. J. E. CHURCH, *Advisor*.

This chapter covering the snow survey activities in Nevada for the period 1944-1946 is a composite report in four parts as follows:

- I. The Nevada Snow Survey Program by Clyde E. Houston.
- II. Central Sierra by H. P. Boardman.
- III. Humboldt River Basin by Dr. J. E. Church.
- IV. The Colorado River Basin by Dr. J. E. Church.

I. THE NEVADA SNOW SURVEY PROGRAM

By CLYDE E. HOUSTON, *Hydraulic Engineer*

Division of Irrigation, Soil Conservation Service, U. S. D. A.

Actual snow surveying for streamflow forecasting in Nevada began about 1910. At this time preliminary work adjacent to Lake Tahoe and Truckee River was carried on to assist in determining the hydraulic characteristics of the river and lake. This pioneer work was later refined and extended into Utah, California, and local surveys in two or three other western States. As of July 1, 1935, the United States Congress authorized the Division of Irrigation of the Department of Agriculture to coordinate and expand the system of snow surveys, for water supply forecasting, to all of the western States. During the ensuing ten years the Federal government cooperated with the Nevada program by furnishing equipment and funds to assist in carrying on the work. Finally in the spring of 1945, at the request of local sponsors, a representative of the Division of Irrigation, Soil Conservation Service, was assigned to Nevada to assist with the snow survey program.

The program in the State is cooperative, with funds, equipment, and personnel contributed by: Nevada State Engineer, Agricultural Experiment Station, California Division of Water Resources, United States Soil Conservation Service, Forest Service, Weather Bureau, Bureau of Reclamation, Geological Survey, Fish and Wildlife Service, Sierra Pacific Power Company, Truckee-Carson Irrigation District, Washoe County Water Conservation District, and Walker River Irrigation District.

There are 96 snow courses in Nevada and the eastern slope of the Sierra in California used for forecasting Nevada streamflow. (See map "Nevada Snow Courses.") During the winter and spring of 1946 surveys of these courses were made by 86 individual snow surveyors, working in parties of two or three, or singly. These surveyors consist of employees of Federal agencies and power companies, and in some

instances private individuals employed for the express purpose of making snow surveys.

The snow survey program may be divided into two parts: (1) the winter work, consisting of actual snow surveys and streamflow forecasting, and (2) the summer work, consisting of improvement and maintenance of snow courses and cooperative relationships. The first part includes the making of surveys and reporting the results to headquarters by either telephone, telegraph, or regular mail. At headquarters these data are analyzed in light of past records, and other hydrologic information and a forecast of runoff for the coming season is determined. This forecast including the survey records and other pertinent information is published and mailed to individuals and organizations concerned with the utilization of the forecasted water supplies.

The manpower shortage during the war years has had its effect on the winter program in that many of the surveyors either entered the service or moved to war centers and worked in war industries. This threw the burden of making more surveys on the older personnel and in some instances, due to lack of time, certain courses were not measured. There is dire need for more surveyors so that more than one man will be acquainted with the location of each snow course. Now that peace has returned a recruitment program will be started to obtain such personnel. These new men must be trained by the more experienced surveyors in the approved procedure of snow surveying, as well as to realize the value of accurate and reliable measurements. The latter is most important, as an inaccurate survey is sometimes worse than no survey, for it may be entirely misleading to the forecaster. To provide safety during storms and to afford rest, food, and lodging facilities regardless of weather, comfortable stopping places are established for snow surveyors at half-day travel intervals, or approximately every 10 miles along the mountain routes they traverse on skis or snowshoes. One new cabin was erected in the spring of 1946 near the upper Baker Creek snow course in eastern Nevada. Cabins are needed in upper Lee Canyon on Charleston Mountain near Las Vegas and in upper Trout Creek near Wells, Nevada.

To insure that natural conditions do not adversely affect the surveys a summer program is carried on for maintenance and improvement of the snow courses. Due to the manpower shortage this portion of the program has had very little attention during the past five years. The usual procedure is to remove brush, down timber, rocks, and an occasional tree to provide a cleared area about eight feet in diameter at each sampling point. How often this must be performed depends upon the type of vegetative growth encountered. Willows and other mountain brush can develop in a year or two, while scattered conifers may not interfere with sampling points for three or four years. In the majority of cases snow-course markers have been placed on trees near the end points of the courses. Where fully developed trees are available this is fairly satisfactory, although attention still must be given to note that overhanging branches do not obstruct the markers. In areas of eastern Nevada, where trees are not so abundant, a program has been initiated to affix markers to two-inch iron pipe set vertically

in concrete at the end points of the snow courses. The pipe is of sufficient length to allow the markers to extend about two feet out of the snow at its greatest recorded depth. The pipe is painted in alternate two-foot stripes of red and yellow color. This both guarantees a permanent course marker and a brilliant guide to the snow surveyor. This type of marking was carried out on 19 courses during the summer of 1945, and it is planned to erect about 40 additional during the summer of 1946. It is believed that by the end of 1948 the permanent marking program for Nevada can be completed.

At the same time summer maintenance work of snow courses is carried on, a visit is made with the snow surveyor to renew working relations and to check the survey set. The equipment, although not as delicate as some types of scientific instruments, needs occasional attention such as testing the scales, and recoating the tubes with wax or shellac. There are approximately 30 snow survey sets in the field in Nevada. With an average value of about \$200 per set, this represents an investment of about \$6,000.

In the early days of snow surveying it was thought that a snow course should consist of from 40 to 80 samples covering areas from one half to one mile in length. Now that years of records have been gathered and a few analyzed it has been found that in practically all cases the courses can be shortened to 10 to 15 samples covering areas from 500 to 1,000 feet in length. During this biennium a program has been underway to shorten all courses that are exceptionally long. This requires lengthy tabulations and analyses to determine which sampling points should be dropped and which retained to obtain a new average fairly similar to the old. By shortening the snow course the labor of the surveyor is decreased which in turn increases the accuracy of the survey. It is hoped that all of the longer courses will be analyzed and shortened by the end of the next biennium.

II. CENTRAL SIERRA

By H. P. BOARDMAN, *Chairman, Forecast Committee*
Nevada Cooperative Snow Survey

The data on stream flow for 1944 were not entirely complete and final checks and corrections had not been made at the time the last biennial report was prepared, so the following corrections are in order for 1944:

The West Walker runoff for April-July was 113,420 acre-feet, instead of 116,300 as stated. For the East Walker the April-August flow was 47,450 acre-feet, corrected for change in storage in Bridgeport reservoir, but not corrected for evaporation from reservoir surface.

1945

The actual results in 1945 were fairly close to the forecast for the Truckee and Tahoe basins, the Truckee River natural flow exclusive of Tahoe for April-July being 249,510 acre-feet, or 76.6 percent of the normal 325,700 acre-feet, while the forecast was for 260,000 acre-feet or 79.9 percent of normal. The rise of Lake Tahoe from April 1 to high water, assuming gates closed, was 1.56 feet, or 92.9 percent of the normal 1.68 feet, 0.11 feet, or 6.6 percent of normal, more than the predicted rise of 1.45 feet. The date of maximum was July 11, while July 10 was the forecast date.

The Carson River at Fort Churchill and both the East and West Walker Rivers exceeded the forecast considerably in 1945, the results being as follows:

Basin	Normals	FORECAST		ACTUAL RESULTS	
		Acre-feet	Percent of Normal	Percent of Normal	Acre-feet
Carson	230,000	152,000	66.1	91.4	210,170
West Walker.....	191,200	162,000	84.7	99.7	190,690
East Walker.....	73,000	66,000	90.4	138.1	100,775

The Carson and the West Walker forecast period is April-July, but April-August is used for the East Walker, due to late runoff from the sawtooth range, west of Bridgeport.

In general, the April precipitation was low, but May was high and also June at some stations. The April-June precipitation at Blue Lakes (Tamarack) was 3.3 inches above normal, and at Woodfords on the West Carson it was 3.76 inches, which seems high for that location, but no normal is yet available for comparison. These may help explain the high runoff of the Carson, and perhaps spring precipitation was high for the Walker Basin also, but there are no good mountain precipitation stations in the Walker Basin, or close to it on the western slope.

Probably excessive ground water in Bridgeport Valley is the reason for high runoff from the East Walker for the last few years. It is hoped we can develop observation wells in that valley to help give valuable information on the water table elevation in future years.

1946

Unusually heavy snowfall last November and December gave promise of an abundant water supply this year, but a very dry January and below normal February changed the picture. A good storm late in March helped so that the April snow surveys showed from 95 percent to 112 percent of normal water equivalent in most of the Tahoe and Truckee high level snow courses, but considerably less for the low level courses (below 7,000 feet elevation). However, a very deficient spring precipitation has resulted in a disappointingly low runoff for the Truckee and Tahoe basins.

The Truckee April-July runoff was 269,690 acre-feet, or 82.8 percent of normal as compared with the "possible minimum" forecast of 290,000 acre-feet, or 89.1 percent of normal.

The rise of Tahoe (gates closed) was only 1.19 feet, or 70.8 percent of normal after April 1, while the "possible minimum" forecast was for 1.50 feet, or 89.3 percent of normal. The April-June precipitation at Tahoe City was only 0.49 inches, while the normal is 3.70 inches, and of course the deficiency in April-May precipitation on higher altitude snow fields subtracts from expected inflow into the Lake, so the actual results are probably consistent with actual water supply.

The term "possible minimum" forecast is not altogether consistent, because it is not based on so nearly an absolute lack of spring precipitation as we had this year.

Now comes the inconsistent check in that the Carson and the West Walker runoffs actually slightly exceeded our "probable" forecast based on assumed normal spring precipitation. The Carson discharged 152,925 acre-feet, or 66.5 percent of normal and the forecast was for 150,000 acre-feet, or 65.2 percent of normal. The West Walker yielded

151,300 acre-feet, or 79.1 percent of normal against a forecast of 150,000, or 78.5 percent of normal.

The East Walker for April-August flowed 58,200 acre-feet, or 79.7 percent of normal and the "probable" forecast was for 65,000 acre-feet, or 89.0 percent of normal.

The water supply is good this year wherever storage is available. Tahoe reached an actual maximum elevation of 6,228.83 and with gates closed would have reached 6,228.94 on June 24, and again on July 7, only two inches below the maximum permissible elevation of 6,229.10. The rains of July 23-25 came too late to cause this maximum to be exceeded, but with gates closed, it would have reached 6,228.92 on July 26. The actual elevation August 1, was 6,228.61.

Bridgeport reservoir was 66 percent full and Topaz 77 percent full on August 1. Boca reservoir was 82 percent full and Lahontan 74 percent full August 1.

So many years have elapsed since the normals we are now using in the Central Sierra were adopted that the committee has decided to revise the runoff normals and that will mean a revision of snow survey water equivalent normals also. This is an opportune time for such revision since we are now decreasing the number of snow samples to be taken on numerous long courses. It is hoped these revisions can be completed before next year's forecast is issued.

III. THE HUMBOLDT RIVER BASIN OF NEVADA

By J. E. CHURCH, *Meteorologist*

Nevada Agricultural Experiment Station

The last biennium seems to have cleared much of the mystery from the flow of the Humboldt and has introduced a period of more exact measurement of the water table.

The effect first noticed in 1942-1943 has been analyzed in detail in *Transactions* of the American Geophysical Union 1944, pp. 96-101, under the title: *Effect of High Water Table in Exaggerating Stream-Flow: Further Analysis of Unusual Year 1942-1943 and Analysis for Year 1943-1944 on Upper Humboldt River, Nevada*, by J. E. Church and H. P. Boardman.

In 1944-1945 the feeders and main stream of the Humboldt were classified on the basis of soil mantle into streams (a) on steeper slopes above meadows and alluvial soil; (b) on medium slopes or bench land, with moderate meadows and alluvial soil; and (c) in valley bottom.

The precipitation for March-July had been nearly double normal as in 1942, but it was possible on the steeper slopes to isolate its effect on the snow cover from its effect on the water table which belonged primarily to alluvial soil. The following discussion appears in the March 1 Forecast 1946, pp. 26, 27:

Variation in Runoff With Type of Soil Mantle

Streams	Snow cover March 1 percent of normal	Precipitation (March-July) percent of normal	Runoff (March-July) percent of normal	Excess runoff percent of normal
<i>Steeper Slopes</i>				
Lamoille Creek (Power House)*.....	107.1	188.8	142.8	40.7
South Fork (Lee)*.....	114.4	188.8	159.2	44.8
Martin Creek (Above Paradise Valley)*.....	109.4	163.2	128.1	18.7
<i>Medium Slopes</i>				
Marys River (Hot Springs)†.....	89.3	188.8	188.0	98.7
North Fork (Devils Gate)†.....	89.3	188.8	177.3	88.0
South Fork (Near Elko)†.....	114.4	188.8	220.9	106.5
<i>Valley Bottom</i>				
Main Upper Humboldt (Palisade)‡.....	102.8	188.8	247.0	144.2

*On steeper slopes above meadows and alluvial soil.

†On medium slopes or bench land, with moderate meadows and alluvial soil.

‡In valley bottom.

The increase in runoff rises sharply with the alluvial type of soil mantle. Since the water table influence must be almost entirely lacking on the steeper slopes, the excess of approximately 40 percent of normal found there may be considered the precipitation factor applicable to the nearly double precipitation that occurred. The factor of 18.7 percent on Martin Creek should have been 34 percent for its excess precipitation of 163.2 percent. But the normals for most of these stations except the South Fork near Elko and the Humboldt at Palisade and Martin Creek are based on relatively short records. If Martin Creek is selected as standard, the precipitation factor on the Upper Humboldt would be lowered from 40 to 25 percent.

On the basis of a precipitation factor of 40 percent, the residual excess due evidently to the high water table or super-saturation of the soil becomes roughly 60 percent on medium slopes and 100 percent in the broad valley. This large excess may be due in part to the excessive precipitation that satisfies somewhat the irrigation needs and reduces the water demands. From and including 1942 when double normal precipitation with the build-up of high water table occurred, the excess runoff at Palisade has been 120, 105, 46, and 145 percent. The first and the last represent also double precipitation.

1945-1946

The present year of 1945-1946, the winter precipitation November-February was 86.8 percent of normal and the snow cover March 1 was 102.7 percent.

The winter temperature (Elko, November-February) was consistently below normal, with an average departure of -2.6°F . Yet the winter runoff at Palisade was 173.8 percent of normal, indicating that the water table was high. The well measurements likewise were somewhat above normal:

Humboldt Valley	+0.92 ft.
Lamoille Valley	+0.04 ft.

Since the snow cover was practically normal, there would be no diversion effects except excess from the water table itself or super-normal rain during runoff.

Forecast March 1

The following forecast was published (March 1 Forecast, pp. 6, 7):

The flow of the streams of the Humboldt Basin during the March-July runoff may be subject to excess runoff of 40 percent of normal if the precipitation during this period should approximate 200 percent of its normal. The reverse also may be true.

A still more potent factor on the lower valley streams, which can be detected March 1 is the height of the water table indicated by the copiousness of the winter runoff and the height of the water in the wells.

All feeders above their canyon mouths are practically unaffected. These are the upper Marys, North Fork, Secret and Starr Creeks, Lamolle, South Fork, and Martin Creek.

These streams below their canyon mouths where the valleys are alluvial and meadows are abundant may suffer an increase of 60 percent of the March-July normal, but the main Humboldt above Palisade may suffer an extreme of 100 percent due to water that cannot be absorbed by the soil.

Since the winter runoff of the main Humboldt was 174 percent of normal and the water table is even higher than last year, the probable effect of high water in the soil will offset any shrinkage due to lack of precipitation during runoff in all streams below canyon mouths, but in the case of normal precipitation may increase the runoff 60 percent above the percentage of the snow cover to 160 percent. The Humboldt at Palisade may even flow 100 percent above it or a total of 200 percent.

The upper streams above the alluvial valleys will flow at 100 percent represented by the snow cover except that they will be subject to excess or deficiency of precipitation during runoff, which can reach to 40 percent of normal March-July runoff.

Paradise Valley because of its apparently high water table should have its valley streams flowing far in excess of the 102 percent of snow cover in its basin.

Forecast Table

(Percent of Normal March-July)

Upper Humboldt—	Probable runoff with normal precipitation
Feeders above alluvial valleys.....	100
Feeders below alluvial valleys.....	160
Main Humboldt at Palisade.....	200 = 430,000 A. F.
Lower Humboldt—	
1. Little Humboldt.....	100 = 20,000 A. F.
Upper Martin Creek, Lower Martin Creek, and Paradise Valley.....	160

Actual Runoff

The data so far obtained bear out the forecast consistently even to the types of streams. The runoff on the nonalluvial mountain slopes conforms closely in percentage of normal to the snow cover. On the alluvial streams, viz, the lower Marys and the main Humboldt, the runoff exceeds the snow cover by 40 to 50 percent of normal. The details are arranged in the following table:

Variation in Runoff With Type of Soil Mantle

Streams	Snow cover (March 1) percent of normal	Precipitation (March-June) percent of normal	Runoff (March-July) percent of normal	Excess runoff percent of normal
<i>Steeper Slopes</i>				
Lamolle Creek (Power House)*.....	110.9	112.0	Lamolle 98.0	-12.9
Martin Creek (Above Paradise Valley)*.....	95.9	87.7	Paradise Valley 85.2	-10.7
<i>Medium Slopes</i>				
Marys River (Hot Springs)†.....	106.6	113.9	Owyhee 149.4	+42.8
<i>Valley Bottom</i>				
Main Upper Humboldt (Palisade)‡.....	102.7	128.2	Wells- Lamolle- Elko 149.6	+46.9

*On steeper slopes above meadows and alluvial soil.

†On medium slopes as bench land, with moderate meadows and alluvial soil.

‡In valley bottoms.

§But have only April-July normal of 29,500 A.-F.; on basis of 1941 March-July normal 32,000 A.-F.

*Probably +31.2% or approximate.

The monthly phases of the March-July flow of the Main Humboldt at Palisade are given in the following table:

	Snow cover percent of normal	Precipitation April-June	Temper- ature departure (Elko) (°F)	Runoff (Palisade) normal (acre- feet)	1946	
		(Wells, Lamolle, Elko) percent of normal			Acre- feet	Percent of normal
March 1	102.7					
March		197.7	-0.8	32,600	65,540	201.0
April		74.2	+1.4	47,200	96,480	204.4
May		141.2	-3.4	54,500	86,400	158.5
June		31.7	-2.0	60,400	59,210	98.0
July		230.4	-0.1	20,300	14,070	69.3
March-June		128.2	-1.2			158.0
March-July		138.4	-1.0	215,000	321,700	149.6

The precipitation during May naturally became effective on the runoff and the precipitation in June was very light. The total for March-June was still 28.2 percent above normal. The water table gives evidence of falling.

IV. THE COLORADO RIVER BASIN

By J. E. CHURCH, Meteorologist

Nevada Agricultural Experiment Station

Since Lake Mead borders on the State of Nevada and forecasting from snow-surveys was developed by the Nevada Agricultural Experiment Station, forecasting of the runoff of the upper Colorado River system has become a local concern next to forecasting the runoff of the Humboldt River.

Although the capacity of Lake Mead to the top of the spillway gates is 31,140,000 acre-feet, the land available for irrigation is so relatively large and the market for power so great that the forecasting of the Colorado water supply has become an earnest and delicate task.

During the past ten years two methods of forecasting have been tried: One based on the total precipitation October-March, and the other on the snow cover April 1. Divergencies between forecast and

actual April-July runoff have frequently exceeded 30 percent of normal, an error too great where close economy is required.

The Nevada system was, therefore, applied to the accumulated data. To the snow cover April 1, was applied correction for the fixed diversion upstream of 4,500,000 acre-feet of water for irrigation as compared with the net normal April-July flow of 9,006,000 acre-feet into Lake Mead. Then on May 1, was applied a correction for deficient or excess precipitation during April.

It was found that during the entire 10 years, 1936-1945, the adjusted forecast of May 1 of the April-July runoff was within 15 percent of normal of the actual. Usually, it was within 11 percent.

The forecasts based on the October-March precipitation varied in half of the years from 19 to 31 percent of normal from the actual. The illustrative table appears on the opposite page.

The detailed discussion has been printed in *Transactions American Geophysical Union* 1946 (June issue), pp. 431-439.

At the suggestion of Ralph L. Parshall, who directs the snow surveys in the Colorado River Basin, the following forecast of runoff into Lake Mead April-July for the present season of 1946 was presented at the Colorado River Forecasters' Meeting at Los Angeles April 19.

RENO, NEVADA, April 16, 1946.

Forecast of Colorado River Near Bright Angel Creek, April 1, 1946

1. SNOW COVER (Water Equivalent)

Sub-basin	Normal (inches water)	1946 (inches water)	Percent of normal	Weight assigned	Total weights
Green River	12.9	12.1	93.8	× 10	= 938
Yampa-White Rivers.....	17.2	14.0	81.4	× 16.5	= 1343.1
Colorado River above					
Grand Junction	13.3	11.4	85.7	× 25	= 2142.5
Gunnison River	16.4	10.6	64.6	× 15	= 969
Dolores River	11.1	4.4	39.6	× 7	= 277.2
San Juan River.....	14.2	4.6	32.4	× 17	= 550.8
				Total.....	90.5
					6220.6

Colorado Basin at Grand Canyon, *Weighted Percentage, 68.7*

2. PRECIPITATION

Green River	4.23	4.44	105.0	× 10	= 1050
Colorado River above					
Grand Junction	1.99	1.53	76.9	× 25	= 1922.5
San Juan River.....	5.01	3.13	62.5	× 17	= 1062.5
				Total.....	52.0
					4035

Colorado Basin at Grand Canyon, *Weighted Percentage, 77.6*

FORECASTS OF RUNOFF DURING APRIL TO JULY, COLORADO BASIN ABOVE GRAND CANYON, CORRECTED FOR DIVERSION APRIL 1 AND PRECIPITATION MAY 1, IN PERCENTAGE OF NORMAL

	YEAR									
	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945
Precipitation, October-March.....	73.0	105.2	118.5	104.0	90.9	133.8	132.2	110.9	92.0	96.7
Corrected for diversions, April 1.....	61.0	91.2	.....	95.8	86.8	157.8	147.2	100.9	99.0	94.7
Corrected for precipitation, May 1.....	61.0	91.2	118.5	95.8	91.8	157.8	147.2	100.9	99.0	94.7
Revised forecast, May 1.....	118.8	109.4	113.4	83.5	71.0	99.8	98.4	106.1	95.6	102.0
Snow cover on April 1.....	.....	.....	.....	76.0	56.5	.....	.....	.....	.....	.....
Corrected for diversions, April 1.....	106.8	95.4	113.4	67.0	61.5	123.8	113.4	96.0	102.6	100.0
Corrected for precipitation, May 1.....	106.8	95.4	113.4	67.0	61.5	123.8	113.4	96.0	102.6	100.0
Revised forecast, May 1.....	96.0	97.8	125.0	63.9	51.4	133.7	127.8	85.6	114.4	90.2
Runoff at Bright Angel Creek, April-July.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Divergence in revised forecasts, precipitation compared to snow cover.....	-45.8	-4.2	+5.1	+20.5	+19.9	+34.0	+33.8	+4.8	-3.6	-5.3
Precipitation compared to runoff.....	-35.0	-6.6	-6.5	+31.1	+40.4	+24.1	+19.4	+15.3	-15.4	+4.5
Snow cover compared to runoff.....	+10.8	-2.4	-11.6	+3.1	+10.1	-9.9	-14.4	+10.4	-11.8	+9.8

3. CORRECTION FACTORS

(1) Diversions Above Bright Angel Creek
(Computable April 1 on Basis of Snow Cover)

SUPPLY		RESIDUE		
Percent- age of normal	(Acre- feet)	Diversions for irrigation (acre-feet)	(Acre- feet)	Percent- age of normal
100	13,506,000	4,500,000	9,006,000	100
68.7 (1946)	9,278,600	4,500,000	4,778,600	53.1

(2) Precipitation During Runoff (April)

(Computed May 1. Maximum loss 20 percent.) Gain can be greater.

Record April 1-15

Station	Normal (inches water)	1946 (inches water)
Green River, Green River (Wyoming).....	0.84	0.48
Colorado River (Grand Junction).....	0.83	0.74
San Juan River (Durango).....	1.50	0.90

Precipitation to date normal.

4. SUMMARY AND COMMENTS

(1) Snow Cover and Precipitation

The snow cover April 1 and precipitation (October-March) in the Colorado Basin are in close agreement; snow 68.7 and precipitation 77.6 percent of normal.

The snow cover and precipitation diminish greatly southward from normal in the Green River Basin to one-third of normal in the San Juan. The percentages are:

Sub-basins	Snow cover	Precipitation
Green River	93.8	105.0
Yampa-White Rivers	81.4	
Colorado River above Grand Junction.....	85.7	76.9
Gunnison River	64.6	
Dolores River	39.6	
San Juan River.....	32.4	62.5
Weighted percentage entire basin.....	68.7	77.6

(2) Forecast

Based on a 68.7 percent snow cover and a probable unrestricted use of 4,500,000 acre-feet for irrigation, only 4,778,600 acre-feet or 53.1 percent of normal should be available for storage in Lake Mead.

Since the diversions, however, will occur mainly on the Green and Upper Colorado Rivers where the snow cover is nearer normal, the relative diversion loss, at least on those streams, should not be so great. The precipitation during runoff has so far been normal.

There are many details yet to be worked out, particularly in diversions. All computations have been based on data provided by Ralph L. Parshall, your chairman, who therefore shares this report with me.

Comparison of Forecast With Actual Runoff

The total runoff of the Colorado River above Lake Mead for April-July as provisionally reported is 5,561,300 acre-feet as compared with 4,778,600 acre-feet (April 15 revised forecast). On the basis of the normal 9,006,000 acre-feet representing the previous 10 years of snow-surveying, the percentage is 61.8, or, on the basis of 8,738,000 acre-feet, the average for 1923-1945, the percentage is 63.6. The divergence is, therefore, only 8 to 11 percent of normal, or far within the 15 percent maximum error May 1 during the previous ten years.

The detailed precipitation, temperature, and runoff by months is included for comparison.

Weighted snow cover April 1, 68.7 percent.

Net runoff below diversions April-July, 61.8 to 63.6 percent.

Monthly Precipitation, Temperature, and Runoff

Month	Weighted precipitation (Green River, Grand Junction, Durango) percent	Effect on runoff (percent of normal)	Temperature departure (Grand Junction) °F	1946 Acre-feet	Runoff above Lake Mead normal acre-feet†	Percent of normal
April.....	87.2	-2.6	+6.0	1,014,000	1,272,000	79.7
May.....	147.8	+9.6	-1.0	1,772,000	2,872,000	61.7
June.....	13.8	-17.2*	+3.2	1,987,000	3,190,000	62.3
July.....	75.0	-5.0	+1.8	788,300	1,404,000	56.1
Total April-July...	93.0	-1.4	+2.5	5,561,300	8,738,000	63.6

*The precipitation during June and July loses much of its effectiveness because of the rapid shrinking of the snow cover. The net effectiveness is probably only one-fifth of that in April. Likewise, the precipitation effectiveness in May does not exceed three-fourths of that of April.
 †10-years monthly means not available.

The April-May gain may, therefore, be +4.6 percent and the June-July loss -4.4 percent.

The high departure in temperature of +6.0 °F in April plainly caused the high runoff, which shrank correspondingly in May. But the heavy precipitation in May (much of it on snow) together with the high departure of +3.2 °F in June caused the runoff of June to recover somewhat despite the almost complete absence of precipitation during the month.

The revised forecast, April 15, was still 53.1 percent, but on May 1 would have been 50.5 percent. The actual runoff for April-July (subject probably to slight revision) was 63.6 percent, or on basis of 10-year normal of 9,006,000 acre-feet it would have been 61.8 percent. In any case, the accuracy would have been within 13 percent.

Comparison of Various Forecasts

Since J. R. Riter, Chief of the Hydrology Division of the Branch of Project Planning of the Bureau of Reclamation, Denver, has at my request sent the various predictions of inflow into Lake Mead presented before the Colorado River Forecast Committee on April 19, I decided to reduce the various forecasts to percentages of normal so that a detailed comparison might be made of the entire effort.

Estimates in acre-feet as well as percentages based on the 10-year mean of 9,006,000 acre-feet are included in the table:

Predictions of Inflow to Lake Mead, April 19, 1946

Name	Agency	PREDICTED RUN-OFF —FLOOD SEASON APRIL-JULY, Inc.— (Acre-feet)	(Percent normal)	Annual* (acre-feet)
Parshall.....	S. C. S.....	8,300,000	92.2	
Vetter.....	U. S. B. R., Region 3.....	†6,200,000	68.8	
Honnold.....	U. S. B. R., Hydrology Division	†6,900,000	76.6	
	U. S. W. B.....	6,600,000	73.3	
Dr. Church.....	Nevada Coop. Snow Surveys.....	†4,778,600	53.1	
Whitney.....	So. California Edison Co.....*	(6,300,000)	70.0	9,300,000
Transtram.....	L. A. Dept. of W. and P.....*	(6,270,000)	69.6	9,270,000
Prior.....	L. A. Dept. of W. and P.....	6,500,000	72.2	
U. S. G. S.....	(Actual).....	5,561,300	61.8	

*To compare with flood season—deduct 3,000,000 acre-feet which is approximately 70 percent (conditions of 1946) of normal August-March, inclusive, flow.
 †Average of predictions based on snow surveys and precipitation.
 ‡Original 4,815,000 based on N. 9,000,000.

It will be noted that the forecasts are bunched between 68.8% and 76.6% except the Nevada forecast which was 53.1% and the forecast by Parshall of the Soil Conservation Service which was 92.2%. The lowest of the first bunch is 68.8% by Vetter of the Bureau of Reclamation, Region 3 (Boulder Dam), while the Nevada forecast is 53.1%. The actual, based upon 9,006,000 acre-feet average of 10 years, representing the length of the snow survey is 61.8%. Mr. Parshall evidently has tried to use the runoff of the past season as his major correction factor in determining the runoff.

The question has been discussed regarding the total amount of diversions that can be expected from the Colorado River either normally or particularly during the present season when the snow cover had fallen to 68.7% of normal. George Malone stated that in the original Colorado River studies the duty of water was less than 3 acre-feet per acre because of considerable return flow. Professor Boardman also suggests that a portion of the 3 acre-feet, if used, would be used only after the close of July when the forecast ends. It is probable, also, that most of the land on the upper Colorado and the San Juan watersheds is watered by ditches instead of flooding. This should cut down somewhat the use of water. On the upper Green River the meadows are broader, and flooding probably is more prevalent as compared with the deep-terraced canyons below.

On the basis of $2\frac{1}{2}$ acre-feet diversion per acre, Table 3, Correction Factors (1) Diversion above Bright Angel Creek, page 116, should be rewritten as follows:

SUPPLY		Diversions for irrigation (acre-feet)	RESIDUE	
Percentage of normal	(Acre-feet)		(Acre-feet)	Percentage of normal
100	12,756,000	3,750,000	9,006,000	100
68.7 (1946)	8,763,400	3,750,000	5,013,400	55.7

Query

How much acreage is irrigated by diversion ditches? How much by flooding as on the Humboldt River?

What is effect of deep-terraced canyons in the Upper Colorado and San Juan Rivers? What is the effect of broader valleys along the upper Green River?

Actual runoff (U. S. G. S.) 5,561,300 acre-feet = 61.8% of normal. This will afford the following corrected comparison as of April 15:

U. S. Bureau of Reclamation, Region 3.....	68.8%
Actual U. S. G. S. (Tucson).....	61.8%
Nevada Cooperative Snow Surveys.....	55.7%
U. S. B. R. (3).....	7.0% above actual
Nevada Cooperative Snow Surveys.....	6.1% below actual

CHAPTER XV

State Board of Registered Professional Engineers

BY STANLEY G. PALMER, *Secretary*

The Engineer's Registration Law as passed in 1919 and amended in 1935 defines the practice of professional engineering in the following terms: "The practice of professional engineering within the meaning and intent of this Act includes any professional service such as consultation, investigation, evaluation, planning, and design or responsible supervision of construction or operation in connection with any public or private utilities, structures, buildings, machines, equipment, processes, works or projects wherein the public welfare or the safeguard of life, health, or property is concerned or involved, when such professional services require the application of engineering principles and data; that the provisions of this Act shall not apply to non-resident mining engineers employed for the purpose of making mine examinations."

The registration board appointed by the Governor consists at the present time of the following members:

A. M. Smith, Chairman, State Engineer, Carson City, appointed first in July 1939.

S. G. Palmer, Secretary, Dean of College of Engineering, University of Nevada, Reno, appointed first in July 1941.

A. J. Shaver, Resident Engineer, Colorado River Commission, Las Vegas, appointed first in July 1939.

W. H. Settelmeyer, Elko County Surveyor, Elko, appointed first in July 1939.

H. D. Mills, Assistant State Highway Engineer, Carson City, appointed first in July 1941.

During the period July 1, 1944, to July 1, 1946, 200 new applications were approved, two elapsed registrations were reinstated, 19 applications received and still pending.

At the present time there are 431 registered engineers in good standing divided into the following classifications:

Electrical Engineers 23, Mechanical Engineers 19, Civil Engineers 145, Highway Engineers, including Land Surveyors, 28, Mining Engineers, including Metallurgical and Chemical and Cartographic Engineers, 104, Architects 14. 110 are not definitely classified as they are among the older registrants.

The distribution is approximately as follows:

Reno and vicinity, 81.

Fallon, 3.

Tonopah, Goldfield, and Mina, 7.

Eureka and Gabbs, 3.

Yerington and Wellington, 3.

Lovelock and Imlay, 5.

Winnemucca, Battle Mountain, Wells, Elko, and McDermitt, 10.

Carson City and Virginia City, 30.

Las Vegas, Henderson, Boulder City, Overton, and Searchlight, 53.

Ely, Ruth, Kimberly, and McGill, 13.

Pioche and Bristol Silver, 6.

Out of State, 59.

According to the registration law the financial report is made for the calender year. This report included here is for the calender years of 1944 and 1945.

Total income from renewal fees, registration fees, and interest on bonds—

1944.....	\$1,406.25
1945.....	1,701.25
	<hr/>
	\$3,107.50

Total gains in assets—

1944.....	\$811.97
1945.....	1,201.23
	<hr/>
	\$2,003.20

Expenditures—

Telephone calls	\$23.01
Postage	114.60
Printing	168.85
Office supplies	35.66
National Council	50.00
Secretary	280.00
Stenographic help	265.10
Meeting expenses (including travel).....	95.08
Engineers' Council for Professional Development	15.00
Refunds	57.00
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	\$1,104.30

Total income..... \$3,107.50

Total expenditures..... 1,104.30

Net gain..... \$2,003.20

By keeping operating expenses to a minimum the present board has increased the assets during the time since it was first appointed from approximately \$450, which approximately covered the outstanding obligations of the preceding board, to \$4,290.

Four \$500 war bonds, Series G, have been purchased with a part of the funds.

The Nevada Board is a member of the National Council of State Boards of Engineering Registration and pays yearly dues to this organization. In return it is provided with services which the Board offers, such as promoting the public welfare by improving professional engineering standards through efficient administration of State Engineering Registration Laws, by facilitating interstate registration of engineers, and by defining and maintaining national qualifications for registration.

Registration has been approved in the past very largely on the evidence presented by applications of engineering training and experience. Since the board maintains reciprocity relations with other boards and to keep the engineering profession on a high level, examinations will be requested of all applicants in the future.

The new directory is nearly ready for the printer. Delay has been caused due to the return of veterans and rapid shift of many engineers in location bringing in daily changes in addresses. It has also been delayed pending return of the cards sent to all older registered engineers who were not formerly classified and asking for information regarding occupation to properly classify them.

CHAPTER XVI**Irrigation Districts and Companies****IRRIGATION DISTRICTS**

Walker River Irrigation District; Pershing County Conservation District; Truckee-Carson Irrigation District and Washoe County Water Conservation District.

IRRIGATION COMPANIES

Muddy River Irrigation Company; Preston Irrigation Company; Lund Irrigation Company; Bunkerville Irrigation Company; Mesquite Irrigation Company; Alamo Irrigation Company; Panaca Irrigation Company and Pacific Reclamation Water Company.

WALKER RIVER IRRIGATION DISTRICT

Officers—Wilbur Seyden, President; M. Dellamonica, Vice President; Fred W. Settelmeyer, Treasurer; C. O. Gemstedt, Secretary; Richard B. Day, Gus Williams, Directors; W. M. Kearney, Attorney.
Office at Yerington, Nevada.

Organized April 14, 1919.

Walker River Irrigation District comprises all the irrigable lands of the east, west and main Walker Rivers in the State of Nevada, with the exception of the Walker River Indian Reservation. These rivers have their source in the eastern slopes of the Sierra Nevada Mountains, drawing from a watershed of some 3,000 square miles. The total area of the district is 260,000 acres, of which 160,000 acres are irrigable. At the present time, 128,450 acres are held under private ownership of which 79,175 acres have water rights. The irrigated area is approximately 53,000 acres.

The outstanding bonded indebtedness of this district is now \$264,000. These bonds carry an interest rate of 4% per annum and are all held by the Reconstruction Finance Corporation. They are scheduled to be redeemed over the period between now and the year 1965.

During the past two years, the activities of this district have consisted chiefly of operation and maintenance. However, notable improvements in the distribution and drainage systems are now under consideration.

A complete description of the operation and status of this district may be found in the 1934-1936 Biennial Report of the State Engineer.

LOCAL IMPROVEMENT DISTRICTS NOS. 1, 2, 3, 4, AND 5 OF WALKER RIVER IRRIGATION DISTRICT

Officers—Wilbur Seyden, President; M. Dellamonica, Vice President; Fred W. Settelmeyer, Treasurer; C. O. Gemstedt, Secretary; Richard B. Day, Gus Williams, Directors; W. M. Kearney, Attorney.

TRUCKEE-CARSON IRRIGATION DISTRICT

Officers—Geo. R. Miller, President; R. J. Swope, Vice President; H. W. Emery, Secretary and Treasurer; W. H. Alcorn, F. C. Erb, W. A. Harmon, John C. Mall, J. R. McCulloch, Directors; W. H. Wallace, Manager.

Office at Fallon, Nevada.

Organized November 25, 1918.

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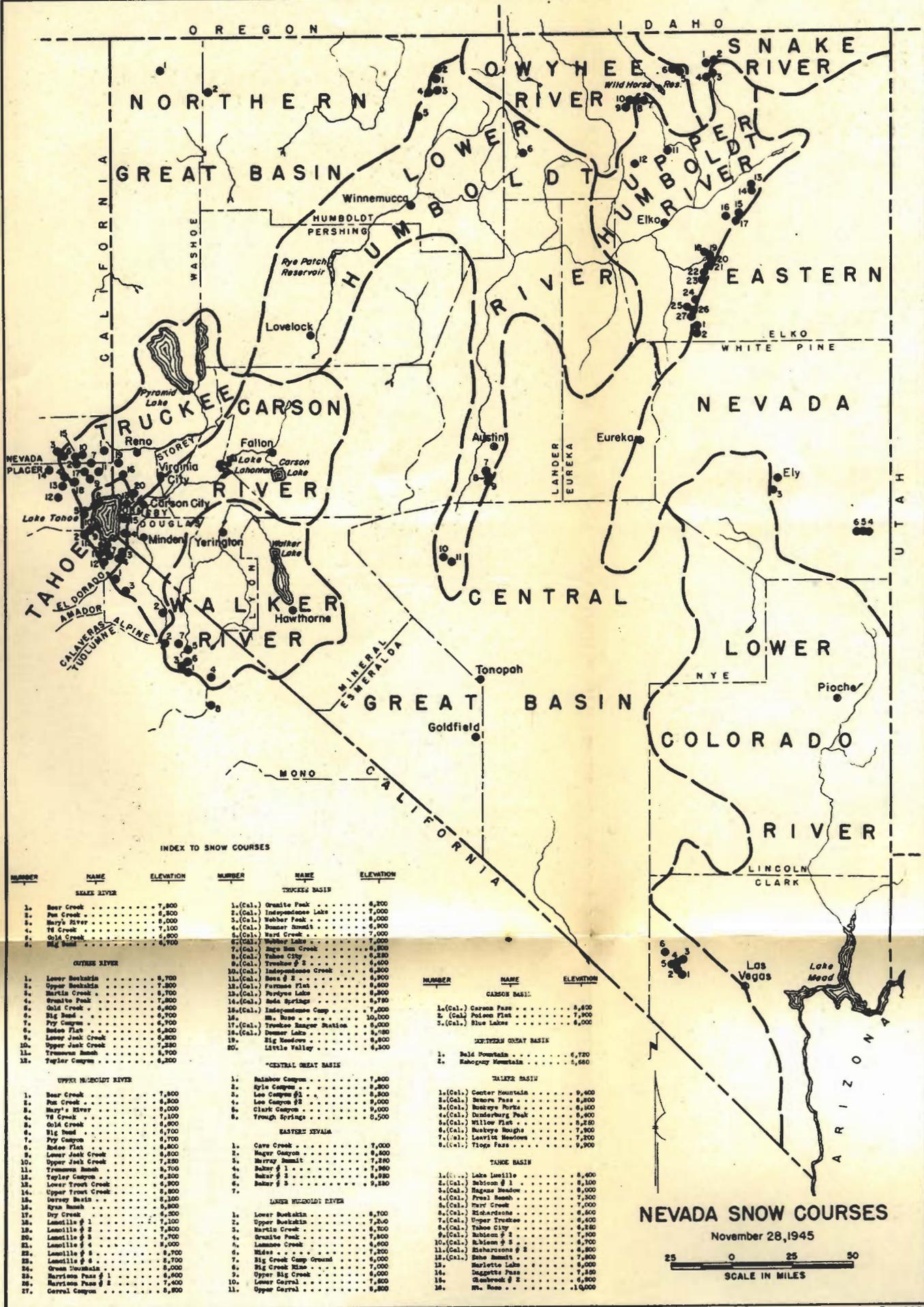
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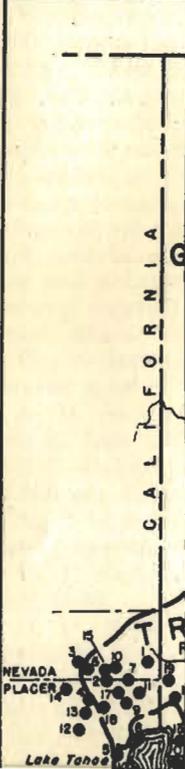




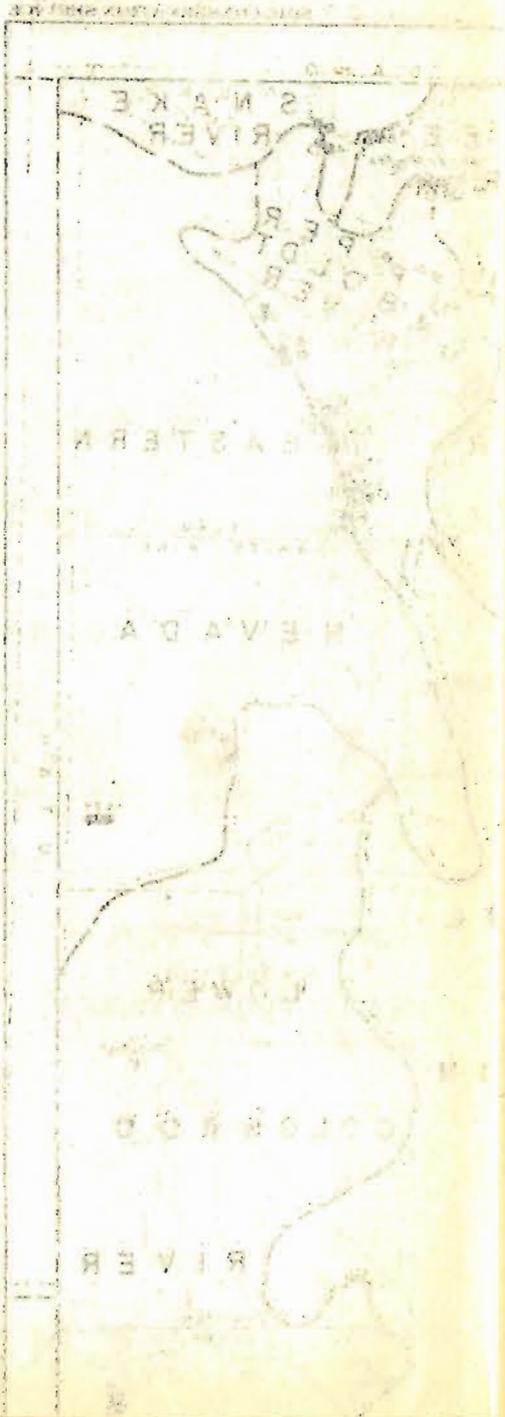
NEVADA SNOW COURSES
November 28, 1945



U. S. DEPARTMENT



No.	Name	Section	Area
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The Newlands Project, located in Western Nevada, embraces lands mainly in Churchill and Lyon Counties. This project was the first of the numerous Federal projects to be investigated, and upon which construction work was commenced by the United States Reclamation Service under the Act of Congress approved June 17, 1902, commonly known as the Reclamation Act. Actual construction work was commenced during September 1903, and water was delivered to project lands from the new system of works during 1905. The project was operated and maintained by the United States Bureau of Reclamation until December 31, 1926, on which date control was transferred to the Truckee-Carson Irrigation District under a contract dated December 18, 1926. The irrigation district was organized on November 25, 1918, under the laws of the State of Nevada.

WASHOE COUNTY WATER CONSERVATION DISTRICT

Officers—L. M. Christensen, President; Silvo Questa, Vice President; Geo. L. Ferris, Secretary; E. A. Capurro, Treasurer; Edward M. Peckham, J. L. Hash, Ernest J. Kleppe, Directors; Chas. M. Merrill, Attorney; Harold Pabst, Caretaker at Boca; John D. Franklin, Engineer-Manager.

Office at 29 East First Street, Reno, Nevada.

Organized June 1929.

The Washoe County Water Conservation District was organized in pursuance of the provisions of that certain Act of the Legislature of the State of Nevada, known as the Nevada Irrigation District Act, on June 21, 1929, in Reno, Nevada.

Investigations were immediately started as to securing supplemental water for district members by virtue of upstream storage. On June 13, 1935, an agreement known as the Truckee River Agreement was approved by the United States Secretary of the Interior, this agreement being among five parties, namely, the United States of America, the Truckee-Carson Irrigation District, the Washoe County Water Conservation District, the Sierra Pacific Power Company, and other users of the waters of the Truckee River. Whereupon Boca reservoir was constructed by the Bureau of Reclamation, at the mouth of the Little Truckee River. The capacity of the reservoir is 42,000 acre-feet and was constructed at a cost of \$1,000,000, one-half of said cost to be paid back by Washoe County and the other half to be paid by the Conservation District over a repayment contract period with the Government of forty years.

Inasmuch as distribution is handled by the Federal Water Master, most work entailed by the district are administrative and the operation and maintenance of Boca reservoir. Flood control and storage along with regulation of the Truckee River flow are prime factors which are decided upon by this district in conjunction with other signatories of the Truckee River agreement.

Due to the rapid suburban growth of population around the cities of Reno and Sparks, the district membership has increased from 650, in 1938, to over 1,600, in 1945. This has become a serious administrative problem and considerable work has been done in the past two years to facilitate and alleviate the extra work such a large membership entails.

Boca Dam has proved to be a big factor in flood control on the

Truckee River for amounts running from 90,000 acre-feet to 130,000 acre-feet per year are regulated and controlled through its needle valves.

PERSHING COUNTY WATER CONSERVATION DISTRICT

Officers—John Froelich, President; Ruth Ruddell, Vice President; Clarence L. Young, Secretary; Harry Anderson, Treasurer; Lester Hanson, Lawrence Devita, Fred Nordman and L. Arobio, Directors; Sanford A. Bunce, Attorney; and Peter F. Anker, Superintendent.

Office at Lovelock, Nevada.

Organized February 1926.

This district has about 30,000 acres of irrigable lands within its boundaries. Of this amount, 21,096 acres have decreed water rights. In the Lovelock Valley only about 11,600 acres of lands having decreed rights are not included in the district. During the latter part of 1936 the Rye Patch Dam was completed on the Humboldt River. This structure is located about 23 miles northeast of Lovelock, and was built by the Bureau of Reclamation under a repayment contract dated October 1, 1934, with the Pershing County Water Conservation District. The history and description of this project was fully described by L. J. Foster, Construction Engineer, in an article appearing in the 1934-1936 Biennial Report.

The repayment contract mentioned above between the Bureau and the District provides that the total cost of the project shall be returned to the United States in forty annual payments over a period of forty years without interest charges. If the annual payments are not made when due, such payments carry a six percent interest charge.

The project consists of two salient features, namely, the construction of Rye Patch dam and the purchase of water rights and the making of river channel improvements in the Battle Mountain area. These features are discussed in the 1936-1938 Biennial Report.

MUDDY VALLEY IRRIGATION COMPANY

Officers—Edwin Marshall, Logandale, Chairman; John Whipple, Logandale, Vice Chairman; Clarence A. Lewis, John Perkins, Overton, and Jesse Whipple, Logandale, Directors; Louie Buboltz, Overton, Secretary-Treasurer; Ernest Gubler, Overton, Ditchrider; Clarence A. Lewis, Water Commissioner.

Office at Overton, Nevada.

Outstanding activities being carried on by the directors and stockholders of the Muddy Valley Irrigation Company, in cooperation with the various county, State, and Federal agencies, have had to do with the development of an overall program of drainage, irrigation, and domestic water systems improvement, water storage, and flood control. It is felt that some headway is being made since applications to the Bureau of Reclamation for investigations of problems involved are being given consideration. Likewise, various Clark and Lincoln County legal and service organizations have prepared and submitted an application to the U. S. Army Engineers for flood control structures at the Pine and Mathews Canyons in the Clover Mountain area east of Caliente in Lincoln County as a means of reducing flood hazards of the Meadow Valley wash.

VIRGIN VALLEY, CLARK COUNTY, NEVADA, IRRIGATION COMPANIES
Mesquite Irrigation Company

Officers—James Pulsipher, President; Vernon Frehner and Orange Barnum, Directors; J. Alfred Tobler, Secretary-Treasurer; and J. Lewis Pulsipher, Advisor.

Office at Mesquite, Nevada.

Organized June 8, 1925.

Bunkerville Irrigation Company

Officers—William N. Leavitt, President; Merl Wittwer, Director and Secretary-Treasurer; Marriner Cox, Director; and Harmon Wittwer, Ditchrider.

Office at Bunkerville, Nevada.

Organized June 25, 1925.

Each of these companies divert their irrigation waters by the brush-rock diversion dam method from the Virgin River which is very much subject to high spring run-off and occasional summer flash storm floods. This condition makes for comparatively frequent losses owing to the temporary brush-rock dams washing out. Maintenance costs and crop losses are thereby held comparatively and seemingly unnecessarily high.

To determine the course to be taken in the matter of consolidation of interests of these two companies whereby but one diversion only would be maintained, the officers of these two companies have creditably jointly appealed to their Virgin Soil Conservation District supervisors to apply to the Soil Conservation Service to conduct a comprehensive study and survey to determine the feasibility and advisability of proceeding in the improvement of their respective irrigation systems through the consolidated way. This application has received the commendable support of the Virgin Valley Soil Conservation District supervisors who have forwarded same to the State Soil Conservation Service.

The problem of domestic water supply for these two communities has, however, owing to necessity, operated in the opposite direction. Their supply at first came through development of one source, the so-called Cabin-Mica Notch springs area approximately 10 miles from points of use. Since the development and expansion of the market milk production program in both communities, it became clearly evident that sources for additional supplies of domestic and culinary water were seriously needed. Consequently, the Bunkerville Community sold all rights to their portion of the joint supply and installation to the Mesquite Community. Bunkerville, then proceeded with development of a supply at what is termed the "Duds" and the "Seeps" drainage area at the opposite (west) end of the Virgin Mountain Range. Thus each community is now fairly well supplied with excellent quality of water. Further expansion of use will, however, necessitate storage of early spring run-off. Plans are under way whereby all available water from the respective sources will be held under storage.

This domestic-culinary water is supplied each community under the direction of a community water committee who supervises all phases of work connected with the supply. Monthly payments are made by users under three classes of users: Family home, schools, and commercialized interests. There are 164 users in the two communities.

Supervisory and managerial committees are:

For the Bunkerville Domestic Water Supply Association—Parley Hunt, Chairman, Read Leavitt, Secretary-Treasurer, Washington Leavitt, Merl Wittwer, Charles Leavitt, and John Leavitt.

For the Mesquitie Domestic Water Supply Association—Max Hafen, Chairman, Alfred Frehner, Director and Secretary-Treasurer, Leonard Reber, John Jensen, and Orval Abbott.

LUND IRRIGATION COMPANY

Officers—A. N. Carter, President; Lorn O'Donnell, Vice President; Kelly Harrison, Secretary; Vance McKenzie, Member; George Fawcett, Member.

Office at Lund, Nevada.

Organized 1907.

Activities of the Lund Irrigation Company during the year 1945: Through a cooperative program at the County Agent's office and Farm Security office of Ely, the Board of Directors of the Lund Irrigation Company voted that a study of the irrigation system be made. A study is being made to determine water losses in the Lund Irrigation ditches and this study shall be carried on throughout 1946.

Wiers are going to be constructed in the company ditches. It is hoped by the stockholders that by the end of the summer of 1946 definite data will be obtained to determine what should be done regarding conservation of water in the Lund Irrigation district. In cooperation with the Agricultural Extension Service the Irrigation Company at present is obtaining a new set of bylaws, and in due time will be filed with the Secretary of State.

PRESTON IRRIGATION COMPANY

Officers—Andy Peterson, President; Wes Reid, Vice President; James Jensen, Secretary; Carlyle Peacock, Member; Randal Bradley, Member.

Office at Preston, Nevada.

Organized March 24, 1911.

The Board of Directors and stockholders voted that a study regarding conservation of water be made for the year of 1946 to determine what could be done to conserve water in the company ditches. During the year of 1945 the Preston Irrigation Company carried on regular business and there was no special program that was completed during this year.

PACIFIC RECLAMATION WATER COMPANY

Officers—Ensign Hill, Chairman; Alf D. Bake, Vice Chairman; Ernest H. Uhlig, Secretary-Treasurer.

Office at Metropolis, Nevada.

Irrigation season started early in May of 1945 with 43 feet of water in the reservoir. In 1945 there were delivered 26 inches per share for 1695.5 shares of water stock. The release from the reservoir was closed towards the end of September with a carry over of 28 feet of water. On April 1, 1946, the water level stood at 40 to 41 feet and it is planned to deliver at least 26 inches of water per share.

For sometime consideration has been given towards strengthening the dam so that more water could be stored from Bishop and Johnson Creeks.

ALAMO IRRIGATION COMPANY

Officers—John P. Wright, President; Dan Stewart, Secretary; Vivian Frehner, B. A. Ercanbrack, Harvey Frehner, Members.

Office at Alamo, Nevada.

Organized 1922.

In the decree in the Matter of the Determination of the Relative Rights in and to the Waters of Pahranaagat Lake and its Tributaries, signed by Judge William E. Orr on October 14, 1929, the Alamo Irrigation Company was given decreed water rights on 501.1 acres of land. Of this amount, 435.1 acres were harvest crop lands, the balance being diversified pasture. The source of the water is Ash Springs Creek.

The annual cost of operation is about \$1,100. The cost of repairs and replacements are approximately \$640 per year. Taxes amount to about \$77 per year.

Water is furnished by this company for domestic and garden pumping to 30 families in the town of Alamo and to 21 farms at an annual fee of about \$1.25 per acre. The company has no indebtedness.

PANACA IRRIGATION COMPANY

Officers—Job F. Hall, President; Frank C. Lee, Secretary; Charles Hansen, Milton L. Wadsworth, Allen Findley, Members.

CHAPTER XVII

Status of Applications Filed During the Period from July 1, 1944, to June 30, 1946

Following is a condensed statement giving the salient data in connection with applications filed during the period from July 1, 1944, to June 30, 1946, in the order of:

1. Application serial number.
2. Date of filing.
3. Name of applicant.
4. Source of water supply.
5. Purpose of appropriation.
6. Action on application.
7. Status of permits as of June 30, 1946.

11138....	7- 5-44....	Fred T. Roberts and Ola May Roberts; Underground source (Las Vegas Artesian Basin); Irrigation and domestic; Approved December 4, 1944, for 0.05 c.f.s. G. S.
11139....	7-12-44....	D. L. Stewart; Pony Spring No. 2; Stockwatering and domestic; * Approved January 9, 1945, for 0.00625 c.f.s. G. S.
11140....	7-19-44....	Benton V. Smith; Two Springs and Two Springs Creek; Quasi-municipal and domestic; Approved January 25, 1945, for 1.0 c.f.s. G. S.
11141....	7-19-45....	R. J. White and Slat Jacobs; Underground source; Stockwatering; Approved December 13, 1944, for 0.0078 c.f.s. G. S.
11142....	7-24-44....	P. J. Goumond; Underground (Las Vegas Artesian Basin); Irrigation; Approved May 8, 1945, for 4.0 c.f.s. G. S.
11143....	7-26-44....	Lola Buck; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved December 6, 1944, for 0.05 c.f.s. G. S.
11144....	7-27-44....	Matthew D. Butler and Florence W. Butler; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved December 4, 1944, for 0.30 c.f.s. G. S.
11145....	7-29-44....	O. D. Iveson; Nigger Creek (flood waters); To change point of diversion and place of use; Irrigation and domestic; Approved October 21, 1944, for 2,000 acre-feet per annum. G. S.
11146....	7-31-44....	E. F. Nickel, et al.; Surplus water from the Old Ranch flowing in Las Vegas Creek; Irrigation; Cancelled June 18, 1945, because of failure to refile corrected application within statutory time.
11147....	7-31-44....	Albert and Joy Hatcher and John F. and Rose Haynes; Surplus water from the Old Ranch flowing in Las Vegas Creek; Irrigation; Cancelled June 18, 1945, because of failure to refile corrected application within statutory time.
11148....	8- 2-44....	Daniels Brothers; Underground; Stockwatering; Cancelled June 18, 1945, because of failure to refile corrected application within statutory time.
11149....	8- 2-44....	Daniels Brothers; Stonewell Spring; Stockwatering; Cancelled June 18, 1945, because of failure to refile corrected application within statutory time.
11150....	8- 3-44....	Mrs. Hildene Trudgen; Underground; Stockwatering; * Approved February 1, 1946, for 0.0188 c.f.s. G. S.
11151....	8- 4-44....	W. H. Settlemeyer; Whiterock Creek; Power; Withdrawn by applicant April 27, 1945.
11152....	8- 8-44....	R. J. Kelly and V. E. Greenwald; Gold Bar Well, also known as Gold Bar Spring; Stockwatering; * No action.
11153....	8- 8-44....	R. J. Kelly and V. E. Greenwald; Mud Spring; Stockwatering; * No action.
11154....	8- 8-44....	R. J. Kelly and V. E. Greenwald; Underground; Stockwatering; No action.
11155....	8-14-44....	Clara V. and S. P. James, Sr.; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved January 25, 1945, for 0.0391 c.f.s. G. S.
11156....	8-19-44....	Hotels El Rancho, Inc.; Underground (Las Vegas Artesian Basin); General Hotel Supply and domestic; Approved December 4, 1944, for 0.50 c.f.s. G. S.
11157....	8-19-44....	Hotels El Rancho, Inc.; Underground (Las Vegas Artesian Basin); General Hotel Supply and domestic; Approved December 4, 1944, for 0.50 c.f.s. G. S.
11158....	8-19-44....	E. O. and Marion Lorie Underhill; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved May 1, 1945, for 0.3 c.f.s. G. S.
11159....	8-24-44....	Erwin Burns and Ernest Higbee; Hancock Reservoir in Dry Channel and Tributaries; Stockwatering and domestic; Approved January 9, 1945, for 0.016 c.f.s. G. S.

*Protested application. G. S. Good standing.

- 11160.... 8-24-44....J. M. Bingham and F. Lorin Bunker; Cherry, Pine and Cottonwood Creeks and flood water in the Cherry Creek Valley; Irrigation and domestic;* No action.
- 11161.... 8-25-44....Angelo C. Florio; Underground; Stockwatering;* No action.
- 11162.... 8-25-44....Gladys Storey; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved April 13, 1945, for 0.30 c.f.s. G. S.
- 11163.... 9- 2-44....Callahan Zinc-Lead Company; Underground Mining and domestic; Approved September 11, 1945, for 0.20 c.f.s. G. S.
- 11164.... 9- 6-44....S. J. Anderson and Elmer H. Peterson; Underground (Las Vegas Artesian Basin); Irrigation and domestic; No action. G. S.
- 11165.... 9- 9-44....James W. and Mae Cook; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved December 6, 1944, for 0.10 c.f.s. G. S.
- 11166.... 9-11-44....R. H. Morrison and Peggie Morrison; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved March 29, 1946, for 0.03 c.f.s. G. S.
- 11167.... 9-14-44....D. L. Stewart; Jumbo Spring; Stockwatering and domestic;* Approved December 26, 1944, for 0.003 c.f.s. G. S.
- 11168.... 9-14-44....George J. Spence (Assigned by George F. Spence and Helen Spence to H. E. Spence. Deed filed July 23, 1945); Underground (Las Vegas Artesian Basin); Industrial and domestic; Approved January 16, 1945, for 0.5 c.f.s. G. S.
- 11169.... 9-16-44....John A. Bell; Rogers Spring; Irrigation and domestic; Approved March 5, 1945, for 1.5 c.f.s. G. S.
- 11170.... 9-21-44....Ogle Swingle; Big High Rock Creek; Irrigation and domestic; Approved August 8, 1945, for 2.0 c.f.s. G. S.
- 11171.... 9-23-44....Water Company of Tonopah; Underground; To change place of use and manner of use of waters of an underground source heretofore granted under Permit 11003; Domestic, commercial, industrial and military camp purposes; Approved January 9, 1945, for 1.2 c.f.s. G. S.
- 11172.... 9-23-44....Water Company of Tonopah; Underground; To change place of use and manner of use of underground source heretofore granted under Permit 11002; Domestic and military camp, commercial and industrial use; Approved January 9, 1945, for 1.2 c.f.s. G. S.
- 11173.... 9-25-44....George K. Cremer; Underground; Commercial and domestic; Cancelled June 18, 1945, because of failure to refile corrected application within statutory time.
- 11174.... 9-27-44....H. D. Cornell; Six Mile Manse Spring; Stockwatering; Approved July 19, 1945, for 0.022 c.f.s. G. S.
- 11175....10- 2-44....Edward M. and Alice M. Ladd; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved April 27, 1945, 0.1 c.f.s. G. S.
- 11176....10- 9-44....Dick White; Stump Spring; Stockwatering;* Denied July 27, 1945, on the grounds that the granting of Application 11176 would contravene the provisions of Section 2 of the 1935 stockwatering Act.
- 11177....10-11-44....Clarence Brey; Unnamed Stream; Irrigation; Cancelled June 18, 1945, because of failure to refile corrected application within statutory time.
- 11178....10-11-44....Clarence Brey; Unnamed Spring; Irrigation and domestic; Cancelled June 18, 1945, because of failure to refile corrected application within statutory time.
- 11179....10-11-44....J. P. Cayton; Underground; Irrigation; Approved October 10, 1945, for 3.0 c.f.s. G. S.
- 11180....10-11-44....J. P. Cayton; Underground; Irrigation; Approved January 25, 1946, for 3.0 c.f.s. G. S.
- 11181....10-11-44....Ray Van Horn; Underground; Irrigation; Approved September 29, 1945, for 1.0 c.f.s. G. S.
- 11182....10-11-44....Ray Van Horn; Underground; Irrigation; No action.
- 11183....10-11-44....Ray Van Horn; Underground; Irrigation; No action.
- 11184....10-11-44....Ray Van Horn; Underground; Irrigation; No action.
- 11185....10-11-44....Ray Van Horn (Assigned February 18, 1946, by Ray Van Horn and Sallie Van Horn, to E. S. Bowman. Deed filed February 20, 1946); Underground; Irrigation; No action.
- 11186....10-13-44....Florence E. Smith; Lata Canyon Creek; Irrigation; Approved January 22, 1945, for 0.58 c.f.s. G. S.
- 11187....10-20-44....Fred Bartine; Eureka Creek; To change the point of diversion and place of use of a portion of the waters of Eureka Creek as heretofore granted under Permit No. 10682; Irrigation; Approved April 11, 1945, for 0.0492 c.f.s. G. S.
- 11188....10-21-44....A. C. Florio; Treasure Well; Stockwatering;* No action.
- 11189....10-26-44....M. Bell; Cochrane Ditch from the Truckee River; To change point of diversion, manner and place of use; Irrigation; Cancelled March 12, 1945, because of failure to refile corrected application within statutory time.
- 11190....10-27-44....County of Clark; Cold Creek Spring; Fish Hatchery; Approved October 11, 1945, for 4.0 c.f.s. Withdrawn by applicant April 17, 1946.
- 11191....10-27-44....County of Clark; Willow Spring; Fish Hatchery; Approved October 11, 1945, for 2.0 c.f.s. Withdrawn by applicant April 17, 1946.

*Protested application. G. S. Good standing.

- 11192....10-30-44....L. J. Fee, Everett Gallup and W. D. Joffiffe; New Year Lake and Tributaries; Irrigation; Approved September 29, 1945, for 4,500 acre-feet per second. G. S.
- 11193....10-30-44....L. J. Fee; New Year Lake; Irrigation; Approved September 29, 1945, for 7,200 acre-feet per second. G. S.
- 11194....11- 4-44....Hotels Securities Co.; Underground (Las Vegas Artesian Basin); To change place of use; Quasi-municipal and domestic; No action.
- 11195....11- 4-44....Hotels Securities Co.; Underground (Las Vegas Artesian Basin); To change place of use; Quasi-municipal and domestic; No action.
- 11196....11- 6-44....Elda A., John T. and Wm. Orr Gilcrease; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved June 4, 1945, for 4.7 c.f.s. G. S.
- 11197....11- 8-44....John P. and Mary V. Hughes; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved March 3, 1945, for 0.0118 c.f.s. G. S.
- 11198....11- 8-44....E. A. Honrath; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved March 5, 1945, for 0.27 c.f.s. G. S.
- 11199....11-10-44....Sheldon W. Lamb; Antelope Spring; Stockwatering and domestic; * No action.
- 11200....11-10-44....A. F. Bordoli; Twin Springs Slough; Stockwatering; Approved April 11, 1945, for .0156 c.f.s. G. S.
- 11201....11-10-44....A. F. Bordoli; Underground; Stockwatering and domestic; * Approved February 5, 1946, for 0.0156 c.f.s. G. S.
- 11202....11-10-44....A. F. Bordoli; Troy Creek; Irrigation; * Approved February 5, 1946, for 0.50 c.f.s. G. S.
- 11203....11-10-44....Joseph L. Raffetto; Truckee River; To change place of use and point of diversion of waters of Truckee River heretofore granted under Claim No. 383 of the Temporary Restraining Order; Irrigation and domestic; Approved April 7, 1945, for 140.9 acre-feet per annum. G. S.
- 11204....11-10-44....Joseph L. Raffetto; Truckee River; To change point of diversion and place of use of waters of the Truckee River heretofore granted under Claim No. 383 of the Temporary Restraining Order; Irrigation and domestic; Approved April 7, 1945, for 28.1 acre-feet per annum. G. S.
- 11205....11-15-44....Benjamin F. Casey; Jack Ass Spring; Stockwatering and domestic; Approved August 2, 1945, for .006 c.f.s. G. S.
- 11206....11-15-44....Ford Farris; Underground; Irrigation; Approved August 20, 1945, for 1.0 c.f.s. G. S.
- 11207....11-18-44....Wm. Clark; Underground; Domestic and Quasi-municipal; Approved March 5, 1945, for 0.1 c.f.s. G. S.
- 11208....11-21-44....C. C. Maracci; Waste water from disposal plant at Las Vegas Army Air Field; Irrigation; No action.
- 11209....11-24-44....Harry F. Munkers and Leona M. Munkers; Underground (Las Vegas Artesian Basin); Domestic and irrigation; Approved April 9, 1945, for .0363 c.f.s. G. S.
- 11210....11-27-44....Ezra B. Coram and Van O. Eastland; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; * Approved July 28, 1945, for 1.25 c.f.s. G. S.
- 11211....11-29-44....Tonopah & Goldfield Railroad Company; Underground; Railroad and domestic use; Approved May 8, 1945, for 0.25 c.f.s. G. S.
- 11212....12- 4-44....Basil Brewer and George A. Riley; Underground; Stockwatering; No action.
- 11213....12-11-44....Basil Brewer and George A. Riley; Bar 99 Spring; Stockwatering; * No action.
- 11214....12-11-44....Margaret M. Folsom; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved March 13, 1945, for 0.35 c.f.s. Canceled November 30, 1945, because of failure to comply with provisions of permit.
- 11215....12-11-44....Harry Mack, Nate Mack and Murray Wollman (Assigned to Pacific States Theatres, Inc., except an undivided one-fourth interest to Gene Pace and an undivided one-fifth interest deeded to Bee Dragani. Deed filed August 31, 1945); Underground (Las Vegas Artesian Basin); Irrigation and domestic; (To change point of diversion of waters heretofore granted under Permit No. 11123); Approved April 18, 1945, for 0.119 c.f.s. G. S.
- 11216....12-21-44....Marion K. Stewart; Bird Spring; Stockwatering and domestic; No action.
- 11217....12-21-44....M. M. Sweeney; Underground (Las Vegas Artesian Basin); Quasi-municipal; Approved May 8, 1945, for 0.3 c.f.s. G. S.
- 11218....12-26-44....Robert and Josie Russell; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved June 20, 1945, for 0.10 c.f.s. G. S.
- 11219....12-27-44....Circle L Ranch; Underground; Irrigation and domestic; Approved September 27, 1945, for 1.0 c.f.s. G. S.
- 11220....12-27-44....Circle L Ranch; Underground; Irrigation; Approved August 28, 1945, for 0.25 c.f.s. G. S.
- 11221....12-27-44....Circle L Ranch; Underground; Irrigation; Approved August 28, 1945, for 0.25 c.f.s. G. S.
- 11222....12-27-44....Circle L Ranch; Underground; Irrigation; Approved August 28, 1945, for 0.25 c.f.s. G. S.

*Protested application. G. S. Good standing.

- 11223....12-27-44....Circle L Ranch; Underground; Irrigation; Approved August 28, 1945, for 0.25 c.f.s. G. S.
- 11224....12-27-44....Circle L Ranch; Unnamed Spring; Stockwatering;* No action.
- 11225....12-28-44....Joe Morrissey; Underground (Las Vegas Artesian Basin); Quasi-municipal; Approved March 23, 1945, for 0.20 c.f.s. G. S.
- 11226....12-29-44....Murray anl Agnes Wollman and Albert and Marion Wollman; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved June 4, 1945, for 0.8 c.f.s. G. S.
- 11227.... 1- 6-45....Harry Mack, Nate Mack and Murray Wollman (Assigned to Pacific States Theatres except on undivided one-fourth interest to Gene Pace and one-fifth interest to Bee Dragan); Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; Approved May 1, 1945, for 0.3 c.f.s. G. S.
- 11228.... 1- 6-45....Copper Exploration Mining Company; Unnamed Springs; To change place and manner of use of waters heretofore granted under Permit No. 9617; Domestic; Approved October 3, 1945, for 0.50 c.f.s. G. S.
- 11229.... 1- 8-45....M. L. Miller; Miller Spring; Stockwatering;* No action.
- 11230.... 1- 8-45....M. L. Miller; Bostwick Creek; Stockwatering;* No action.
- 11231.... 1- 8-45....Bell Telephone Company of Nevada; Underground (Las Vegas Artesian Basin); To change point of diversion of underground source heretofore granted under Permit No. 9243; Irrigation and domestic; Approved April 13, 1945, for 0.1 c.f.s. G. S.
- 11232.... 1-10-45....H. N. Sharp; Troy Creek; Irrigation and domestic; Approved May 1, 1945, for 1.0704 c.f.s. G. S.
- 11233.... 1-12-45....O. A. Eflinger and Grace Eflinger; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved May 1, 1945, for 0.084 c.f.s. G. S.
- 11234.... 1-16-45....Ewald F. Winkelman and Edgar N. Palen; Drainage water; Irrigation; No action.
- 11235.... 1-25-45....Hyrum T. Church and A. E. Littleton; Seepe Spring; Stockwatering; No action.
- 11236.... 1-25-45....J. H. Frasher; Underground; Mining and domestic;* No action.
- 11237.... 2- 2-45....Basil Brewer and George A. Riley; McAfee Creek; Irrigation and domestic; Approved September 27, 1945, for 15 c.f.s. G. S.
- 11238.... 2- 5-45....Blaine Austin; Underground; Stockwatering; Cancelled November 20, 1945, because of failure to refile corrected application within statutory time.
- 11239.... 2- 5-45....Blaine Austin; Underground; Stockwatering; Cancelled November 20, 1945, because of failure to refile corrected application within statutory time.
- 11240.... 2- 7-45....Frank Trosi; Biddleman Spring; Stockwatering and domestic; Cancelled November 20, 1945, because of failure to refile corrected application within statutory time.
- 11241.... 2- 7-45....Coverton K. and Alice M. Ryster; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved June 5, 1945, for 0.15 c.f.s. G. S.
- 11242.... 2-13-46....B. H. Robison; Spring Gulch Lower Spring; Stockwatering;* No action.
- 11243.... 2-14-45....Gatchell Mine, Inc.; Unnamed Creek; Milling;* No action.
- 11244.... 2-15-45....Carl M. and Effie M. Martin; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved July 16, 1945, for 0.15 c.f.s. G. S.
- 11245.... 2-20-45....T. F. Brennen Land & Livestock Co.; South Fork of Oglvie Creek; To change point of diversion, manner and place of use; Irrigation; Withdrawn by applicant August 14, 1945.
- 11246.... 2-21-45....Robt. B. Griffith; Underground; To change point of diversion and manner of use of underground water in the Las Vegas Artesian Basin heretofore granted under permit No. 11077; Quasi-municipal and domestic; Approved July 3, 1945, for 0.8 c.f.s. G. S.
- 11247.... 2-23-45....W. E. Hutchings; Moon River Spring; Irrigation; Approved October 15, 1945, for 5.0 c.f.s. G. S.
- 11248.... 2-24-45....James D. McPherson; Colorado River; Mining, milling and domestic; Approved June 20, 1945, for 0.5 c.f.s. G. S.
- 11249.... 3- 1-45....Las Vegas Land and Water Company; Underground (Las Vegas Artesian Basin); Municipal supply and domestic; Approved June 27, 1945, for 5.0 c.f.s. G. S.
- 11250.... 3- 5-45....Northern Nevada Mining Company; Riley Creek; Milling; Approved May 25, 1945, for 0.75 c.f.s. G. S.
- 11251.... 3- 6-45....Casa de Oro Inc. (Assigned to Marion Hicks an undivided two-thirds interest and to Clifford Jones an undivided one-third interest); Underground (Las Vegas Artesian Basin); General Hotel Supply and domestic; Approved August 13, 1945, for 1.0 c.f.s. G. S.
- 11252.... 3-14-45....Mario Belli and Erminia Belli; Truckee River; To change point of diversion and place of use of waters of Truckee River heretofore granted under Claim No. 428 in the Temporary Restraining Order; Irrigation; Approved June 6, 1945, for 0.18 c.f.s. G. S.
- 11253.... 3-26-45....A. F. Winter; Underground (Las Vegas Artesian Basin); Domestic and quasi-municipal;* Approved July 16, 1945, for 1.0 c.f.s. G. S.

*Protested application. G. S. Good standing.

- 11255.... 3-30-45....A. J. Wood and Lela C. Wood; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; Approved August 20, 1945, for 0.20 c.f.s. G. S.
- 11256.... 3-31-45....Sheldon Lamb; Underground; Stockwatering; Denied on the grounds that the approval thereof would contravene the 1925 Stockwatering Act, February 19, 1946.
- 11257.... 4- 1-45....Ralph Hunt and M. W. Mann; Underground; Irrigation and domestic; Approved November 5, 1945. G. S.
- 11258.... 4- 1-45....Basil Brewer and George A. Riley; Underground; Stockwatering and domestic;* No action.
- 11259.... 4- 4-45....N. B. Coughlin, E. J. Shirley, S. M. Chiatovich and H. R. Humphrey; Coyotte Hole; Stockwatering; No action.
- 11260.... 4- 4-45....N. B. Coughlin, E. J. Shirley, S. M. Chiatovich and H. R. Humphrey; McAfee Spring; Stockwatering; No action.
- 11261.... 4- 4-45....N. B. Coughlin, E. J. Shirley, S. M. Chiatovich and H. R. Humphrey; North Spring; Stockwatering; No action.
- 11262.... 4- 4-45....N. B. Coughlin, E. J. Shirley, S. M. Chiatovich and H. R. Humphrey; Unnamed Seeps; Stockwatering; No action.
- 11263.... 4- 5-45....Louis G. and Margaret C. Biel; Underground (Las Vegas Artesian Basin); Quasi-municipal;* Approved July 13, 1945, for 0.15 c.f.s. G. S.
- 11264.... 4- 5-45....E. L. Cord, Leidy Creek (Robinson Creek); To change point of diversion); Power and domestic; Approved July 24, 1945, for 3.0 c.f.s. G. S.
- 11265.... 4- 6-45....Basil Brewer and George A. Riley; Underground; To change point of diversion, manner and place of use; Stockwatering;* No action.
- 11266.... 4- 6-45....Basil Brewer and George A. Riley; Bar 99 Spring; To change point of diversion, manner and place of use; Stockwatering;* No action.
- 11267.... 4-12-45....Albert Romeo; Underground; Irrigation; Approved July 28, 1945, for 2.0 c.f.s. G. S.
- 11268.... 4-18-45....H. F. Dangberg Land & Live Stock Co.; Underground; Stockwatering and domestic; No action.
- 11269.... 4-18-45....H. F. Dangberg Land & Live Stock Co.; Underground; Stockwatering and domestic; No action.
- 11270.... 4-18-45....H. F. Dangberg Land & Live Stock Co.; Underground; Stockwatering and domestic; No action.
- 11271.... 4-18-45....Matilda R. Russell; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; Approved August 24, 1945, for 0.20 c.f.s. G. S.
- 11272.... 4-25-45....Maude E. Heller; Underground; Irrigation and domestic; Approved August 2, 1945, for 1.4 c.f.s. G. S.
- 11273.... 4-27-45....E. L. Cord; Water Hole Spring; Stockwatering; Approved August 2, 1945, for .01 c.f.s. G. S.
- 11274.... 4-27-45....J. M. Prunty; Virgin River; Irrigation; No action.
- 11275.... 4-28-45....E. L. Cord; Fish Lake; Irrigation;* No action.
- 11276.... 4-30-45....Ogle Swingle; King Spring; Irrigation and domestic; Approved August 8, 1945, for 0.25 c.f.s. G. S.
- 11277.... 5- 2-45....W. E. Saylor and Ruth A. Saylor; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved October 3, 1945, for 0.20 c.f.s. G. S.
- 11278.... 5- 5-45....E. L. Cord; Storm and flood waters of Leidy Creek; Irrigation; Approved November 5, 1945, for 4.0 c.f.s. G. S.
- 11279.... 5- 5-45....Ira H. Kent; Underground; Stockwatering and domestic; No action.
- 11280.... 5- 8-45....International Smelting and Refining Company; Unnamed Spring; Domestic and mining; Withdrawn by applicant August 1, 1945.
- 11281.... 5-12-45....Gladys L. Splane (Assigned by Gladys Splane to Carl L. Hyde and May L. Hyde. Deed filed September 7, 1945); Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved August 20, 1945, for 1.6 c.f.s. G. S.
- 11282.... 5-14-45....Wm. S. and Josephine M. Harris; Underground; Irrigation and domestic; Approved December 29, 1945, for 0.20 c.f.s. G. S.
- 11283.... 5-14-45....Gus D. and Helen P. Corey; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved April 15, 1946, for 0.025 c.f.s. G. S.
- 11284.... 5-14-45....Sunrise Acres Water Association, Inc.; Underground (Las Vegas Artesian Basin); Municipal; Approved September 5, 1945, for 0.50 c.f.s. G. S.
- 11285.... 5-14-45....A. A. Daniels and J. M. Daniels; Underground; Stockwatering;* Approved January 11, 1946, for 0.01 c.f.s. G. S.
- 11286.... 5-14-45....A. A. Daniels and J. M. Daniels; Underground; Stockwatering;* No action.
- 11287.... 5-14-45....A. A. Daniels and J. M. Daniels; Underground; Stockwatering;* Approved January 11, 1946, for 0.01 c.f.s. G. S.
- 11288.... 5-16-45....Jack F. Haakie and Frankie Haakie; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved August 29, 1945, for 0.5 c.f.s. Abrogated by virtue of filing application 11380.
- 11289.... 5-19-45....McCullough Tool Company; Underground; Stockwatering; No action.

*Protested application. G. S. Good standing.

11290....	5-19-45....	McCullough action.	Tool Company; Underground; Stockwatering; No
11291....	5-19-45....	McCullough action.	Tool Company; Underground; Stockwatering; No
11292....	5-19-45....	McCullough action.	Tool Company; Underground; Stockwatering; No
11293....	5-19-45....	McCullough action.	Tool Company; Underground; Stockwatering; No
11294....	5-19-45....	McCullough action.	Tool Company; Underground; Stockwatering; No
11295....	5-19-45....	McCullough action.	Tool Company; Underground; Stockwatering; No
11296....	5-19-45....	McCullough action.	Tool Company; Underground; Stockwatering; No
11297....	5-19-45....	McCullough action.	Tool Company; Underground; Stockwatering; No
11298....	5-19-45....	McCullough action.	Tool Company; Underground; Stockwatering; No
11299....	5-22-45....	George Gove;	Asa More Canyon Creek; Irrigation and domestic; Approved February 28, 1946, for 1.3 c.f.s. G. S.
11300....	5-24-45....	Leland M. Woods and Lillian L. Woods;	Underground (Las Vegas Artesian Basin); General Hotel Supply and domestic; Approved August 24, 1945, for 0.5 c.f.s. G. S.
11301....	5-25-45....	B. H. Robison;	Bassett Creek; Irrigation;* No action.
11302....	5-28-45....	E. F. Nelson and Mamie I. Nelson;	Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; Approved August 20, 1945, for 0.25 c.f.s. G. S.
11303....	5-28-45....	Loretta Rooker;	Underground; Irrigation and domestic; Approved March 4, 1946, for 3.5 c.f.s. G. S.
11304....	5-28-45....	Cornelius Rooker;	Underground; Irrigation and domestic; Approved March 4, 1946, for 2.5 c.f.s. G. S.
11305....	5-28-45....	Cornelius Rooker;	Underground; Irrigation and domestic; Approved March 4, 1946, for 2.0 c.f.s. G. S.
11306....	5-30-45....	E. W. and Lucille Cragin;	Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved October 4, 1945, for 0.20 c.f.s. G. S.
11307....	6- 6-45....	R. Stanley Hicks;	Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; Approved September 26, 1945, for 1.0 c.f.s. G. S.
11308....	6- 6-45....	Byron A. Ercanbrack;	Rock Spring; Stockwatering; Approved June 5, 1946, for 0.003 c.f.s. G. S.
11309....	6- 7-45....	J. A. and Edna Griffin (Assigned by Mrs. Edna Griffin to Earl D. Crinite. Deed filed May 29, 1946; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved August 31, 1945, for 0.15 c.f.s.	
11310....	6- 8-45....	Dave L. Barnes;	Underground; Stockwatering; No action.
11311....	6- 9-45....	E. A. Henriod;	Underground; Stockwatering; No action.
11312....	6-16-45....	Kenneth Gubler;	Underground; Irrigation; Approved February 28, 1946, for 360 acre-feet for 90 acres of land. G. S.
11313....	6-16-45....	E. A. Henriod;	Moonshine Springs; Stockwatering; No action.
11314....	6-16-45....	E. A. Henriod;	Underground; Stockwatering; Approved November 8, 1945, for 0.017 c.f.s. G. S.
11315....	6-20-45....	Sunrise Acres Water Association, Inc.;	Underground; To change point of diversion, manner and place of use; Municipal; No action.
11316....	6-20-45....	Otto Ziege and Henry T. Giller;	Carbonate Mill Site; Mining, milling and domestic;* No action.
11317....	6-22-45....	D. G. and Julia Lorenzi;	Underground (Las Vegas Artesian Basin); Quasi-municipal; Approved October 27, 1945, for 0.5 c.f.s. G. S.
11318....	6-26-45....	Caliente Public Utilities;	Deep Wells; Domestic; Cancelled April 23, 1946, because of failure to refile corrected application within statutory time.
11319....	6-28-45....	Ethel and Harry Frost;	Unnamed Creek and tributary springs; Irrigation and domestic; Approved December 6, 1945, for 1.0 c.f.s. G. S.
11320....	6-28-45....	David Chasen (Assigned by Dave Chasen to Jerry Glesler. Deed filed December 27, 1945);	Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; Approved September 26, 1945, for 2.0 c.f.s. G. S.
11321....	6-29-45....	Victor Lambertucci;	Underground; Irrigation and domestic; Approved February 7, 1946, for 2.0 c.f.s. G. S.
11322....	6-30-45....	Victor V. Kunkel and Marjorie H. Kunkel;	Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; Approved November 3, 1945, for 0.25 c.f.s. G. S.
11323....	6-30-45....	Kenneth Searles;	Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved November 2, 1945, for 0.5 c.f.s. G. S.
11324....	7- 7-45....	Wayne L. Jenison and Bernice Jenison;	Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved November 5, 1945, for 0.5 c.f.s. G. S.

*Protested application. G. S. Good standing.

- 11325.... 7- 7-45....Frank Vernon Somerville and Willie Lee Somerville; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved December 6, 1945, for 0.5 c.f.s. G. S.
- 11326.... 7- 7-45....W. B. Stewart; Virgin River; Irrigation and domestic; Cancelled April 23, 1946, because of failure to refile corrected application within statutory time.
- 11327.... 7-12-45....T. A. Wells; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; Approved October 27, 1945, for 1.0 c.f.s. G. S.
- 11328.... 7-12-45....R. J. Kaitenborn and Jerome Mack; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
- 11329.... 7-12-45....Ira Blundell; Unnamed Spring; Stockwatering; No action.
- 11330.... 7-13-45....United States Department of the Interior, Bureau of Reclamation; Humboldt River; To change point of diversion, manner and place of use; Approved September 19, 1945, for 9.942 c.f.s. per season. G. S.
- 11331.... 7-16-45....One Eleven Bar Cattle Company; Underground; Stockwatering and domestic; Approved November 26, 1945, for 0.008 c.f.s. G. S.
- 11332.... 7-16-45....One Eleven Bar Cattle Company; Underground; Stockwatering and domestic; Approved November 26, 1945, for .0094 c.f.s. G. S.
- 11333.... 7-16-45....One Eleven Bar Cattle Company; Underground; Stockwatering and domestic; * Approved December 27, 1945, for 0.0125 c.f.s. G. S.
- 11334.... 7-16-45....One Eleven Bar Cattle Company; Underground; Stockwatering and domestic; Approved November 26, 1945, for .008 c.f.s. G. S.
- 11335.... 7-16-45....One Eleven Bar Cattle Company; Underground; Stockwatering and domestic; Approved November 26, 1945, for .008 c.f.s. G. S.
- 11336.... 7-16-45....Thrirot Brothers; Underground; Stockwatering and domestic; * Denied May 17, 1946, on the grounds that the approval thereof would contravene section 2 of the 1925 Stockwatering Act.
- 11337.... 7-19-45....P. J. Goumond; Underground; Irrigation and domestic; Approved November 3, 1945, for 1.5 c.f.s. G. S.
- 11338.... 7-19-45....Thomas P. and Grayce G. Walker; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved November 3, 1945, for 0.50 c.f.s. G. S.
- 11339.... 7-20-45....J. W. Richard; Pahrnagat Lake; Irrigation and domestic; Approved November 3, 1945, for 3.6 c.f.s. G. S.
- 11340.... 7-24-45....George W. Rittenhouse and Inez B. Rittenhouse; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; Approved October 22, 1945, for 0.30 c.f.s. G. S.
- 11341.... 7-24-45....C. A. Stewart and Una Stevens Stewart; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved November 19, 1945, for 0.30 c.f.s. G. S.
- 11342.... 7-25-45....P. J. Goumond; Underground; Irrigation and domestic; Approved November 3, 1945, for 1.0 c.f.s. G. S.
- 11343.... 7-30-45....Floyd Lamb; Pahrnagat Lake; Irrigation; Withdrawn by applicant June 12, 1946.
- 11344.... 7-30-45....G. B. Austin; Camp Spring; Mining, milling and domestic; Approved February 28, 1946, for 1.0 c.f.s. G. S.
- 11345.... 8- 1-45....State of Nevada, Fish and Game Commission; Unnamed Springs; Fish culture; Approved November 26, 1945, for 1.5 c.f.s. G. S.
- 11346.... 8- 1-45....Mt. Rose Up-Ski Corporation; Tamarack Creek, Tributary to South Brown's Creek; To change point of diversion, manner and place of use; Approved October 22, 1945, for 0.04 c.f.s. G. S.
- 11347.... 8- 4-45....L. H. Hamp; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved November 3, 1945, for 0.8 c.f.s. G. S.
- 11348.... 8- 9-45....Basil Brewer and George A. Riley; Underground; Stockwatering and domestic; * No action.
- 11349.... 8-11-45....Sue Magee Gamble; Black Canyon Creek; Mining, milling and domestic; Approved March 9, 1946, for 4.0 c.f.s. G. S.
- 11350.... 8-11-45....James E. Doutre; Siegel Creek; Stockwatering; * No action.
- 11351.... 8-11-45....James E. Doutre; Kilsy Spring No. 2; Stockwatering; No action.
- 11352.... 8-11-45....James E. Doutre; Kilsy Spring No. 1; Stockwatering; No action.
- 11353.... 8-11-45....James E. Doutre; Siegel Creek; To change point of diversion; Irrigation and domestic; Cancelled June 27, 1946.
- 11354.... 8-11-45....E. A. Henriod and James E. Doutre; Underground; Stockwatering; No action.
- 11355.... 8-11-45....Eugene A. Henriod; Underground; Stockwatering; No action.
- 11356.... 8-14-45....The Lake Tahoe Mining Company, Inc.; A series of springs; Mining and domestic; Approved May 8, 1946, for 2.0 c.f.s. G. S.
- 11357.... 8-14-45....Joe Cardinal; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; Approved November 29, 1945, for 0.60 c.f.s. G. S.
- 11358.... 8-16-45....Arnold Zaugg; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; Approved December 19, 1945, for 0.75 c.f.s. G. S.
- 11359.... 8-17-45....Callahan Zinc-Lead Co.; Underground; Mining, milling and domestic; Approved November 29, 1945, for 0.60 c.f.s. G. S.

*Protested application. G. S. Good standing.

- 11360.... 8-24-45....Robert William Owens; Big Timber Springs; Stockwatering; Cancelled June 27, 1946, because of failure to refile amended application.
- 11361.... 8-24-45....Robert William Owens; Bill Smith Springs; Stockwatering and domestic; Cancelled June 27, 1946, because of failure to refile amended application.
- 11362.... 8-24-45....Robert William Owens; Gold Springs; Stockwatering; Cancelled June 27, 1946, because of failure to refile amended application.
- 11363.... 8-24-45....Robert William Owens; Rock Springs; Stockwatering and domestic; Cancelled June 27, 1946, because of failure to refile amended application.
- 11364.... 8-24-45....Robert William Owens; Santa Cruz Springs; Stockwatering and domestic; Cancelled June 27, 1946, because of failure to refile amended application.
- 11365.... 8-24-45....Robert William Owens; Upper Crystal Springs; Stockwatering and domestic; Cancelled June 27, 1946, because of failure to refile amended application.
- 11366.... 8-24-45....Robert William Owens; Wood Canyon Springs; Stockwatering and domestic; Cancelled June 27, 1946, because of failure to refile amended application.
- 11367.... 8-24-45....Robert William Owens; Rainbow Springs; Stockwatering and domestic; Cancelled June 27, 1946, because of failure to refile amended application.
- 11368.... 9- 1-45....Roland H. Wiley; Underground (Las Vegas Artesian Basin); Quasi-municipal; Approved March 9, 1946, for 0.50 c.f.s. G. S.
- 11369.... 9- 4-45....Marguerite D. Quinby; Underground; Mining and domestic; No action.
- 11370.... 9- 8-45....Washoe County; Underground; Fish culture and domestic; Approved March 11, 1946, for 2.0 c.f.s. G. S.
- 11371.... 9- 8-45....Washoe County; Underground; Fish culture and domestic; Approved March 11, 1946, for 2.0 c.f.s. G. S.
- 11372.... 9-13-45....E. J. Primm; Underground; Quasi-municipal and domestic; Approved January 31, 1946, for 0.75 c.f.s. G. S.
- 11373.... 9-13-45....E. J. Primm; Underground; Quasi-municipal and domestic; Approved January 31, 1946, for 0.75 c.f.s. G. S.
- 11374.... 9-17-45....Floyd A. Walsh and A. Roy Nesbitt; Barton Spring; Stockwatering and domestic;* Approved December 17, 1945, for 0.0031 c.f.s. G. S.
- 11375.... 9-24-45....Texas A. McCall; Fairbanks Spring; Mining, milling and domestic; No action.
- 11376.... 9-24-45....Texas A. McCall; Fairbanks Spring; Irrigation and domestic; No action.
- 11377....10- 1-45....John H. Conaway; Joshua Spring; Stockwatering and domestic;* No action.
- 11378....10- 1-45....John H. Conaway; Horn Spring; Stockwatering and domestic;* No action.
- 11379....10- 4-45....Lambert Van Der Meer and Malena Van Der Meer; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved March 11, 1946, for 0.10 c.f.s. G. S.
- 11380....10- 4-45....Jack F. and Frankie Haakie; Underground (Las Vegas Artesian Basin); Irrigation and domestic; To change the point of diversion of an underground source as heretofore appropriated under application No. 11288; Approved March 8, 1946, for 0.5 c.f.s. G. S.
- 11381....10- 9-45....R. P. Wilson; Surface and underground flow of Black Canyon; Mining, milling and domestic; Cancelled June 27, 1946, because of failure to refile amended application.
- 11382....10-10-45....Alma Woods; Underground; Stockwatering; Approved February 25, 1946, for 0.009 c.f.s. G. S.
- 11383....10-11-45....Reno Newspapers, Inc.; Unnamed Spring; Domestic; Approved January 8, 1946, for 1.0 c.f.s. G. S.
- 11384....10-11-45....Roy L. Wilbur; Deep or Big Spring; Irrigation and domestic; No action.
- 11385....10-13-45....N. B. Coughlin, E. J. Shirley, S. M. Chiatovich, and H. R. Humphrey; Big Spring; Stockwatering;* No action.
- 11386....10-13-45....N. B. Coughlin, E. J. Shirley, S. M. Chiatovich, and H. R. Humphrey; Cow Camp Well; Stockwatering;* No action.
- 11387....10-13-45....John H. Conway; Mona Spring; Stockwatering and domestic;* No action.
- 11388....10-13-45....Norman L. White and Marion S. White; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved January 21, 1946, for 0.3 c.f.s. G. S.
- 11389....10-15-45....B. F. Porter Estate, a Corporation; Underground; Stockwatering; No action.
- 11390....10-15-45....B. F. Porter Estate, a Corporation; Crowbar Spring; Stockwatering; No action.
- 11391....10-15-45....B. F. Porter Estate, a Corporation; Chipmunk Spring; Stockwatering; No action.
- 11392....10-15-45....B. F. Porter Estate, a Corporation; Johnstone Spring; Stockwatering; No action.
- 11393....10-15-45....B. F. Porter Estate, a Corporation; Whiterock Spring; Stockwatering; No action.
- 11394....10-15-45....B. F. Porter Estate, a Corporation; Pinto Mountain Spring; Stockwatering; No action.
- 11395....10-15-45....B. F. Porter Estate, a Corporation; Bartlett Peak Spring; Stockwatering; No action.

*Protested application. G. S. Good standing.

- 11396....10-15-45....B. F. Porter Estate, a Corporation; Troughs Spring; Stockwatering; No action.
- 11397....10-15-45....B. F. Porter Estate, a Corporation; Indian Springs; Stockwatering; No action.
- 11398....10-15-45....B. F. Porter Estate, a Corporation; Battle Creek Spring; Stockwatering; No action.
- 11399....10-15-45....B. F. Porter Estate, a Corporation; Lower Pigeon Spring; Stockwatering; No action.
- 11400....10-15-45....B. F. Porter Estate, a Corporation; Mahogany Spring; Stockwatering; No action.
- 11401....10-15-45....R. B. Walker and Frances E. Walker; Cottonwood Creek; Irrigation and domestic; Cancelled June 27, 1946, because of failure to refile amended application.
- 11402....10-19-45....Fred and Goldie Sifford; Firpo's Spring; Mining and domestic; Approved January 8, 1946, for 1.5 c.f.s. G. S.
- 11403....10-22-45....Robinson Neeman; Unnamed Seeps; Quasi-municipal; No action.
- 11404....10-22-45....Robinson Neeman; Browns Creek; Quasi-municipal; No action.
- 11405....10-24-45....Charlie and Elizabeth Hammond; Hiko Spring; Stockwatering and domestic; No action.
- 11406....10-24-45....Charlie and Elizabeth Hammond; Willow Spring; Stockwatering and domestic; No action.
- 11407....10-24-45....Charlie and Elizabeth Hammond; Sacatone Spring; Stockwatering and domestic; No action.
- 11408....10-24-45....Charlie and Elizabeth Hammond; Dripping Spring; Stockwatering and domestic; No action.
- 11409....10-25-45....Theodore Werner and Kenneth Searles; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; Approved April 17, 1946, for 0.01 c.f.s. G. S.
- 11410....10-26-45....Peter Damele; Underground; Stockwatering; No action.
- 11411....10-26-45....Peter Damele; Underground; Stockwatering; No action.
- 11412....11- 1-45....T. F. Ball and Jeannetta Ball; Underground (Las Vegas Artesian Basin); Quasi-municipal; Approved March 29, 1946, for 0.011 c.f.s. G. S.
- 11413....11- 1-45....Harry Mack; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; * No action.
- 11414....11- 1-45....James S. Fulcher; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; Approved March 29, 1946, for 0.031 c.f.s. G. S.
- 11415....11- 1-45....Steve Brown; Mason Springs; Domestic and stockwatering; No action.
- 11416....11- 3-45....M. B. Bates and J. H. Sewell; Underground; Stockwatering; Approved March 9, 1946, for 0.05 c.f.s. G. S.
- 11417....11- 3-45....M. B. Bates and J. H. Sewell; Underground; Stockwatering; * No action.
- 11418....11- 3-45....M. B. Bates and J. H. Sewell; Underground; Stockwatering; * No action.
- 11419....11- 3-45....M. B. Bates and J. H. Sewell; Underground; Stockwatering; Approved March 9, 1946, for 0.05 c.f.s. G. S.
- 11420....11- 7-45....E. H. Thomas and H. W. Polk; Underground (Las Vegas Artesian Basin); Quasi-municipal; Approved April 12, 1946, for 0.50 c.f.s. G. S.
- 11421....11- 7-45....E. H. Thomas and H. W. Polk; Underground (Las Vegas Artesian Basin); Quasi-municipal; Approved April 12, 1946, for 0.50 c.f.s. G. S.
- 11422....11- 7-45....E. H. Thomas and H. W. Polk; Underground (Las Vegas Artesian Basin); Quasi-municipal; Approved April 12, 1946, for 0.50 c.f.s. G. S.
- 11423....11- 7-45....E. H. Thomas and H. W. Polk; Underground (Las Vegas Artesian Basin); Quasi-municipal; Approved April 12, 1946, for 0.50 c.f.s. G. S.
- 11424....11-15-45....J. J. Gubler; White River Slough; Irrigation; Cancelled June 27, 1946, because of failure to refile amended application.
- 11425....11-15-45....Ransom V. Middaugh and Mary A. Middaugh; Underground; Irrigation and domestic; No action.
- 11426....11-15-45....Rosegold Placers, Inc.; Underground; Placer mining and domestic; No action.
- 11427....11-16-45....D. L. Stewart; Stewart Spring; Stockwatering and domestic; No action.
- 11428....11-16-45....C. A. Morehouse and Gertrude Morehouse; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
- 11429....11-23-45....One Eleven Bar Cattle Co.; Timpiute Mill surplus water; Stockwatering and domestic; Approved March 20, 1946, for 0.008 c.f.s. G. S.
- 11430....11-23-45....One Eleven Bar Cattle Co.; Underground; Stockwatering and domestic; Approved March 20, 1946, for 0.008 c.f.s. G. S.
- 11431....11-23-45....Nick Pahor; Underground (Las Vegas Valley Artesian Basin); Irrigation and domestic; Approved May 7, 1946, for 0.045 c.f.s. G. S.
- 11432....11-23-45....H. C. Harris and Naomi M. Harris; Underground (Las Vegas Valley Artesian Basin); Irrigation and domestic; Approved May 16, 1945, for 0.40 c.f.s. G. S.
- 11433....11-23-45....N. B. Coughlin, E. J. Shirley, S. M. Chiatovich and H. R. Humphrey; Horath Spring; Stockwatering; * No action.
- 11434....11-23-45....N. B. Coughlin, E. J. Shirley, S. M. Chiatovich and H. R. Humphrey; Indian Garden Spring; Stockwatering; * No action.

*Protested application. G. S. Good standing.

- 11435....11-23-45....N. B. Coughlin, E. J. Shirley, S. M. Chiatovich, and H. R. Humphrey; Willow Spring; Stockwatering;* No action.
- 11436....11-23-45....N. B. Coughlin, E. J. Shirley, S. M. Chiatovich, and H. R. Humphrey; Birch Spring; Stockwatering;* No action.
- 11437....11-26-45....Town of North Las Vegas; Underground (Las Vegas Artesian Basin); Municipal use; Approved April 1, 1946, for 1.0 c.f.s. G. S.
- 11438....11-26-45....Thriot Brothers; Run-off water from Atolia Mining Co. Mill operation; Stockwatering; Denied May 17, 1946, on the grounds that the approval thereof would contravene Section 2 of the 1925 Stockwatering Act.
- 11439....11-29-45....W. J. Stinson; Underground; Stockwatering; No action.
- 11440....11-29-45....W. J. Stinson; Underground; Stockwatering; No action.
- 11441....11-30-45....Carson Indian Agency; Underground; Irrigation; No action.
- 11442....12- 3-45....City of Wells; Underground; Municipal; No action.
- 11443....12- 6-45....Walter Dewey Parker; Buffalo Slough; Irrigation and domestic; No action.
- 11444....12- 6-45....Diamond S Ranch; Pole Creek; Irrigation; No action.
- 11445....12- 6-45....Diamond S Ranch; Pole Creek; Irrigation; No action.
- 11446....12-11-45....Daniels Brothers; Indian Garden Spring; Stockwatering; No action.
- 11447....12-11-45....Daniels Brothers; Unnamed Spring; Stockwatering; No action.
- 11448....12-17-45....Pete Etcheverry; Underground; Stockwatering; No action.
- 11449....12-17-45....Pete Etcheverry; Underground; Stockwatering; No action.
- 11450....12-20-45....Dan Filippini; Duff Creek; Irrigation;* No action.
- 11451....12-20-45....Dan Filippini; Little Cottonwood Creek; Irrigation and stockwatering; No action.
- 11452....12-20-45....C. A. Roberts and Rachel C. Roberts; Lower Ranch Spring; Stockwatering and domestic; No action.
- 11453....12-20-45....C. A. Roberts and Rachel C. Roberts; South Spring; Stockwatering and domestic; No action.
- 11454....12-20-45....C. A. Roberts and Rachel C. Roberts; Cane Springs; Stockwatering and domestic; No action.
- 11455....12-20-45....C. A. Roberts and Rachel C. Roberts; Galvanized Tank Spring; Stockwatering and domestic; No action.
- 11456....12-20-45....C. A. Roberts and Rachel C. Roberts; Sheep Spring; Stockwatering and domestic; No action.
- 11457....12-20-45....C. A. Roberts and Rachel C. Roberts; Clay Bank Spring; Stockwatering and domestic; No action.
- 11458....12-20-45....C. A. Roberts and Rachel C. Roberts; East Spring; Stockwatering and domestic; No action.
- 11459....12-20-45....C. A. Roberts and Rachel C. Roberts; Rock Spring; Stockwatering and domestic; No action.
- 11460....12-20-45....C. A. Roberts and Rachel C. Roberts; Bootlegger Spring; Stockwatering and domestic; No action.
- 11461....12-20-45....C. A. Roberts and Rachel C. Roberts; West Spring; Stockwatering and domestic; No action.
- 11462....12-20-45....C. A. Roberts and Rachel C. Roberts; Big Timber Spring; Stockwatering and domestic; No action.
- 11463....12-20-45....C. A. Roberts and Rachel C. Roberts; Big Timber Spring; Stockwatering and domestic; No action.
- 11464....12-20-45....C. A. Roberts and Rachel C. Roberts; Center Spring; Stockwatering and domestic; No action.
- 11465....12-20-45....C. A. Roberts and Rachel C. Roberts; Center Spring (Upper Diversion); Stockwatering and domestic; No action.
- 11466....12-21-45....Fallini Brothers; Underground; Stockwatering; No action.
- 11467....12-21-45....Fallini Brothers; Twin Springs Wash; Stockwatering; No action.
- 11468....12-21-45....Ross F. Steele; Troy Creek; Power and milling; No action.
- 11469....12-21-45....Yomba Shoshone Tribe; Underground; Stockwatering; No action.
- 11470....12-24-45....Leonard and Earl Wadsworth; Chicken Inn Spring; Stockwatering and domestic; No action.
- 11471....12-26-45....C. J. Gaspari Underground; Stockwatering; Approved April 24, 1946, for 0.0031 c.f.s. G. S.
- 11472....12-26-45....M. E. Ward; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic;* Approved May 13, 1946, for 0.05 c.f.s. G. S.
- 11473....12-26-45....Smith Gold Placers, Inc.; Underground; Placer mining; No action.
- 11474....12-29-45....McNeill Housing Company; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
- 11475.... 1- 2-46....R. H. Conklin; Underground; Stockwatering and domestic; No action.
- 11476.... 1- 4-46....Clyde B. Stark; Underground; Stockwatering and domestic; No action.
- 11477.... 1- 4-46....Clyde B. Stark; Underground; Stockwatering; No action.
- 11478.... 1- 9-46....Floyd Lamb and J. W. Richard; Tributaries to Pahranaagat Lake; Irrigation; No action.
- 11479.... 1- 9-46....Mrs. Margaret E. Bauer; Underground; Irrigation; Approved April 15, 1946, for 1.00 c.f.s. G. S.
- 11480.... 1-10-46....Harold J. Stocker, Geraldine M. Stocker and Mayme V. Stocker; Underground; Quasi-municipal and domestic; Approved April 24, 1946, for 0.04 c.f.s. G. S.
- 11481.... 1-10-46....Harry McNamara; Unnamed Seep; Mining and milling; No action.
- 11482.... 1-10-46....Mark G. Bradshaw; Tognoni Spring; Mining and milling; No action.

*Protested application. G. S. Good standing.

11483....	1-10-46....	R. J. Kelly and V. E. Greenwald; Underground; Stockwatering; No action.
11484....	1-10-46....	R. J. Kelly and V. E. Greenwald; Underground; Stockwatering; No action.
11485....	1-10-45....	James M. Daniels; Underground; Stockwatering; No action.
11486....	1-14-46....	E. L. Cord; Trail Creek; To change point of diversion, manner and place of use; Irrigation; No action.
11487....	1-14-46....	Gene Pace; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; Approved April 24, 1946, for 0.02 c.f.s. G. S.
11488....	1-16-46....	B. L. and Vivian Dochess; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved April 17, 1946, for 0.01 c.f.s. G. S.
11489....	1-16-46....	South Side Irrigating Canal Co. (Inc); Truckee River; To change point of diversion, manner of use and place of use; Irrigation; No action.
11490....	1-19-46....	John H. Conway; Underground; Stockwatering and domestic; Approved May 16, 1946, for 0.0063 c.f.s. G. S.
11491....	1-21-46....	Helena T. Crutchfield; Jones Creek; Irrigation and domestic; No action.
11492....	1-30-46....	J. P. Gibbons; Underground; Quasi-municipal; No action.
11493....	1-30-46....	Charlie Hammond and Elizabeth Hammond; Natural Springs; Stockwatering and domestic; No action.
11494....	1-31-46....	Nat Wolff; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved June 24, 1946, for 0.8 c.f.s. G. S.
11495....	2- 1-46....	Chris Wilson; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved June 12, 1946, for 0.4 c.f.s. G. S.
11496....	2- 2-46....	Central Pacific Railway Company; Underground; Railroad and domestic; Approved May 9, 1946, for 1.0 c.f.s. G. S.
11497....	2- 6-46....	Ottillia Tschow; Underground (Las Vegas Artesian Basin); General Hotel Supply and domestic; Approved June 24, 1946, for 0.05 c.f.s. G. S.
11498....	2- 6-46....	Wilbur Clark; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
11499....	2- 7-46....	The Nunn Company; Underground; Milling and domestic; No action.
11500....	2-13-46....	Ebbie H. Davis; Underground (Las Vegas Artesian Basin); Stockwatering and domestic; No action.
11501....	2-18-46....	V. L. Robinson, Lawrence and Ainsley Sharp, Ernest, Joe and Edwin Higbee; Underground; Stockwatering and domestic; No action.
11502....	2-27-46....	D. V. Romeos; Goat Spring; Stockwatering; No action.
11503....	2-27-46....	Nate Mack; Underground (Las Vegas Artesian Basin); Quasi-municipal; No action.
11504....	2-28-46....	Eldred Lemul Leavitt; Virgin River; Irrigation; No action.
11505....	3- 1-46....	Nevada Minerals Co.; Underground; Mining, milling; No action.
11506....	3- 1-46....	V. E. Greenwald; Underground; Stockwatering; No action.
11507....	3- 1-46....	V. E. Greenwald; Underground; Stockwatering; No action.
11508....	3- 1-46....	Charles J. McGill; Whites Canyon Creek; Irrigation and domestic; No action.
11509....	3- 5-46....	C. B. Stark; Underground; Stockwatering and domestic; No action.
11510....	3- 5-46....	Kenneth C and Zelda Lawrence; Underground; Irrigation and domestic; No action.
11511....	3- 8-46....	Frank J. Seibert; Las Vegas Creek; Irrigation and domestic; No action.
11512....	3-14-46....	Mrs. Evelyn S. Potter; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
11513....	3-16-46....	Parley E. Harris, II; Rio Virgin; Irrigation; No action.
11514....	3-20-46....	Ebbie H. Davis; Underground; Stockwatering and domestic; No action.
11515....	3-20-46....	Ebbie H. Davis; Underground; Stockwatering and domestic; No action.
11516....	3-20-46....	Ebbie H. Davis; Underground; Stockwatering and domestic; No action.
11517....	3-20-46....	Ebbie H. Davis; Underground; Stockwatering and domestic; No action.
11518....	3-22-46....	Gregson Bautzer; Underground; General Hotel Supply and domestic; Withdrawn by applicant, May 21, 1946.
11519....	3-22-46....	Gregson Bautzer; Underground (Las Vegas Artesian Basin); General Hotel Supply and domestic; Approved June 24, 1946, for 0.50 c.f.s. G. S.
11520....	3-22-46....	Gregson Bautzer; Underground (Las Vegas Artesian Basin); General Hotel Supply and domestic; Approved June 24, 1946, for 0.5 c.f.s.
11521....	3-22-46....	Town of Mina, State of Nevada; Spearmint Canyon Springs; To change point of diversion, place and manner of use; Municipal and domestic; Approved June 10, 1946, for 1.0 c.f.s. G. S.
11522....	3-25-46....	Leland M. and Lillian L. Woods; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
11523....	3-25-46....	J. B. Reynolds and Katie L. Reynolds; Flood waters; Irrigation; No action.
11524....	3-25-46....	Joaquin Arbonies; Gold Ace Spring; Irrigation and domestic; No action.
11525....	3-26-46....	D. L. Stewart; Jump Up Spring; Stockwatering; No action.
11526....	3-27-46....	Cyriil O. Bastain; Flood Waters; Stockwatering; No action.

*Protested application. G. S. Good standing.

- 11527.... 3-28-46....J. H. Gates; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
- 11528.... 3-28-46....V. E. Greenwald; Timber Mountain Spring; Stockwatering; No action.
- 11529.... 3-28-46....V. E. Greenwald; Wagon Spring; Stockwatering; No action.
- 11530.... 3-29-46....L. H. Dickens; Arrow Spring; Mining and domestic; No action.
- 11531.... 3-29-46....Mrs. Berenice Sullivan Holmstrom, Mrs. Adeline Minor and Mrs. Minnie Heidenreich; Unnamed Spring and Creek; Irrigation and domestic; No action.
- 11532.... 3-30-46....Milton Holmes; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
- 11533.... 4- 4-46....George H. McKaig and Mary McKaig; Underground; Irrigation and domestic; No action.
- 11534.... 4- 4-46....First National Bank of Nevada, Trustee for Viola Sauer; Old Frank Spring; Irrigation and domestic; No action.
- 11535.... 4- 4-46....H. H. Costerisan; Underground; Irrigation; No action.
- 11536.... 4- 4-46....H. H. Costerisan; Underground; Irrigation; No action.
- 11537.... 4- 4-46....H. H. Costerisan; Underground; Irrigation; No action.
- 11538.... 4- 4-46....H. H. Costerisan; Underground; Irrigation; No action.
- 11539.... 4- 4-46....H. H. Costerisan; Underground; Irrigation; No action.
- 11540.... 4- 4-46....Buddy A. F. Cayton; Underground; Irrigation; No action.
- 11541.... 4- 5-46....Richard Henry and Nora A. Sheehy; Unnamed Spring; Irrigation and domestic; No action.
- 11542.... 4- 6-46....Hazel June Warner; Underground; Quasi-municipal; No action.
- 11543.... 4- 6-46....The Francis Corporation; Underground; Quasi-municipal; No action.
- 11544.... 4- 6-46....L. H. Dickens; Diamond Spring; Mining and domestic; No action.
- 11545.... 4- 9-46....Sheldon Lamb; Big Creek; Irrigation; No action.
- 11546.... 4- 9-46....Helen Gubler; Surface and underground water in Meadow Valley Wash; Irrigation and domestic; No action.
- 11547.... 4- 9-46....Storm Cloud Mining Co.; Storm Cloud Spring; Mining, milling and domestic; No action.
- 11548.... 4-13-46....Carl C. Kingsbury; Underground; Irrigation and domestic; No action.
- 11549.... 4-18-46....Vegas Heights Community; Underground (Las Vegas Artesian Basin); Municipal; No action.
- 11550.... 4-22-46....Frank E. and Olga Gowen; Underground (Las Vegas Artesian Basin); Irrigation and domestic; No action.
- 11551.... 4-22-46....Vegas Heights Community; Underground (Las Vegas Artesian Basin); Municipal; No action.
- 11552.... 4-22-46....Bertram R. Russell and Barbara P. Russell; Underground Irrigation and domestic; No action.
- 11553.... 4-25-46....Petan Company; Circle and/or Duck Creek; Stockwatering and irrigation; No action.
- 11554.... 4-25-46....Richard Stadelman; Underground (Las Vegas Artesian Basin); Irrigation and domestic; No action.
- 11555.... 4-25-46....T. A. Wells; Underground (Las Vegas Artesian Basin); Irrigation and domestic; No action.
- 11556.... 4-25-46....T. A. Wells; Underground (Las Vegas Artesian Basin); Irrigation and domestic; No action.
- 11557.... 4-26-46....John T. Coffee, Jr.; Surplus waters of Brown Creek and tributaries; Irrigation, domestic, fish culture and recreation; No action.
- 11558.... 4-27-46....Walter Hughes and R. F. Harmer; Underground; Irrigation; No action.
- 11559.... 4-27-46....Murray Wollman; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
- 11560.... 4-27-46....Murray Wollman; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
- 11561.... 4-27-46....Dr. E. A. Vincent; Underground (Las Vegas Artesian Basin); Irrigation and domestic; No action.
- 11562.... 4-29-46....C. E. Smolke; Underground (Las Vegas Artesian Basin); Irrigation and domestic; No action.
- 11563.... 4-29-46....Lloyd E. Devore; Mandalay Springs; Irrigation and domestic; No action.
- 11564.... 4-29-46....Leon and Marie Grivel; Underground; Irrigation and domestic; No action.
- 11565.... 4-30-46....Mrs. Adeline Minor, Mrs. Berenice Sullivan Holmstrom, and Mrs. Minnie Heidenreich; Underground; Domestic and commercial; No action.
- 11566.... 5- 1-46....F. M. Fulstone, Inc.; Underground (Las Vegas Artesian Basin); Irrigation and domestic; No action.
- 11567.... 5- 1-46....Thomas E. Sharp; Underground (Las Vegas Artesian Basin); To change point of diversion; Irrigation and domestic; No action.
- 11568.... 5- 3-46....Sheldon Lamb; Underground; Stockwatering; No action.
- 11569.... 5- 4-46....Frank Harrington; Squaw Creek; Irrigation and domestic; No action.
- 11570.... 5- 6-46....Frank W. Fulstone, T. W. Salchenberger and S. A. Kenoyer; Underground; Irrigation and domestic; No action.
- 11571.... 5- 6-46....Mrs. Marie Streshley, Mrs. Edith Givens and W. L. Petersen; Underground; Stockwatering and domestic; No action.
- 11572.... 5- 6-46....Mrs. Marie Streshley, Mrs. Edith Givens and W. L. Petersen; Underground; Stockwatering and domestic; No action.
- 11573.... 5- 9-46....Storm Cloud Mining Co., Inc.; Storm Cloud Willow Spring; Mining, milling and domestic; No action.

*Protested application. G. S. Good standing.

- 11574.... 5-13-46....Sigurd Tolwick; Buser Creek and Spring; Irrigation and power; No action.
- 11575.... 5-13-46....William Hendrix; Nugget Spring; Stockwatering and irrigation; No action.
- 11576.... 5-13-46....M. P. Depaoli; Fort Defence Creek and tributaries; Irrigation and domestic; No action.
- 11577.... 5-16-46....Wm. Albert Johnson; Underground (Las Vegas Artesian Basin); Irrigation and domestic; No action.
- 11578.... 5-16-46....P. J. Goumond; Underground; To change point of diversion and place of use; Irrigation and domestic; No action.
- 11579.... 5-20-46....Gregson Bautzer; Underground (Las Vegas Artesian Basin); General Hotel Supply and domestic; No action.
- 11580.... 5-23-46....Gladys L. Splane; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
- 11581.... 5-24-46....Caliente Public Utilities; Underground; Domestic; No action.
- 11582.... 5-24-46....Caliente Public Utilities; Underground; Domestic; No action.
- 11583.... 5-26-46....Mrs. Berenice Sullivan Holmstrom, Mrs. Adeline Minor and Mrs. Minnie E. Heidenreich; Unnamed Creek and Springs; Irrigation and domestic; No action.
- 11584.... 5-27-46....Emil Pahor; Underground (Las Vegas Artesian Basin); Irrigation and domestic; No action.
- 11585.... 6- 1-46....H. S. Staley; Fairbanks Spring; Irrigation and domestic; No action.
- 11586.... 6- 1-46....F. M. Cook; West Spring; Mining, milling and domestic; No action.
- 11587.... 6- 1-46....F. M. Cook; North Summit Springs; Mining, milling and domestic; No action.
- 11588.... 6- 3-46....A. L. Arnold; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
- 11589.... 6- 3-46....Dan Filippini; Sod House Creek; Irrigation; No action.
- 11590.... 6- 5-46....Glenn D. Hurt; Underground; Irrigation and domestic; No action.
- 11591.... 6- 6-46....Opaco Lumber and Realty Company; Underground (Las Vegas Artesian Basin); Irrigation and domestic; No action.
- 11592.... 6- 7-46....John Ross; Brown Creek; Quasi-municipal; No action.
- 11593.... 6-10-46....James R. and John G. Murdock; Kelley Creek; Irrigation and domestic; No action.
- 11594.... 6-10-46....Oly T. Edgell; Underground (Las Vegas Artesian Basin); Irrigation and domestic; No action.
- 11595.... 6-10-46....A. F. Winter; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
- 11596.... 6-10-46....E. E. Kaltenborn and Moe Taub; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
- 11597.... 6-10-46....R. J. Kaltenborn; Underground (Las Vegas Artesian Basin); Irrigation and domestic; No action.
- 11598.... 6-10-46....Harry Mack; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
- 11599.... 6-10-46....Murray Wollman; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
- 11600.... 6-10-46....Murray Wollman; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
- 11601.... 6-10-46....Murray Wollman; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
- 11602.... 6-12-46....S. H. Manor; Frazier Spring; Stockwatering; No action.
- 11603.... 6-12-46....S. H. Manor; Little Willow Spring; Stockwatering; No action.
- 11604.... 6-12-46....S. H. Manor; Laundry Spring; Stockwatering; No action.
- 11605.... 6-12-46....Floyd R. Lamb and Carlton P. Lamb; Cliff Spring; Stockwatering and domestic; No action.
- 11606.... 6-12-46....Floyd R. Lamb and Carlton P. Lamb; Unnamed drainage basin through Sundown Reservoir; Stockwatering and domestic; No action.
- 11607.... 6-12-46....Floyd R. Lamb and Carlton P. Lamb; Shirley Spring; Stockwatering and domestic; No action.
- 11608.... 6-12-46....Floyd R. Lamb and Carlton P. Lamb; Indian Spring; Stockwatering and domestic; No action.
- 11609.... 6-12-46....Floyd R. Lamb and Carlton P. Lamb; Dry Lake drainage through Jackpot Reservoir; Stockwatering and domestic; No action.
- 11610.... 6-12-46....Floyd R. Lamb and Carlton P. Lamb; Live Oak Spring; Stockwatering and domestic; No action.
- 11611.... 6-13-46....Thomas T. Schofield and Della Schofield; Underground (Las Vegas Artesian Basin); Irrigation and domestic; No action.
- 11612.... 6-13-46....Bonnie Wood; Underground (Las Vegas Artesian Basin); Irrigation and domestic; No action.
- 11613.... 6-14-46....W. L. Petersen; Blackbird Creek; Irrigation and domestic; No action.
- 11614.... 6-17-46....Wm. Moore, Harold Hynes, B. E. Barron and Joseph Schramm; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
- 11615.... 6-17-46....Henry E. Heidenreich, Roy F. Heidenreich and Edwin E. Heidenreich; North Creek and tributaries; Irrigation and domestic; No action.
- 11616.... 6-18-46....Glen H. Rohlf; Unnamed natural spring; Domestic and garden use; No action.
- 11617.... 6-19-46....Joseph Hoffman and Marie Hoffman; Underground (Las Vegas Artesian Basin); Irrigation and domestic; No action.

*Protested application. G. S. Good standing.

- 11618.... 6-19-46....A. R. Ruppert and N. L. Ruppert; Underground (Las Vegas Artesian Basin); Irrigation and domestic; No action.
- 11619.... 6-19-46....Oran L. Ballinger; Virgin River; Irrigation and domestic; No action.
- 11620.... 6-24-46....El Rancho Hotel and Village, Inc.; Underground (Las Vegas Artesian Basin); Quasi-municipal; No action.
- 11621.... 6-24-46....El Rancho Hotel and Village, Inc.; Underground (Las Vegas Artesian Basin); Quasi-municipal; No action.
- 11622.... 6-24-46....Willard L. Stewart; Flood and drainage; Stockwatering; No action.
- 11623.... 6-25-46....Bonanza Lodge, Inc.; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; No action.
- 11624.... 6-27-46....The Virginia City Water Company; North Creek and Tributaries; To change point of diversion, manner and place of use; Irrigation; No action.

CHAPTER XVIII

Status of Applications Filed Prior to July 1, 1944

Following is a condensed statement giving the salient data in connection with applications filed prior to July 1, 1944, upon which action has been taken during the present biennium, in the order of:

1. Application serial number.
2. Date of filing.
3. Name of applicant.
4. Source of water supply.
5. Purpose of appropriation.
6. Action on application.
7. Status of permits as of June 30, 1946.

3255....	2-27-15....	Eleanor Miriam Langwith; (Assigned by Eleanor Miriam Langwith to Margaret Angela Langwith. Deed filed May 9, 1919); Humboldt River; Irrigation; Cancelled February 1, 1945, because of failure of applicant to comply with the provisions of permit.
3753....	12-22-15....	Charles W. Clubine; Sherman Creek; Irrigation and domestic; Cancelled August 10, 1944, because of failure of applicant to comply with the provisions of permit.
3757....	12-27-15....	Parker Liddell; Miller Creek; Irrigation and domestic; Withdrawn by applicant June 15, 1945.
4101....	8-12-16....	Metropolis Land Co.; Trout Creek; Municipal and domestic; Withdrawn by applicant April 27, 1945.
4102....	8-12-16....	Metropolis Land Company; Trout Creek; (To change point of diversion); Irrigation and domestic; Withdrawn by applicant April 27, 1945.
4103....	8-12-16....	Metropolis Land Company; Spring Creek (to change point of diversion); Irrigation, stockwatering, and domestic; Withdrawn by applicant April 27, 1945.
4104....	8-12-16....	Metropolis Land Company; Burnt Creek; (To change point of diversion); Irrigation, stockwatering and domestic; Withdrawn by applicant April 27, 1945.
4301....	2- 9-17....	A. C. Trieloff; (Assigned to Walter J. Harrls. Deed filed November 10, 1919); Truckee River; Irrigation and domestic; Withdrawn by applicant November 15, 1944.
4569....	8-31-17....	Nick Abelman and J. C. McKay; Monte Cristo Spring; Domestic; Denied February 20, 1945.
4748....	11-27-17....	Joanna Cronin; Springs; Domestic and other uses; Cancelled March 26, 1946, because of failure of applicant to comply with the provisions of the permit.
4985....	4- 1-18....	William Gideon Morris; Big Spring; Irrigation, stockwatering and domestic; Certificate No. 2819 issued November 22, 1944, for 1.54 c.f.s.
6371....	1- 7-21....	Sam T. Bentley and Chas. G. Aldridge; Deadman Gulch, flood and unappropriated waters; Irrigation and domestic; Cancelled August 15, 1944, because of failure of applicant to comply with the provisions of permit.
6426....	3-28-21....	Ramon Montero and Michel Bidart; (Assigned to the Pine Forest Land and Stock Company. Deed filed January 2, 1924); Leonard Creek; Irrigation and stockwatering; Approved October 10, 1944, for 0.20 c.f.s. G. S.
6447....	4-27-21....	Mrs. C. W. Newman and Asa M. Cline; German Springs; Stockwatering; Certificate No. 2808 issued August 29, 1944, for 0.003 c.f.s.
6506....	7-11-21....	Ethel S. Henrie; Meadow Valley Wash Creek (To change point of diversion and place of use); Irrigation and domestic; Cancelled February 1, 1945, because of failure of applicant to comply with the provisions of permit.
7014....	10-28-23....	St. John Laborde and Peter Laborde; (Assigned to Henry Filipplni. Deed filed July 1, 1941); Burton Spring; (To change the place of use); Irrigation and stockwatering; Approved April 5, 1945, for 0.3349 c.f.s. G. S.
7080....	4- 9-24....	Jacob Steiner; Mammoth Spring; Irrigation; Cancelled August 10, 1944, because of failure of applicant to comply with the provisions of the permit.
7613....	1- 3-26....	Harry W. Parker; Mike Springs; Mining; Cancelled May 27, 1946, because of failure of applicant to comply with the provisions of the permit.
7674....	3-27-26....	W. H. Millinghausen; (Assigned to T. O. McKinnon); Petrified Spring; Stockwatering; Certificate 2864 issued May 3, 1945, for 0.019 c.f.s.

G. S. Good standing.

- 7775.... 6- 7-26....Harry W. Parker; (Assigned to J. Henry Goodman. Deed filed August 5, 1935); Bassett Canyon Creek; Mining; Cancelled August 10, 1944, because of failure of applicant to comply with provisions of the permit.
- 8001.... 2- 8-27....R. B. Wier; Underground; Irrigation; Cancelled February 1, 1945, because of failure of applicant to comply with the provisions of the permit.
- 8052.... 3-25-27....George H. Eldridge; Want Spring; Stockwatering; Certificate 2852 issued March 5, 1945, for 0.003 c.f.s.
- 8350....10-20-27....Carson and Tahoe Lumber and Fluming Company; Marlette Creek; Irrigation and domestic; Cancelled March 12, 1945, because of failure of applicant to comply with provisions of permit.
- 8401....11-28-27....I. D. McNett; Sand Springs; Irrigation and domestic; Certificate 2929 issued March 11, 1946, for 0.06 c.f.s.
- 8488.... 3-22-28....Gertrude S. Church; (Assigned to Zephyr Cove Properties, Inc. Deed filed April 3, 1946); South Zephyr Cove Creek; (To change the place of use heretofore appropriated under permit 7776); Certificate 2935 issued March 11, 1946, for 0.50 c.f.s.
- 8490.... 3-28-28....Wm. Ferguson; Underground; Stockwatering and domestic; Certificate 2870 issued June 21, 1945, for 0.003125 c.f.s.
- 8508.... 4-19-28....D. F. Capell; (Assigned to T. O. McKinnon. Deed filed July 27, 1940); Wild Horse Spring; Stockwatering and domestic; Certificate 2865 issued May 3, 1945, for 0.025 c.f.s.
- 8510.... 4-19-28....D. F. Capell; (Assigned to T. O. McKinnon. Deed filed July 27, 1940); Gillis Spring; Stockwatering and domestic; Certificate 2866 issued May 3, 1945 for 0.025 c.f.s.
- 8635.... 7-21-28....Geo. B. Williams; (Assigned by George B. Williams to George B. Williams Land and Livestock Company. Assigned by George B. Williams Livestock Company to Raymond Cushman and Mabel Cushman); Cancelled August 10, 1944, because of failure of applicant to comply with provisions of permit.
- 9184....12-20-29....Laborde Bros. and Company; (Assigned to Henry Filippini. Deed filed July 1, 1941); Underground; Stockwatering; Certificate 2875 issued July 24, 1945, for 0.012 c.f.s.
- 9197.... 1- 7-30....Laborde Bros. and Company; (Assigned to Henry Filippini. Deed filed July 1, 1941); Underground; Stockwatering; Certificate 2876 issued July 24, 1945 for 0.012 c.f.s.
- 9219.... 1-24-30....J. L. Hylton; Underground; Stockwatering; Cancelled August 21, 1945, because of failure of applicant to comply with the provisions of permit.
- 9327.... 9- 2-30....Benton V. Smith; Surprise Spring; Domestic and camp use; Certificate No. 2799 issued August 11, 1944, for 0.3 c.f.s.
- 9343.... 9-29-30....Mrs. Zoe Birnie; Meadow Valley Wash; Irrigation and domestic; Cancelled November 30, 1945, because of failure of applicant to comply with the provisions of the permit.
- 9363....10-29-30....Don Maestretti; (Assigned to Roy A. Brown. Deed filed March 9, 1943); LeBeau Creek; Irrigation and domestic; Certificate 2816 issued November 14, 1944, for 0.515 c.f.s.
- 9385-11-22-30....Fred Bartine; Bartine Spring; Irrigation and domestic; Withdrawn by applicant April 10, 1946.
- 9404.... 1-22-31....Ed. P. Graham; Watson Spring; Irrigation and domestic; Certificate 2796 issued July 5, 1944, for 0.002 c.f.s.
- 9415.... 2-23-31....Battista Vener; (Assigned by decree to Constant Vener); Cottonwood Canyon; Irrigation; Cancelled May 27, 1946, because of failure of applicant to comply with provisions of permit.
- 9430.... 3-18-31....A. G. McBride; Underground; Stockwatering and domestic; Certificate 2919 issued December 26, 1945, for 0.032 c.f.s.
- 9492.... 6-29-31....Wm. J. Walker; Watson Springs; Irrigation and domestic; Certificate No. 2920 issued January 16, 1946, for 0.0129 c.f.s.
- 9588.... 4-14-32....A. B. Gardner; Flood waters of Pine, Cottonwood and Little Cherry Creeks; Stockwatering; Denied September 7, 1944, on the grounds that applicant is no longer interested in the application.
- 9651.... 3-12-33....Thomas L. Williams; (Assigned to Town of North Las Vegas. Deed filed February 21, 1938); Underground (Las Vegas Artesian Basin); Municipal and domestic; Withdrawn by applicant April 10, 1946.
- 9668.... 6-17-33....W. C. Bradley; Underground (Las Vegas Artesian Basin); Irrigation; Cancelled September 26, 1944, because of failure to comply with the provisions of the permit.
- 9727.... 3- 2-34....Parman Valerdi Company; (Assigned to Vern R. Parman and Ralph G. Parman. Deed filed March 16, 1945); Schultz Spring; Stockwatering and domestic. Certificate 2814 issued October 27, 1944, for 0.001 c.f.s.
- 9888.... 8- 6-35....Pine Forest Land and Livestock Company; Leonard Creek and tributaries; Irrigation and domestic; Approved October 10, 1944, for 13.2 c.f.s.
- 9906....10-24-35....Benjamin F. Casey; Underground; Stockwatering; Certificate 2818 issued November 22, 1944, for 0.011 c.f.s.
- 9966.... 3-14-36....The City of Winnemucca; Underground; Municipal; Certificate 2789 issued August 11, 1944, for 1.782 c.f.s.
- 9992.... 6-19-36....G. B. Humphrey; (Assigned to the Town of North Las Vegas); Underground (Las Vegas Artesian Basin); Domestic and irrigation; Certificate 2939 issued April 26, 1946, for 1.0 c.f.s.

G. S. Good standing.

- 10093.... 2-24-37....Ora Tahoma Mining Company; (Assigned to Indianeen Mines, Inc. Deed filed June 24, 1940); Birch Springs; Milling and domestic; Cancelled May 27, 1946, because of failure of applicant to comply with provisions of permit.
- 10097.... 3-10-37....Fred Vollmar; (Assigned to Desert Silver, Inc. Deed filed May 29, 1939); Unnamed Spring; Mining, milling and domestic; Cancelled February 1, 1945, because of failure of applicant to comply with provisions of permit.
- 10150.... 8-10-37....Citizen's Committee of Goldfield; (Assigned to Goldfield Water System); Underground; Municipal; Certificate 2795 issued July 1, 1944, for 0.25 c.f.s.
- 10174....10- 4-37....Peacock Brothers; Rowe Creek and tributaries; Irrigation; Certificate 2836 issued January 5, 1945, for 1.0 c.f.s.
- 10176....10-15-37....Preston Irrigation Company, Inc.; Arnoldson Spring; Irrigation; Approved August 11, 1944, for 4.0 c.f.s. G.S.
- 10177....10-15-37....Preston Irrigation Company, Inc.; Preston Big Spring; Irrigation; Approved August 11, 1944, for 5.5 c.f.s. G.S.
- 10213.... 3- 3-38....Rio Grande Copper Company; Golden Copper Spring; Mining, milling and domestic; Cancelled May 15, 1945, because of failure of applicant to comply with provisions of permit.
- 10299.... 9-20-38....Rip Van Winkle Mining Company; Rip Van Winkle Spring; Milling, mining and domestic; Certificate 2811 issued October 24, 1944, for 0.5 c.f.s.
- 10308....11-30-38....J. N. Bryan; (Assigned to W. W. and Jessie Whitaker. Deed filed November 16, 1944); Lodi Tunnel Spring; Stockwatering; Certificate 2883 issued July 27, 1945, for 0.0234 c.f.s.
- 10314....12-15-38....J. N. Bryan; (Assigned to W. W. and Jessie Whitaker. Deed filed November 16, 1944); Jack Springs; Stockwatering; Certificate 2884 issued July 27, 1945, for 0.0234 c.f.s.
- 10315....12-15-38....J. N. Bryan; (Assigned to W. W. and Jessie Whitaker. Deed filed November 16, 1944); Marble Falls Spring; Stockwatering; Certificate 2885 issued July 27, 1945, for 0.0234 c.f.s.
- 10317....12-15-38....J. N. Bryan; (Assigned to W. W. and Jessie Whitaker. Deed filed November 16, 1944); Green Springs; Stockwatering; Certificate 2886 issued July 27, 1945, for 0.0234 c.f.s.
- 10398.... 7-17-39....J. N. Bryan; (Assigned to W. W. and Jessie Whitaker. Deed filed November 16, 1944); Stookey Spring; Stockwatering; Certificate 2887 issued July 27, 1945, for 0.0234 c.f.s.
- 10399.... 7-17-39....J. N. Bryan; (Assigned to W. W. and Jessie Whitaker. Deed filed November 16, 1944); Overland Spring; Stockwatering; Certificate 2888 issued July 27, 1945, for 0.0234 c.f.s.
- 10400.... 7-17-39....J. N. Bryan; (Assigned to W. W. and Jessie Whitaker. Deed filed November 16, 1944); Gabbs Valley Well; Stockwatering; Certificate 2889 issued July 27, 1945, for 0.0156 c.f.s.
- 10433....10-25-39....Abel and Curtner Livestock Company; Antelope Springs; Stockwatering; Certificate 2921 issued February 5, 1945, for 0.05 c.f.s.
- 10457....12-11-39....L. E. Roberts; Deerlodge Creek; Mining and milling; Cancelled May 27, 1946, because of failure of applicant to comply with the provisions of permit.
- 10458....12-15-39....Las Vegas Land and Water Company; Underground (Las Vegas Artesian Basin); Municipal and domestic; Certificate 2828 issued January 5, 1945, for 2.13 c.f.s.
- 10460....12-21-39....E. H. Burdick; (Assigned to Atolia Mining Company. Deed filed May 14, 1946); Underground; Mining and milling; Certificate 2806 issued August 26, 1944, for 0.45 c.f.s.
- 10468.... 2-13-40....Krsto P. Stanisich; Unnamed Spring; Mining and milling. Denied November 20, 1944.
- 10497.... 4-29-40....91 Club, Inc.; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Certificate 2930 issued March 19, 1946, for 0.15 c.f.s.
- 10507.... 5-18-40....Emery Garrett; (Assigned to Buck Horn Cattle Co.); Big Creeks; Irrigation and domestic; Approved August 28, 1944, for 1.20 c.f.s. G.S.
- 10508.... 5-20-40....Las Vegas Land and Water Company; Underground; Municipal and domestic; Certificate 2829 issued January 5, 1945, for 0.96 c.f.s.
- 10510.... 5-20-40....Frank Walker and David Francis; Bradshaw Spring (to change place of use); Stockwatering; Certificate 2607 issued November 10, 1944, for 0.019 c.f.s.
- 10512.... 6- 5-40....B. and M. Mining Company; Underground; Mining; Cancelled April 8, 1946, because of failure of applicant to comply with the provisions of permit.
- 10515.... 6- 7-40....C. H. Jackson, Jr.; Unnamed Spring; Irrigation and domestic; Certificate 2834 issued January 5, 1945, for 0.02 c.f.s.
- 10521.... 6-20-40....H. W. Parker and J. K. Luther; Underground; Mining, milling and domestic; Denied September 7, 1944, on the grounds that applicants are no longer interested in the application.
- 10522.... 6-20-40....H. W. Parker and J. K. Luther; Sharpel Spring; Mining, milling and domestic; Denied September 7, 1944.
- 10523.... 6-20-40....H. W. Parker and J. K. Luther; Wolframite Spring; Milling and domestic; Denied September 7, 1944.
- 10528.... 7- 6-40....Frank Dio Data; Underground; Irrigation and domestic; Certificate 2853 issued March 8, 1945, for 0.09 c.f.s.
- 10533.... 7-15-40....Crater Range Mines, Inc.; An Unnamed Spring; Mining, milling and domestic; Denied November 30, 1944.

G. S. Good standing.

- 10534.... 7-15-40....Crater Range Mines, Inc.; Pine Creek; Power and domestic; Denied November 30, 1944.
- 10535.... 7-15-40....Crater Range Mines, Inc.; Jarbidge River; Power; Denied November 30, 1944.
- 10536.... 7-15-40....Crater Range Mines, Inc.; Unnamed Spring; Mining, milling and domestic; Denied November 30, 1944.
- 10558.... 9-17-40....F. S. Talcott; Reed Canyon Creek; Irrigation; Cancelled September 26, 1944, because of failure of applicant to comply with provisions of permit.
- 10559.... 9-20-40....John H. Bunch and Nellie Bunch; Underground; Quasi-municipal, irrigation and domestic; Cancelled March 2, 1946, because of failure of applicant to comply with provisions of permit.
- 10562.... 9-25-40....N. E. Hanson; Underground; Mining, milling and domestic; (Assigned to Defense Plant Corporation. Deed filed January 28, 1943); Certificate 2904 issued October 19, 1945. for 0.50 c.f.s.
- 10568....10-21-40....Leon V. and Manley T. Garland; (Assigned half-interest to W. W. Hartman); Unnamed Wash; Mining, milling and domestic; Certificate 2835 issued January 5, 1945, for 0.1025 c.f.s.
- 10573....10-28-40....Helen Southerland Wengert; Underground (Las Vegas Artesian Basin); Domestic; Certificate 2827 issued January 5, 1945, for 0.10 c.f.s.
- 10575....10-30-40....E. L. Cord; Underground; Irrigation, stockwatering and domestic; Certificate 2859 issued April 17, 1945, for 0.66 c.f.s.
- 10576....10-30-40....E. L. Cord; Underground; Irrigation, stockwatering and domestic; Certificate 2860 issued April 17, 1945, for 0.66 c.f.s.
- 10577....10-30-40....E. L. Cord; Underground; Irrigation, stockwatering and domestic; Certificate 2861 issued April 17, 1945, for 0.07 c.f.s.
- 10578....10-30-40....E. L. Cord; Underground; Stockwatering and domestic; Certificate 2862 issued April 17, 1945, for 0.33 c.f.s.
- 10579....11- 1-40....Harry F. and Grace I. Read; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Certificate 2931 issued March 19, 1946, for 0.14 c.f.s.
- 10582....11- 6-40....Theodore Michelas; Underground (Las Vegas Artesian Basin); Quasi-municipal; Certificate 2843 issued February 5, 1945, for 0.44 c.f.s.
- 10583....11- 8-40....The Western Pacific Railroad Company; Cottonwood Springs; Locomotive and domestic; Certificate 2830 issued January 5, 1945, for 0.3760 c.f.s.
- 10584....11- 8-40....The Western Pacific Railroad Company; Little Cottonwood Springs; Locomotive and domestic; Certificate 2831 issued January 5, 1945, for 0.0070 c.f.s.
- 10585....11- 8-40....The Western Pacific Railroad Company; Cedar Spring; Locomotive and domestic; Certificate 2832 issued January 5, 1945, for 0.1517 c.f.s.
- 10586....11- 8-40....The Western Pacific Railroad Company; Little Cedar Spring; Locomotive and domestic; Certificate 2833 issued January 5, 1945, for 0.405.
- 10589....11-14-40....Eldorado-Rover Mining Company; Colorado River; Mining, milling and domestic; Cancelled September 26, 1944, because of discontinuance of operation.
- 10599....11-26-40....Lois Kellog II; Underground; Irrigation and domestic; Approved May 10, 1946, for 3.0 c.f.s. G.S.
- 10600....11-26-40....Lois Kellog II; Underground; Irrigation and domestic; Approved May 10, 1946, for 3.0 c.f.s.
- 10602....12- 2-40....Carl A. Foster; Underground; Domestic; Cancelled February 15, 1945, because of failure of applicant to comply with provisions of permit.
- 10603....12- 6-40....G. M. Standifer; Underground; Mining and domestic; Cancelled February 1, 1945, because of failure of applicant to comply with the provisions of the permit.
- 10605....12-26-40....United States of America, Department of Agriculture, Forest Service; Boy Scout Spring; Domestic and recreational; Certificate 2800 issued August 26, 1944, for 0.084 c.f.s.
- 10606....12-26-40....United States of America, Department of Agriculture, Forest Service; Unnamed Spring; Domestic; Certificate 2914 issued November 19, 1945, for 0.001 c.f.s.
- 10608.... 1-10-41....Murray Wollman; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Certificate 2858 issued April 10, 1945, for 0.84 c.f.s.
- 10609.... 1-11-41....Charles L. Sherwood; North Fork of Owyhee River; Milling and domestic; Cancelled October 1, 1945, because of failure of applicant to comply with the provisions of permit.
- 10611.... 1-16-41....Marion E. Yelland; Taft Creek (to change point of diversion and place of use); Irrigation; Certificate 2812 issued October 24, 1944, for 4.0 c.f.s.
- 10612.... 1-21-41....United States Indian Service; Underground; Quasi-municipal; Certificate 2855 issued March 23, 1945, for 0.03 c.f.s.
- 10615.... 1-28-41....J. W. Lambert, George F. Bauerdorf and Joe Feldman; Underground; Mining, milling and domestic; Cancelled February 1, 1945, because of failure of applicant to comply with provisions of permit.
- 10618.... 2- 7-41....Carter Brothers; Underground; Irrigation; Certificate 2840 issued January 16, 1945, for 0.5935 c.f.s.

G. S. Good standing.

- 10621.... 2-18-41....A. C. Ronald; Underground; Domestic and irrigation; Cancelled February 1, 1945, because of failure of applicant to comply with provisions of permit.
- 10631.... 2-25-41....N. E. Hanson; Underground; Mining, milling and domestic; Certificate 2897 issued October 19, 1945, for 0.50 c.f.s.
- 10632.... 2-25-41....N. E. Hanson; Underground; Mining, milling and domestic; Certificate 2898 issued October 19, 1945, for 0.5 c.f.s.
- 10633.... 2-28-41....Copper Canyon Mining Company; Copper Canyon Springs; Domestic; Certificate 2895 issued September 15, 1945, for 0.0024 c.f.s.
- 10635.... 3-11-41....Mr. and Mrs. Carl Baker; Underground; Quasi-municipal; Certificate 2857 issued April 10, 1945, for 0.055 c.f.s.
- 10660.... 5-10-41....Wilson and Mikkelsen; Underground; Domestic, irrigation and general service station use; Certificate 2807 issued August 26, 1944 for 0.025 c.f.s.
- 10670.... 5-26-41....Arthur Leon Arnold; Underground; Quasi-municipal; Certificate 2871 issued June 21, 1945, for 0.2 c.f.s.
- 10673.... 6- 2-41....Edith B. Ferraro; Cottonwood Creek (to change point of diversion); Irrigation; Certificate 2907 issued October 24, 1945, for 1.69 c.f.s.
- 10676.... 6- 9-41....Basic Ores, Inc.; Underground (to change point of diversion); Mining, milling and domestic; Certificate 2903 issued October 19, 1945, for 0.50 c.f.s.
- 10678.... 6-10-41....Barium Products, Ltd.; Underground; Mining and domestic; Certificate 2878 issued July 26, 1945, for 0.009 c.f.s.
- 10682.... 6-26-41....Fred Bartine; Eureka Creek; Irrigation; Certificate 2890 issued August 29, 1945, for 0.0209 c.f.s.
- 10688.... 7- 3-41....United States of America; Forest Service; Unnamed Spring; Irrigation; Certificate 2801 issued August 26, 1944, for 0.302 c.f.s.
- 10689.... 7- 3-41....United States of America; Forest Service; Unnamed Spring; Domestic and recreational; Certificate 2879 issued July 26, 1945, for 0.001 c.f.s.
- 10690.... 7- 3-41....United States of America; Forest Service; Unnamed Spring; Domestic; Certificate 2802 issued August 26, 1944, for 0.009 c.f.s.
- 10692.... 7- 3-41....United States of America; Forest Service; Unnamed Spring; Domestic; Certificate 2803 issued August 26, 1944, for 0.002 c.f.s.
- 10693.... 7- 3-41....United States of America; Forest Service; Unnamed Spring; Domestic; Certificate 2804 issued August 26, 1944, for 0.0042 c.f.s.
- 10697.... 7-11-41....E. A. Clark; Underground; Domestic and quasi-municipal; cancelled March 2, 1946, because of failure of applicant to comply with provisions of permit.
- 10700.... 7-19-41....Contact Mining Company; Brown Station Springs; Mining and milling; Cancelled April 27, 1945, because of failure of applicant to comply with provisions of permit.
- 10712.... 8- 6-41....Harold D. Cornell; Pahrump Valley Artesian Basin; Irrigation and domestic; Withdrawn by applicant May 11, 1946.
- 10729.... 9-12-41....Grace Zopf; Frossors Spring; Irrigation and domestic; Cancelled September 26, 1944, because of failure of applicant to comply with provisions of permit.
- 10730.... 9-13-41....Basic Magnesium, Inc.; (Assigned to Defense Plant Corporation); Underground; Mining, milling and domestic. Certificate 2899 issued October 19, 1945, for 0.50 c.f.s.
- 10731.... 9-13-41....Basic Magnesium, Inc.; (Assigned to Defense Plant Corporation); Underground; Mining, milling and domestic; Certificate 2900 issued October 19, 1945, for 0.50 c.f.s.
- 10732.... 9-13-41....Basic Magnesium, Inc.; (Assigned to Defense Plant Corporation); Underground; Mining, milling and domestic; Certificate 2901 issued October 19, 1945, for 0.50 c.f.s.
- 10740.... 10- 6-41....R. A. Coffman; Underground; Quasi-municipal, irrigation and domestic; Cancelled March 2, 1946, because of failure of applicant to comply with provisions of permit.
- 10741.... 10- 6-41....Silver Divide Mines Company; Unnamed Spring; Mining, milling and domestic; Denied May 6, 1946, due to failure of applicant to submit fee for issuance of permit.
- 10742.... 10-14-41....International Smelting and Refining Company; Underground; Mining, milling and domestic; Certificate 2916 issued November 26, 1945, for 0.1201 c.f.s.
- 10745.... 10-14-41....Henry Wick; Underground; Irrigation and domestic; Certificate 2917 issued December 18, 1945, for 0.05 c.f.s.
- 10746.... 10-14-41....Consolidated Goldacres Company; Unnamed well; Mining, milling and domestic; Certificate 2908 issued October 24, 1945, for 0.193 c.f.s.
- 10747.... 10-17-41....John H. Conway; West Oak Spring; Stockwatering and domestic; Certificate 2805 issued August 26, 1944, for 0.01 c.f.s.
- 10757.... 11-15-41....Ivan M. Pinjov; Underground; Irrigation and domestic; Certificate 2882 issued July 27, 1945, for 0.01 c.f.s.
- 10758.... 11-20-41....Frank V. and Wille Lee Somerville; Underground; Quasi-municipal; Denied March 8, 1946, on the grounds that applicant failed to submit fee for issuance of permit.
- 10761.... 12- 8-41....Sebastian Mikilich; Underground; Irrigation and domestic; Certificate 2894 issued September 14, 1945, for 0.06 c.f.s.

- 10797... 3-25-42...Henry A. Studwell; Underground (Las Vegas Artesian Basin); Domestic and quasi-municipal; Approved April 17, 1945, for 0.5 c.f.s. G. S.
- 10803... 4- 2-42...Basic Magnesium, Inc.; Underground; Mining, milling and domestic; Certificate 2902 issued October 19, 1945, for 0.50 c.f.s.
- 10805... 4- 6-42...George F. Gove; Gove Spring; Irrigation and domestic; Approved February 28, 1946, for 0.5 c.f.s. G. S.
- 10807... 4-11-42...George Eldridge; Muncy Creek; Irrigation; Approved March 29, 1945, for 2.8 c.f.s. G. S.
- 10808... 4-11-42...George Eldridge; Kalamazoo Creek; Irrigation; Approved March 29, 1945, for 2.8 c.f.s. G. S.
- 10814... 4-20-42...Paul Stewart, Ernie Higbee, Lawrence Sharp; East and South Sheep Mt. Dry Channels; Stockwatering; Certificate 2839 issued January 5, 1945, for 0.0094 c.f.s.
- 10828... 5-20-42...Louis Wiener, Jr.; Underground (Las Vegas Artesian Basin); Domestic and quasi-municipal; Denied April 24, 1946, due to failure to submit fee for permit.
- 10829... 5-25-42...J. N. Hawkins and Helen V. Hawkins; Churchill Canyon and tributaries; Irrigation and domestic; Cancelled March 2, 1946, because of failure of applicant to comply with provisions of permit.
- 10835... 6-11-42...Emery E. Garrett; Troy Creek; Stockwatering and domestic; Approved August 28, 1944, for 0.00625 c.f.s. G. S.
- 10836... 6-11-42...Emery E. Garrett; (Assigned by Emery Garrett to J. A. Hail and Lew Cook. Deed filed December 9, 1943); Unnamed Spring; Stockwatering and domestic; Approved August 28, 1944, for 0.00625 c.f.s. G. S.
- 10838... 6-12-42...E. C. Bradshaw; Underground; Mining, milling and domestic; Approved November 8, 1945, for 0.25 c.f.s. G. S.
- 10840... 6-13-42...E. C. Clark, E. H. Wallace and Frank Wallace; Underground; Domestic and milling; Denied May 10, 1945, on the grounds that applicant failed to submit fee for issuance of permit.
- 10843... 6-22-42...B. H. Eobison; Bassett Creek Slough; Irrigation; Approved March 8, 1946, for 4.0 c.f.s. G. S.
- 10844... 6-24-42...A. C. Delkin; Underground (Las Vegas Artesian Basin); Manufacturing and domestic; Certificate 2918 issued December 18, 1945, for 0.055 c.f.s.
- 10845... 7- 9-42...Bert Ayers, Klen Jensen and Frank Allen (Assigned to A. L. Simpson. Deed filed August 20, 1945); Cave Spring; Stockwatering; Approved January 19, 1945, for 0.0053 c.f.s. G. S.
- 10849... 7-29-42...Angelo DeBarnardi; New Spring; Irrigation and domestic; Withdrawn by applicant August 28, 1944.
- 10866... 9-19-42...United Cattle and Packing Company (Assigned to H. N. Sharp. Deed filed November 3, 1944); Deep Creek Canyon; Stockwatering and domestic; Approved September 7, 1944, for 0.0156 c.f.s. G. S.
- 10872... 9-26-42...Salvador Urrutia; Black Springs; Irrigation and domestic; Approved March 12, 1945, for 1.0 c.f.s. G. S.
- 10873... 9-28-42...Albert Romeo; High and waste waters of Steptoe Creek and waste water of Georgetown Ranch; Irrigation; Approved June 20, 1945, for 2.0 c.f.s. G. S.
- 10884... 10-13-42...R. C. Martin; Eob Martin Spring; Mining, milling, and domestic; approved November 5, 1945, for 0.5 c.f.s. G. S.
- 10897... 12- 3-42...John H. Conaway and P. W. Duffin et al.; Bishop Creek; Stockwatering; Certificate 2770 issued February 24, 1945, for 0.016 c.f.s.
- 10902... 12-17-42...E. A. Henriod; Wenzel Spring; Stockwatering and domestic; Denied August 15, 1944, on the grounds that the granting of a permit hereunder would violate the provisions of the 1925 Stockwatering Act and the 1931 Nevada Range Law.
- 10905... 12-24-42...Bartholomae Oil Corporation; (Assigned Bartholomae Corporation); Underground; Stockwatering and domestic; Withdrawn August 10, 1944.
- 10943... 4- 8-43...United Strategic Metals Company; Dry Gulch; Milling and Domestic; Cancelled June 29, 1945, because of failure of applicant to comply with provisions of permit.
- 10955... 5-10-43...United Cattle and Packing Company; (Assigned to H. N. Sharp. Deed filed November 3, 1944); Deep Creek Canyon; Irrigation and domestic; Approved September 7, 1944, for 1.0 c.f.s. G. S.
- 10956... 5-15-43...H. R. Fisher and W. L. Petersen; Pony Canyon and tributaries; Mining, milling and domestic; Certificate 2813 issued October 24, 1944, for 1.0 c.f.s.
- 10957... 5-21-43...F. W. Brush and Edna Brush; Cottonwood Creek (to change point of diversion); Irrigation; Certificate 2863 issued April 19, 1945 for 0.7340 c.f.s.
- 10959... 6- 3-44...United States of America, Department of Interior, National Park Service; Cave Springs (to change point of diversion, method of conveyance and place of manner of use); Domestic and recreational; Approved March 19, 1945, for 0.15 c.f.s. G. S.

G. S. Good standing.

- 10967.... 7- 3-43....James Hunter; Simpson No. 2 Spring; Stockwatering; Certificate 2810 issued October 24, 1944, for 0.0063 c.f.s.
- 10968.... 7- 3-43....Los Angeles and Salt Lake Railroad Company; Underground; Railroad and domestic; Certificate 2817 issued November 20, 1944, for 0.534 c.f.s.
- 10969.... 7- 9-43....Lawrence Henz and Marguerite Henz; Underground; Irrigation and domestic; Approved August 18, 1944, for 0.01 c.f.s. G. S.
- 10973.... 8- 4-43....Dan Stewart and Cornell Stewart; Underground; Stockwatering and domestic; Denied January 22, 1945, in accordance with the Stockwatering Act.
- 10974.... 8- 4-43....Paul Stewart, Cornell Stewart and Dan Stewart; Wild Horse Spring; Stockwatering and domestic; Certificate 2877 issued July 24, 1945, for 0.0078 c.f.s.
- 10976.... 8- 7-43....S. H. Manor; Rock Hill Spring; Stockwatering; Approved March 19, 1945, for 0.0035 c.f.s. G. S.
- 10983.... 8-16-43....Melvin Schwake; Carey Creek (to change point of diversion and place of use); Irrigation and stockwatering; Certificate 2937 issued April 25, 1946, for 0.37 c.f.s.
- 10984.... 8-18-43....Hugh K. Snudden; Underground (Las Vegas Artesian Basin); Quasi-municipal and domestic; Denied September 7, 1944, on the grounds that applicant sold his property and the purchaser is not interested in drilling for water.
- 10993.... 9- 1-43....George Eldridge; North Millick Spring; Irrigation; Approved November 8, 1945, for 2.0 c.f.s.
- 10994.... 9- 2-43....Marion E. Yelland; Taft Creek and tributaries; Irrigation; Approved August 7, 1944, for 3.5 c.f.s. G. S.
- 10997.... 9-13-43....Defense Tungsten Mines, Inc.; Cold Springs; Mining and domestic; Denied March 19, 1945, on the grounds that the applicant failed to submit fee for issuance of permit.
- 11004.... 9-23-43....Angelo C. Florio; Underground; Stockwatering and domestic; Approved August 28, 1944, for 0.10 c.f.s. G. S.
- 11008.... 9-23-43....Angelo C. Florio; Underground; Stockwatering and domestic; Certificate 2837 issued January 5, 1945, for 0.094 c.f.s.
- 11009.... 9-14-43....Joseph L. Raffetto; Truckee River (to change point of diversion and place of use); Irrigation and domestic; Certificate 2821 issued January 5, 1945, for 402 acre-feet per year.
- 11010.... 9-24-43....Joseph L. Raffetto; Truckee River (to change point of diversion and place of use); Irrigation and domestic; Certificate 2832 issued January 5, 1945, for 129 acre-feet per year.
- 11011.... 9-24-43....Joseph L. Raffetto; Truckee River (to change point of diversion and place of use); Irrigation and domestic; Cancelled February 11, 1944.
- 11012.... 9-24-43....Joseph L. Raffetto; Truckee River (to change point of diversion and place of use); Irrigation and domestic; Certificate 2823 issued January 5, 1945, for 59 acre-feet per year.
- 11014.... 9-24-43....Joseph L. Raffetto; Truckee River (to change point of diversion and place of use); Irrigation and domestic; Certificate 2824 issued January 5, 1945, for 7 acre-feet per year.
- 11015.... 9-24-43....Joseph L. Raffetto; Truckee River (to change point of diversion and place of use); Irrigation and domestic; Certificate 2825 issued January 5, 1945, for 240 acre-feet per year.
- 11016.... 9-30-43....Alma Woods; Underground; Stockwatering; Certificate 2815 issued November 14, 1944, for 0.016 c.f.s.
- 11019.... 10- 7-43....M. G. L. Mining Corporation; Underground; Milling tungsten ores and domestic; Certificate 2809 issued September 7, 1944, for 0.67 c.f.s.
- 11020.... 10- 9-43....George I. Williams; Troy Canyon Creek; Stockwatering and domestic; Denied November 2, 1944, on the grounds that to grant a permit hereunder would contravene the provisions of the 1925 Stockwatering Act.
- 11021.... 10-14-43....Don C. Crawford; Crawford Creek; Irrigation and domestic; Approved October 9, 1944, for 1,500 acre-feet per annum.
- 11023.... 10-29-43....R. H. Matlack and D. E. Culbertson; Rock Hill Spring; Stockwatering and domestic; Denied April 5, 1945, on the grounds that the approval thereof would intervene with prior existing rights.
- 11024.... 10-29-43....Elda A. Gilcrease, John T. Gilcrease and William Orr Gilcrease; Underground; Irrigation and domestic; Approved July 18, 1944, for 2.0 c.f.s. G. S.
- 11027.... 11- 4-43....Wm. E. Rinehart; Cherry Gulch Spring; Stockwatering; Approved October 4, 1944, for 0.038 c.f.s. G. S.
- 11028.... 11- 8-43....Julius Redelius and J. Benjamin Parker; South Mitchell Springs; Mining, milling and domestic; Cancelled July 25, 1944, because of failure of applicant to refile corrected application.
- 11031.... 12- 2-43....Wm. A. Bartholomae, Jr.; Underground; Irrigation and domestic; Certificate 2820 issued December 29, 1944, for 0.62 c.f.s.
- 11033.... 12- 3-43....Juanita W. Bleak and Cassey L. Wheeler; Dead Man Spring; Stockwatering and domestic; Approved September 22, 1944, for 0.0031 c.f.s. G. S.
- 11034.... 12- 3-43....Molybdenum Products Company; Underground; Mining, crushing, processing and domestic; Approved August 23, 1944, for 1.0 c.f.s. G. S.

G. S. Good standing.

- 11036....12- 6-43....Joe Eldridge; Castle Rock Spring; Stockwatering. Approved December 26, 1944, for 0.0153 c.f.s. G. S.
- 11037....12-10-43....Fallini Brothers; Twin Springs Wash; Stockwatering; Certificate 2909 issued October 24, 1945, for 0.003 c.f.s.
- 11038....12-13-43....Geo. A. Fink; Underground; Irrigation; Approved July 26, 1944, for 1.0 c.f.s.
- 11039....12-15-43....Hotels El Rancho, Inc.; Underground (Las Vegas Artesian Basin); General Hotel Supply and domestic; Approved July 22, 1944, for 0.5 c.f.s. G. S.
- 11042....12-29-43....Young Brothers; Hamblin Valley Wash; Irrigation and domestic; Approved February 1, 1945, for 5.0 c.f.s. G. S.
- 11045.... 1- 6-44....Roland H. Wiley; Underground; Irrigation and domestic; Cancelled July 25, 1944, because of failure of applicant to refile corrected application within statutory time.
- 11049.... 1-12-44....Fallini Brothers; Underground; Stockwatering; Certificate 2910 issued October 24, 1945, for 0.002 c.f.s.
- 11050.... 1-14-44....Department of Highways; Underground; General Domestic Use; Approved July 18, 1944, for 0.03 c.f.s. G. S.
- 11051.... 1-19-44....Joe S. Ronnow; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved July 18, 1944, for 0.25 c.f.s. G. S.
- 11052.... 1-20-44....Fallini Brothers; Underground; Stockwatering; Certificate 2911 issued October 24, 1945, for 0.002 c.f.s.
- 11053.... 1-24-44....Albert L. and Verena M. Hermenjat; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved August 4, 1944, for 0.25 c.f.s. G. S.
- 11055.... 1-24-44....Dan Cornell and Paul Stewart; Quinn Canyon Dry Wash and tributaries; Stockwatering; Denied January 22, 1945, in accordance with the Stockwatering Act of Nevada.
- 11056.... 1-24-44....Dan Cornell and Paul Stewart; Barton Dry Creek and tributaries; Stockwatering; Denied January 22, 1945, in accordance with the Stockwatering Act of Nevada.
- 11057.... 1-24-44....Dan Cornell, Wilson Stewart and Vernon Bunker; Underground; Stockwatering and domestic; Denied January 22, 1945, in accordance with the Stockwatering Act of Nevada.
- 11058.... 1-24-44....Dan Cornell, Wilson Stewart and Vernon Bunker; Underground; Stockwatering and domestic; Denied January 22, 1945, in accordance with the Stockwatering Act of Nevada.
- 11059.... 1-24-44....Dan Cornell, Wilson and Paul Stewart and Vernon Bunker; Underground; Stockwatering and domestic; Denied January 22, 1945, in accordance with the Stockwatering Act of Nevada.
- 11060.... 1-29-44....Less Lytle; Underground; Irrigation; Approved March 27, 1945, for 1.0 c.f.s. G. S.
- 11061.... 2- 1-44....Fallini Brothers; Underground; Stockwatering; Certificate 2912 issued October 24, 1945, for 0.002 c.f.s.
- 11062.... 2- 1-44....Fallini Brothers; Black Spring (to change place of use and point of diversion); Stockwatering; Certificate 2892 issued August 29, 1945, for 0.004 c.f.s.
- 11063.... 2- 3-44....Jean A. Prentiss; (Assigned to Alice Maier); Tony Creek; Irrigation and domestic; Approved September 19, 1944, for 0.3261 c.f.s.
- 11067.... 2-14-44....Erwin Burns and Ernest P. Higbee; Hancock Reservoir in Dry Channel and tributaries; Stockwatering; Cancelled July 25, 1944, because of failure of applicant to refile corrected application.
- 11068.... 2-16-44....J. R. Kelly and V. E. Greenwaldt; Unnamed Spring; Stockwatering; Cancelled July 25, 1944, because of failure of applicant to refile corrected application.
- 11069.... 2-16-44....J. R. Kelly and V. E. Greenwaldt; Mud Spring; Stockwatering; Cancelled July 25, 1944, because of failure of applicant to refile corrected application.
- 11070.... 2-16-44....J. R. Kelly and V. E. Greenwaldt; Curry's Well; Stockwatering; Withdrawn by applicant February 28, 1944.
- 11071.... 2-16-44....J. R. Kelly and V. E. Greenwaldt; Gold Bar Spring; Stockwatering; Cancelled July 25, 1944, because of failure of applicant to refile corrected application.
- 11072.... 2-25-44....Fred Bartine; Underground; Irrigation and domestic; Certificate 2880 issued July 26, 1945, for 0.78 c.f.s.
- 11073.... 2-25-44....Bartholomae Corporation; Underground; Stockwatering and domestic; Withdrawn by applicant February 10, 1945.
- 11075.... 3- 2-44....Department of Highways; Illipah Spring; General domestic; Certificate 2854 issued March 22, 1945, for 0.0022 c.f.s.
- 11076.... 3- 4-44....Leland Hendrix; White River Slough; Irrigation and domestic; Approved December 26, 1944, for 3.20 c.f.s. G. S.
- 11077.... 3- 6-44....Robert B. Griffith; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved July 2, 1945, for 0.8 c.f.s. G. S.
- 11078.... 3- 6-44....Ernest H. Gubler; White River Slough; Irrigation and domestic; Approved January 9, 1945, for 3.6 c.f.s. G. S.
- 11079.... 3- 6-44....Getchell Mine, Inc.; Name unknown; Milling; Cancelled October 10, 1944, because of failure to refile corrected application.

- 11080.... 3- 6-44....Howard B. Hoover; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Cancelled May 21, 1946, because of failure of applicant to comply with provisions of permit.
- 11085.... 3-10-44....Harvey N. Beddo; Miller or Spring Creek; Irrigation; Approved January 9, 1945, for 1.0 c.f.s. G. S.
- 11087.... 3-15-44....Edward E. Burk; (Assigned to Iris Burk Smith); Unnamed Spring; Irrigation and domestic; Approved February 1, 1945, for 0.7 c.f.s. G. S.
- 11089.... 3-17-44....R. J. Kelly and V. E. Greenwaldt; Ben Grant Spring; Stockwatering; Cancelled October 10, 1944, because of failure to refile supporting map.
- 11091.... 3-22-44....A. I. Stoner and J. H. Meyers; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Cancelled October 1, 1945, because of failure of applicant to comply with the provisions of the permit.
- 11092.... 3-24-44....Buddy A. F. Cayton; Underground; Irrigation; Approved July 24, 1944, for 0.4 c.f.s. G. S.
- 11093.... 3-25-44....Arnold V. Schwartz; Little Cottonwood Creek (to change point of diversion); Irrigation; Approved July 27, 1944, for 1.4916 c.f.s. G. S.
- 11095.... 3-31-44....Olly O. Stoffel and Edith Stoffel; (Assigned to Odd Johnsen and Hilda M. Johnsen, undivided one-half interest in well); Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved July 24, 1944, for 0.5 c.f.s. G. S.
- 11096.... 3-31-44....Harold D. Cornell; Underground; Irrigation and domestic; Withdrawn by applicant, May 11, 1946.
- 11098.... 4- 6-44....J. P. Seeburg; Tule George Spring; Stockwatering; Cancelled October 11, 1944, because of failure to refile corrected application within statutory time.
- 11099.... 4- 6-44....Fallon Ice and Cold Storage Company, Inc.; Mississippi Creek; Irrigation and domestic; Approved January 15, 1945, for 0.80 c.f.s. G. S.
- 11100.... 4- 6-44....Thomas M. Metcalf and Anne M. Metcalf; Underground (Las Vegas Artesian Basin); Irrigation and domestic; Certificate 2869 issued May 8, 1945, for 0.05 c.f.s.
- 11101.... 4-10-44....R. J. Kaltenborn; Underground (Las Vegas Artesian Basin); Domestic and irrigation; Approved July 3, 1944, for 0.20 c.f.s. G. S.
- 11102.... 4-10-44....Vassie Martin and Charles R. Martin; Underground (Las Vegas Artesian Basin); Domestic and irrigation; Approved July 3, 1944, for 0.4 c.f.s. G. S.
- 11103.... 4-10-44....Lloyd H. Tritle and Rae Tritle; Underground (Las Vegas Artesian Basin); Domestic and irrigation; Approved October 9, 1944, for 0.10 c.f.s. G. S.
- 11104.... 4-11-44....E. C. and H. L. Lye; Indian Creek (to change point of diversion); Irrigation; Approved August 21, 1944. Certificate 2838 issued January 5, 1945, for 407.25 acre-feet.
- 11107.... 4-17-44....J. C. Fisher and Company, and Louis V. Lohman; Underground (Las Vegas Artesian Basin); Quasi-municipal; Approved August 4, 1944, for 0.40 c.f.s. G. S.
- 11108.... 4-18-44....Howard R. Clinger and E. Penn Smith; Mica Mountain Spring; Mining and domestic; Approved January 15, 1945, for 0.25 c.f.s. G. S.
- 11109.... 4-22-44....Directors of the State Orphans' Home of the State of Nevada; Underground; Irrigation and domestic; Approved September 7, 1944, for 0.74 c.f.s. G. S.
- 11110.... 4-24-44....Nevada Area Council, Boy Scouts of America; Right Fork Lamoille Creek; Swimming pool; Approved September 14, 1944, for 4 acre-feet. G. S.
- 11111.... 4-24-44....City of Las Vegas, a Municipal Corporation; Underground (Las Vegas Artesian Basin); Irrigation; Approved August 23, 1944, for 0.1 c.f.s. G. S.
- 11112.... 4-25-44....Chris Dahlstrom; Unnamed Spring; Stockwatering; Approved September 14, 1944, for 0.01 c.f.s. G. S.
- 11113.... 5- 2-44....Benjamin F. Casey; Jack Ass Spring; Stockwatering and domestic; Cancelled October 14, 1944, because of failure to refile corrected application.
- 11114.... 5- 2-44....Defense Plant Corporation; Underground; Plant operation, fire protection and domestic; Certificate 2905 issued October 19, 1945, for 0.50 c.f.s.
- 11115.... 5- 5-44....Lois Kellog; Underground; Irrigation, milling and domestic; Cancelled July 25, 1944, because of failure to refile corrected application within statutory time.
- 11117.... 5- 9-44....Loretta Rooker; Hell's Bells Spring; Irrigation and domestic; Approved October 27, 1944, for 1.0 c.f.s. G. S.
- 11118.... 5-10-44....Robert A. Thorley; Porphyry Wash; Stockwatering; Approved September 26, 1944, for 0.0156 c.f.s. G. S. Certificate 2826 issued January 5, 1945, for 0.0125 c.f.s.
- 11119.... 5-12-44....M. C. Sinnott; Underground; Domestic and municipal; Approved August 18, 1944, for 0.5 c.f.s. G. S.
- 11120.... 5-13-44....R. J. White and Slats Jacobs; Tonopah Spring; Stockwatering and domestic; Approved December 13, 1944, for 0.0065 c.f.s. G. S.

G. S. Good standing.

- 11121.... 5-20-44....M. M. Sweeney; Underground (Las Vegas Artesian basin); Irrigation and domestic; Cancelled September 4, 1945, because of failure of applicant to comply with provisions of permit.
- 11122.... 5-20-44....Daniels Brothers; Cottonwood Creek; Cancelled October 11, 1944, because of failure of applicant to refile corrected application.
- 11123.... 5-29-44....Val E. Sneed and Mabel Sneed; (Assigned); Underground (Las Vegas Artesian Basin); Irrigation and domestic; Approved December 14, 1944, for 0.119 c.f.s. G.S.
- 11124.... 6- 5-44....A. I. Stoner; Underground (Las Vegas Artesian Basin); Manufacturing; Approved December 6, 1944, for 0.20 c.f.s. G.S.
- 11125.... 6-14-44....Pacific Reclamation Water Company; Bixhop Creek (to change point of diversion and manner of use); Irrigation; Approved September 12, 1944, for 6.32 c.f.s. G.S. Certificate No. 2846 issued February 14, 1945, for 6.32 c.f.s.
- 11126.... 6-14-44....Pacific Reclamation Water Company; Johnson Creek and Springs (to change point of diversion and manner and place of use); Irrigation; Certificate 2847 issued February 14, 1945, for 1.375 c.f.s.
- 11127.... 6-14-44....Pacific Reclamation Water Company; Burnt Creek (to change point of diversion and manner and place of use); Irrigation; Certificate No. 2848 issued February 14, 1945, for 1.375 c.f.s.
- 11128.... 6-14-44....Pacific Reclamation Water Company; Trout Creek (to change point of diversion and manner and place of use); Irrigation; Certificate 2849 issued February 14, 1945, for 2.720 c.f.s.
- 11129.... 6-14-44....Daniels Brothers; Mammoth Spring (to change manner and place of use); Stockwatering; Cancelled November 20, 1944, because of failure to refile corrected application within statutory time.
- 11130.... 6-17-44....Town of North Las Vegas; Underground (Las Vegas Artesian Basin); Municipal; Approved September 26, 1944, for 0.5 c.f.s. G.S.
- 11131.... 6-17-44....Town of North Las Vegas; Underground (Las Vegas Artesian Basin); Municipal; Approved September 26, 1944, for 1.0 c.f.s. G.S.
- 11132.... 6-19-44....Harold D. Cornell; Underground (to change point of diversion); Irrigation and domestic; Approved September 26, 1944, for 4.0 c.f.s. G.S.
- 11133.... 6-21-44....Simone Lompa; sewage affluent of Carson City sewage disposal plant (waste water); Irrigation and domestic; Approved January 31, 1946, for 4.00 c.f.s. G.S.
- 11134.... 6-26-44....George M. Perkins; Grapevine Spring; Stockwatering; Cancelled November 20, 1944, because of failure to refile corrected application within statutory time.
- 11135.... 6-26-44....Robert F. Caudill; Underground; Stockwatering; Withdrawn by applicant October 4, 1944.
- 11136.... 6-27-44....Department of Highways; Callaway Spring; General domestic use; Approved September 14, 1944, for 0.5 c.f.s. G.S.
- 11137.... 6-30-44....Mattia Capelli; Willow Spring; Stockwatering; Cancelled November 21, 1944, because of failure to refile corrected application within statutory time.

G. S. Good standing.

CHAPTER XIX

Certificates Issued Under Permits, 1944-1946

Following is a condensed statement giving the salient data in connection with Certificates Issued Under Permits during the biennium for the period July 1, 1944, to June 30, 1946, in the order of:

1. Certificate number.
2. Book number.
3. Permit number.
4. Name of appropriator.
5. Source of water supply.
6. Purpose of appropriation.
7. Amount of water in cubic feet per second, unless otherwise noted.
8. Date of certificate issued.

2795	9	10150	Goldfield Water System; Underground source Municipal	0.25	7- 1-44
2796	9	9404	Nick and Louise Yrazabal; Watson Spring; Irrigation and domestic	0.002	7- 5-44
2797	9	10907	Bartholomae Corporation; Underground source (Fish Creek No. 3); Stockwatering	0.011	7-14-44
2798	9	9966	City of Winnemucca; Underground (Well No. 2); Municipal	1.782	8-11-44
2799	9	9327	Benton V. Smith; Surprise Spring; Domestic and resort	0.3	8-11-44
2800	9	10605	United States of America, Department of Agri- culture, Forest Service; Boy Scout Spring; Domestic and recreational	0.084	8-26-44
2801	9	10688	United States of America, Forest Service; Unnamed Spring; Irrigation	0.0302	8-26-44
2802	9	10690	United States of America, Forest Service; Unnamed Spring; Domestic	0.009	8-26-44
2803	9	10692	United States of America, Forest Service; Unnamed Spring; Domestic	0.002	8-26-44
2804	9	10693	United States of America, Forest Service; Unnamed Spring; Domestic	0.0042	8-26-44
2805	9	10747	John H. Conaway; West Oak Spring; Stock- watering	0.01	8-26-44
2806	9	10460	Lincoln Mines, Inc.; (Assigned by Lincoln Mines to Atolia Mining Co. Deed filed May 14, 1946); Underground; Mining and milling	0.45	8-26-44
2807	9	10660	J. W. Wilson and Elmer Mikkelsen; Under- ground source (Las Vegas Artesian Basin); Domestic	0.025	8-26-44
2808	9	6447	Charles Hanning (assigned on August 21, 1944 by Charles Hanning and Madeline Hanning to Stanley H. Hunewill and LeNore M. Hunewill. Deed filed October 25, 1944); German Springs; Stockwatering	0.003	8-29-44
2809	9	11019	M. G. L. Mining Corp; Underground; Milling and domestic	0.67	9- 7-44
2810	9	10967	James Hunter; Simpson No. 2 Spring; Stock- watering	0.0063	10-24-44
2811	9	10299	Rip Van Winkle Mining Company; Rip Van Winkle Spring; Milling	0.5	10-24-44
2812	9	10611	Marion E. Yeland; Taft Creek; (to change the point of diversion of water claimed under a vested right which is of record under Proof of Approp. No. 02304); Irrigation	4.0	10-24-44
2813	9	10956	H. R. Fisher and W. L. Petersen; Pony Can- yon and Tributaries; Mining, milling and domestic	1.0	10-24-44
2814	9	9815	Parman-Valerdi Company (assigned to Vern R. Parman and Ralph G. Parnian, deed filed March 16, 1945); Schultz Spring; Stock- watering and domestic	0.001	10-27-44
2815	9	11016	Alma Woods; Underground; Stockwatering	0.016	11-14-44
2816	9	9363	Roy A. Brown; LeBeau Creek; Irrigation and domestic	0.515	11-14-44
2817	9	10968	Los Angeles and Salt Lake Railroad Co.; Under- ground; Railroad and domestic	0.534	11-20-44
2818	9	9906	Benjamin F. Casey; Underground; Stockwater- ing	0.011	11-22-44

2819....9....4985....	William Gideon Morris; Big Spring; Irrigation and domestic	1.54	11-22-44
2820....9..11031....	William A. Bartholomae, Jr.; Underground source (Bartholomae Well No. 1); Irrigation	0.62	12-29-44
2821....9..11009....	Joseph L. Raffetto; Truckee River; (to change the point of diversion and place of use of a water right as evidenced under Claim No. 342 in the Temporary Restraining Order issued by the District Court of the United States in and for the District of Nevada in Equity, Docket No. A3); Irrigation and domestic	*402	1- 5-45
2822....9..11010....	Joseph L. Raffetto; Truckee River; (to change the point of diversion and place of use of a water right as evidenced under Claims Nos. 398, 407 $\frac{1}{2}$, 407 $\frac{1}{2}$, 408 $\frac{1}{2}$ and 408 $\frac{1}{2}$ in the Temporary Restraining Order issued by the District Court of the United States in and for the District of Nevada, in Equity, Docket No. A3.); Irrigation and domestic	*129	1- 5-45
2823....9..11012....	Joseph L. Raffetto; Truckee River; (to change the point of diversion and place of use of a water right as evidenced under Claims Nos. 364 and 364 $\frac{1}{2}$ in the Temporary Restraining Order issued by the District Court of the United States in and for the District of Nevada, in Equity, Docket No. A3); Irrigation and domestic	*59	1- 5-45
2824....9..11014....	Joseph L. Raffetto; Truckee River; (to change the point of diversion and place of use of a water right as evidenced under Claim No. 372 in the Temporary Restraining Order issued by the District Court of the United States in and for the District of Nevada, in Equity, Docket No. A3); Irrigation and domestic	*7	1- 5-45
2825—9..11015....	Joseph L. Raffetto; Truckee River; (to change the point of diversion and place of use of a water right as evidenced under Claim No. 423 in the Temporary Restraining Order issued by the District Court of the United States, in and for the District of Nevada, in Equity, Docket No. A3); Irrigation and domestic	*240	1- 5-45
2826....9..11118....	Robert A. Thorley; Prophry Wash; Stock-watering	0.0125	1- 5-45
2827....9..10573....	J. L. and Rena Hunter; Underground source Las Vegas Valley Artesian Basin); Domestic	0.10	1- 5-45
2828....9..10458....	Las Vegas Land and Water Company; Underground source (Las Vegas Valley Artesian Basin); Municipal supply and domestic	2.13	1- 5-45
2829—9..10508....	Las Vegas Land and Water Company; Underground source (Las Vegas Valley Artesian Basin); Municipal supply and domestic	0.96	1- 5-45
2830....9..10583....	Western Pacific Railroad Company; Cottonwood Spring; Locomotive and domestic	0.3760	1- 5-45
2831....9..10584....	Western Pacific Railroad Company; Little Cottonwood Springs; Locomotive and domestic	0.0070	1- 5-45
2832....9..10585....	Western Pacific Railroad Company; Cedar Spring; Locomotive and domestic	0.1517	1- 5-45
2833....9..10586....	Western Pacific Railroad Company; Little Cedar Spring; Locomotive and domestic	0.0405	1- 5-45
2834....9..10515....	C. H. Jackson, Jr.; Unnamed Spring; Irrigation and domestic	0.02	1- 5-45
2835....9..10568....	Leon V. and Manley T. Garland (undivided one-half interest) W. W. Hartam (undivided one-half interest); Unnamed Wash; Mining, milling, and domestic	0.1025	1- 5-45
2836....9..10174....	Peacock Brothers; Rowe Creek; Irrigation	1.0	1- 5-45
2837....9..11008....	Angelo C. Florio; Underground source (General McArthur Well); Stockwatering	0.094	1- 5-45
2838....9..11104....	E. C. and H. L. Lye; Indian Creek; (to change the point of diversion of 407.24 acre-feet of waters of Indian Creek heretofore appropriated under claim of vested right as evidenced by Proof of Appropriation No. 0665, and as set forth in the Little Humboldt decree); Irrigation	407.25*	1- 5-45
2839....9..10814....	Paul Stewart, Ernie Higbee, and Lawrence Sharp; Sheep Mt. Dry Channels; Stock-watering	0.0094	1- 5-45
2840....9..10618....	Carter Brothers; Underground source; Irrigation	0.5935	1-16-45
2841....9....2512....	H. N. Sharp; Troy Creek; Irrigation and domestic	1.07	1-16-45

*Acre-feet per year.

2842	9	3191	Garley Amos; Cottonwood Creek; Irrigation and domestic	0.82	2- 1-45
2843	9	10582	Theodore Michelas; Underground source (Las Vegas Artesian Basin); Quasi-municipal	0.44	2- 5-45
2844	9	10596	W. T. Stewart; Papoose Channel and Tributaries; Stockwatering and domestic	*5	2-14-45
2845	9	10597	W. T. Stewart; Papoose Dry Lake Channel; Stockwatering and domestic	*5	2-14-45
2846	9	11125	Pacific Reclamation Water Company; Bishop Creek; (to change the place of use of the waters of Bishop Creek); Irrigation and domestic	6.32	2-14-45
2847	9	11126	Pacific Reclamation Water Company; Johnson Creek and Springs; (to change the point of diversion and place of use of the waters of Johnson Creek and Springs); Irrigation and domestic	0.960	2-14-45
2848	9	11127	Pacific Reclamation Water Company; Burnt Creek; (to change the point of diversion and place of use of the waters of Burnt Creek); Irrigation and domestic	1.375	2-14-45
2849	9	11128	Pacific Reclamation Water Company; Trout Creek; (to change the point of diversion and place of use of waters of Trout Creek); Irrigation and domestic	2.720	2-14-45
2850	9	1000 and 1807	Pacific Reclamation Water Company; Bishop Creek and Tributaries; Irrigation; entire flow from August 15-April 15 of following years		2-14-45
2851	9	10316	W. W. Whitaker; Ottaway Spring; Stockwatering	0.0047	2-15-45
2852	9	8052	George H. Eldridge; Want Spring; Stockwatering	0.003	3- 5-45
2853	9	10528	Frank Dio Dato; Underground source; (Las Vegas Valley Artesian Basin); Domestic	0.09	3- 8-45
2854	9	11075	Department of Highways, Illipah Spring; General domestic	0.0022	3-22-45
2855	9	10612	United States Indian Service; Underground source (Las Vegas Valley Artesian Basin); Quasi-municipal	0.03	3-23-45
2856	9	11093	Arnold V. Schwartz; Little Cottonwood Creek; Irrigation—In accordance with decree		4- 4-45
2857	9	10635	Richard R. Stadelman; Underground source (Las Vegas Valley Artesian Basin); Quasi-municipal	0.055	4-10-45
2858	9	10608	Murray Wollman; Underground source (Las Vegas Valley Artesian Basin); Irrigation and domestic	0.84	4-10-45
2859	9	10575	E. L. Cord; Underground source (Well No. 1); Irrigation and domestic	0.66	4-17-45
2860	9	10576	E. L. Cord; Underground source (Well No. 2); Irrigation and domestic	0.66	4-17-45
2861	9	10577	E. L. Cord; Underground source (Well No. 3); Irrigation and domestic	0.07	4-17-45
2862	9	10578	E. L. Cord; Underground source (Well No. 4); Irrigation and domestic	0.33	4-17-45
2863	9	10957	F. W. and Edna Brush; Cottonwood Creek; (to change the point of diversion and place of use of waters of Cottonwood Creek); Irrigation	0.7340	4-19-45
2864	9	7674	T. O. McKinnon; Petrified Spring; Stockwatering and domestic	0.019	5- 3-45
2865	9	8508	T. O. McKinnon; Wild Horse Spring; Stockwatering and domestic	0.025	5- 3-45
2866	9	8510	T. O. McKinnon; Gillis Spring; Stockwatering and domestic	0.025	5- 3-45
2867	9	11171	Water Company of Tonopah; Underground; (to change the manner and place of use of waters heretofore appropriated under Permit No. 11003); Commercial and domestic	0.37	5- 3-45
2868	9	11172	Water Company of Tonopah; Underground; (to change the manner and place of use of waters heretofore appropriated under Permit No. 11002); Commercial and domestic	1.2	5- 3-45
2869	9	11100	Thomas M. and Anne M. Metcalf; Underground; (Las Vegas Artesian Basin); Irrigation and domestic	0.05	5- 8-45
2870	9	8490	William Ferguson; Ferguson well; Stockwatering	0.003125	6-21-45
2871	9	10670	Arthur Leon Arnold; Underground; (Las Vegas Artesian Basin); Quasi-municipal	0.2	6-21-45

*Acre-feet per year.

2872	9..11203	Joseph L. Raffetto; Truckee River; (to change the point of diversion and place of use of the water right as evidenced by Claim No. 383 in the Temporary Restraining Order as amended September 6, 1944 by the District Court of the United States in and for the District of Nevada, In Equity, Docket No. A3); Irrigation and domestic.....	140.9*	6-21-45
2873	9..11204	Joseph L. Raffetto; Truckee River; (to change the point of diversion and place of use of a portion of the water right as evidenced by Claim No. 383 in the Temporary Restraining Order as amended September 6, 1944, by the District Court of the United States, in and for the District of Nevada, In Equity, Docket No. A3); Irrigation and domestic	28.1*	6-21-45
2874	9....2990	Jean Etchart Loge; Anderson Springs; Irrigation and domestic.....	2.50	7-20-45
2875	9....9184	Henry Filippini; Underground; Stockwatering.....	0.012	7-24-45
2876	9....9197	Henry Filippini; Underground; Stockwatering.....	0.012	7-24-45
2877	9..10974	Paul Stewart, Cornell Stewart and Dan Stewart; Wild Horse Spring; Stockwatering and domestic	0.0078	7-24-45
2878	9..10678	Sierra Magnesite Co.; Underground; Mining and domestic	0.009	7-26-45
2879	9..10689	United States of America, Forest Service; Unnamed Spring; Domestic and recreational purposes	0.001	7-26-45
2880	9..11072	Fred Bartine; Underground (Bartine Wells No. 2 and 3); Irrigation and domestic.....	0.78	7-26-45
2881	9..10702	Harold J. and Geraldine M. Stocker; Underground (Las Vegas Artesian Basin); Quasi-municipal	0.07	7-27-45
2882	9..10757	Ivan M. Pinjuv; Underground (Las Vegas Artesian Basin); Irrigation and domestic.....	0.01	7-27-45
2883	9..10308	W. W. Whitaker; Lodi Tunnel Springs; Stockwater	0.0234	7-27-45
2884	9..10314	W. W. Whitaker; Jack Spring; Stockwatering.....	0.0234	7-27-45
2885	9..10315	W. W. Whitaker; Marble Falls Canyon Spring; Stockwatering	0.0234	7-27-45
2886	9..10317	W. W. Whitaker; Green Spring; Stockwatering	0.0234	7-27-45
2887	9..10398	W. W. Whitaker; Stookey Spring; Stockwatering	0.0234	7-27-45
2888	9..10399	W. W. Whitaker; Overland Spring; Stockwatering	0.0234	7-27-45
2889	9..10400	W. W. Whitaker; Gabbs Valley Well; Stockwatering	0.0156	7-27-45
2890	9..10682	Fred Bartine; Eureka Creek; Irrigation.....	0.0209	8-29-45
2891	9..11187	Fred Bartine; Eureka Creek; Irrigation.....	0.0492	8-29-45
2892	9..11062	Fallini Brothers and Constant Vener; Black Rock Spring; Stockwatering.....	0.004	8-29-45
2893	9....8838	City of Wells; Underground; Municipal.....	0.557	8-31-45
2894	9..10761	Sebastian Mikulich; Underground (Las Vegas Artesian Basin); Irrigation and domestic.....	0.06	9-14-45
2895	9..10633	Copper Canyon Mining Co.; Copper Canyon Springs; Domestic camp use.....	0.0024	9-15-45
2896*	9..11330	U. S. Department of the Interior, Bureau of Reclamation; Humboldt River (to change place of use of waters heretofore appropriated under Proof 0064); Domestic.....	0.827	9-24-45
2896	9..11330	U. S. Department of the Interior, Bureau of Reclamation; Humboldt River (to change place of use of waters heretofore appropriated under Proof 0064); Irrigation and domestic	0.980	9-24-45
2896	9..11330	U. S. Department of the Interior, Bureau of Reclamation; Humboldt River (to change place of use of waters heretofore appropriated under Proof 0064); Irrigation and domestic	0.821	9-24-45
2896	9..11330	U. S. Department of the Interior, Bureau of Reclamation; Humboldt River (to change place of use of waters heretofore appropriated under Proof 0064); Irrigation and domestic	0.754	9-24-45
2896	9..11330	U. S. Department of the Interior, Bureau of Reclamation; Humboldt River (to change place of use of waters heretofore appropriated under Proof 0064); Irrigation and domestic	0.623	9-24-45

*Acre-feet per year.

*Eleven certificates were issued under Application No. 11330. These certificates are numbered 2896 to 2896-10.

2896....9..11330....U.	S. Department of the Interior, Bureau of Reclamation; Humboldt River (to change place of use of waters heretofore appropriated under Proof 0064); Irrigation and domestic	1.207	9-24-45
2896....9..11330....U.	S. Department of the Interior, Bureau of Reclamation; Humboldt River (to change place of use of waters heretofore appropriated under Proof 0064); Irrigation and domestic	1.207	9-24-45
2896....9..11330....U.	S. Department of the Interior, Bureau of Reclamation; Humboldt River (to change place of use of waters heretofore appropriated under Proof 0064); Irrigation and domestic	0.609	9-24-45
2896....9..11330....U.	S. Department of the Interior, Bureau of Reclamation; Humboldt River (to change place of use of waters heretofore appropriated under Proof 0064); Irrigation and domestic	1.207	9-24-45
2896....9..11330....U.	S. Department of the Interior, Bureau of Reclamation; Humboldt River (to change place of use of waters heretofore appropriated under Proof 0064); Irrigation and domestic	1.207	9-24-45
2896....9..11330....U.	S. Department of the Interior, Bureau of Reclamation; Humboldt River (to change place of use of waters heretofore appropriated under Proof 0064); Irrigation and domestic	1.207	9-24-45
2897....9..10631....	Defense Plant Corporation; Underground; Mining, milling and domestic.....	0.509	9-24-45
2898....9..10632....	Defense Plant Corporation; Underground; Mining, milling and domestic.....	0.50	10-19-45
2899....9..10730....	Defense Plant Corporation; Underground; Mining, milling and domestic.....	0.50	10-19-45
2900....9..10731....	Defense Plant Corporation; Underground; Mining, milling and domestic.....	0.50	10-19-45
2901....9..10732....	Defense Plant Corporation; Underground; Mining, milling and domestic.....	0.50	10-19-45
2902....9..10803....	Defense Plant Corporation; Underground; Mining, milling and domestic.....	0.50	10-19-45
2903....9..10676....	Defense Plant Corporation; Underground; (to change description of point of diversion appropriation under Permit 10525; Mining milling and domestic.....	0.50	10-19-45
2904....9..10562....	Defense Plant Corporation; Underground; Mining, milling and domestic.....	0.5	10-19-45
2905....9..11114....	Defense Plant Corporation; Underground; Plant operation, fire protection and domestic.....	0.50	10-19-45
2906....9..9827....	James R. Lockhead; Underground; Irrigation.....	0.488	10-23-45
2907....9..10673....	Edith B. Ferraro; Cottonwood Creek (to change point of diversion of decreed water rights as set forth under Proof No. 0672A of the Decree); Irrigation	1.69	10-23-45
2908....9..10746....	Consolidated Goldacres Company; Underground; Mining, milling and domestic.....	0.193	10-24-45
2909....9..11037....	Fallini Brothers; Twin Springs Wash; Stockwatering	0.003	10-24-45
2910....9..11049....	Fallini Brothers; Underground; Stockwatering	0.002	10-24-45
2911....9..11052....	Fallini Brothers and Constant Vener; Underground; Stockwatering.....	0.002	10-24-45
2912....9..11061....	Fallini Brothers; Underground; Stockwatering	0.002	10-24-45
2913....9..11250....	Northern Nevada Mining Company; Riley Creek Milling	0.75	10-30-45
2914....9..10606....	United States of America, Forest Service; Unnamed Spring; Domestic.....	0.001	11-19-45
2915....9..11231....	Bell Telephone Company of Nevada; Underground (Las Vegas Artesian Basin); (to change point of diversion of water previously appropriated under Certificate 1858 issued under permit 9243); Irrigation and domestic	0.10	11-20-45
2916....9..10742....	International Smelting & Refining Company; Underground; Mining, milling and domestic	0.1201	11-26-45
2917....9..10745....	Henry Wick; Underground (Las Vegas Artesian Basin); Irrigation and domestic.....	0.05	12-18-45
2918....9..10844....	A. C. Delkin; Underground (Las Vegas Artesian Basin); Manufacturing and domestic.....	0.055	12-18-45
2919....9..9430....	A. G. McBride; Underground; Stockwatering and domestic	0.032	12-26-45
2920....9..9492....	Wm. J. Walker; Watson Spring and waters from Ruth Mine; Irrigation.....	0.0129	1-16-46
2921....9..10433....	Abel & Curtner Livestock Company; Antelope Spring; Stockwatering.....	0.005	2- 5-46

2922	9.11219	E. L. Cord; Underground; Irrigation.....	0.40	3- 4-46
2923	9.11220	E. L. Cord; Underground; Irrigation.....	0.033	3- 4-46
2924	9.11221	E. L. Cord; Underground; Irrigation.....	0.044	3- 4-46
2925	9.11222	E. L. Cord; Underground; Irrigation.....	0.033	3- 4-46
2926	9.11223	E. L. Cord; Underground; Irrigation.....	0.033	3- 4-46
2927	9.11264	E. L. Cord; Leidy Creek (to change point of diversion under Permit 10532); Power and domestic	3.0	3- 4-46
2928	9.11278	E. L. Cord; Leidy Creek (storm flood waters); Irrigation	4.0	3- 4-46
2929	9.8401	I. D. McNett; Sand Springs; Irrigation and domestic	0.06	3-11-46
2930	9.10497	Hotel El Rancho, Inc.; Underground (Las Vegas Artesian Basin); Domestic and Irrigation..	0.15	3-19-46
2931	9.10579	Harry F. and Grace I. Read; Underground (Las Vegas Artesian Basin); Irrigation and domestic	0.14	3-19-46
2932	9.10680	J. R. and Arline Edmonds; Underground; (Las Vegas Artesian Basin); Irrigation and domestic	0.025	3-30-46
2933	9.7527	Roy Thurston; Spring Creek; (to change point of diversion and place of use of waters of Spring Creek); Irrigation and domestic.....	0.33	3- 8-46
2934	9.10623	H. J. Scott, Trustee; Underground; (Las Vegas Artesian Basin); Quasi-municipal.....	0.10	3-11-46
2935	9.8488	Zephyr Cove Properties, Inc.; South Zephyr Cove Creek; (to change place of use of waters appropriated under Permit 7776); Irrigation and domestic.....	0.50	3-11-46
2936	9.11319	Ethel and Harry Frost; Unnamed Creek and tributary springs; Irrigation and domestic..	0.62	4-17-46
2937	9.10983	Melvin Schwake; Carey Creek; (to change point of diversion and place of use of waters of Carey Creek); Irrigation, stockwatering and domestic	0.37	4-25-46
2938	9.11130	Town of North Las Vegas; Underground (Las Vegas Artesian Basin); Municipal.....	0.30	4-26-46
2939	9.9992	Town of North Las Vegas (Unincorporated); Underground (Las Vegas Artesian Basin); Municipal	1.0	4-26-46
2940	9.9727	Town of Mina; Unknown Spring; Municipal....	0.207	4-30-46
2941	9.10063	City of Wells; Underground; Municipal.....	0.557	5-27-46
2942	9.7703	United States of America in trust for Yomba tribe of Shoshone Indians; Upper Antelope Spring; Stockwatering	0.005	6- 5-46
2943	9.7704	United States of America in trust for Yomba tribe of Shoshone Indlans; Lower Antelope Spring; Stockwatering	0.005	6- 5-46
2944	9.11471	C. J. Gasperi; Underground; Stockwatering....	0.0031	6- 8-46

FINANCIAL STATISTICS

CHAPTER XX**Office Finances**

Statement showing receipts and disbursements of State Engineer's office accounts, and statements of disbursements of other accounts controlled by this office for the period July 1, 1944, to June 30, 1946:

STATEMENT OF EXPENDITURES FROM APPROPRIATION FOR SUPPORT OF STATE ENGINEER'S OFFICE FOR THE PERIOD FROM JULY 1, 1944, TO JUNE 30, 1946, INCLUSIVE

Month and Year	Appropriation by Legislature	Office salaries	Travel expense	Office expense	Equipment	Total	Balance
1944							
Balance July 1, 1944.....							\$14,620.76
July.....		\$834.58	\$371.78	\$115.29	\$64.81	\$1,386.46	
August.....		838.14	134.64	40.21	29.75	1,042.74	
September.....		766.26	107.13	81.10	37.70	992.19	
October.....		766.26	126.97	41.61	38.75	993.59	
November.....		766.26	167.63	45.79	54.25	1,033.93	
December.....		766.26	151.82	131.96	14.00	1,064.04	
Totals.....		\$4,757.76	\$1,059.97	\$455.96	\$239.26	\$6,512.95	\$14,620.76
1945							
Balance January 1, 1945.....							\$8,107.81
January.....		\$801.26	\$189.01	\$171.93	\$34.11	\$1,196.31	
February.....		846.76	33.81	268.23	500.00	1,648.80	
March.....		798.48	139.54	139.54		1,093.92*	
April.....		864.01	155.90	81.26	34.30	1,136.06	
May.....		754.76	290.62	82.06	79.55	1,136.99	
June.....		747.01	173.44	376.42	169.14	1,466.01	
Totals.....		\$4,812.28	\$929.27	\$1,119.44	\$817.10	\$7,678.09	\$8,107.81
1946							
Reverted June 30, 1945.....							\$429.72
July.....	\$33,850.00	\$851.00	\$169.06	\$51.20		\$1,071.26	\$33,850.00
August.....		822.26	293.31	80.16		1,354.80	
September.....		867.34	307.18	86.89	\$159.07	1,261.41	
October.....		885.52	164.59	50.18		1,100.29	
November.....		885.52	111.09	165.33		1,161.94	*55.20
December.....		967.88	302.17	150.93		1,420.98	
Totals.....		\$5,279.52	\$1,347.40	\$584.69	\$159.07	\$7,370.68	\$33,905.20
Balance January 1, 1946.....							7,370.68
1946							
January.....		\$855.52	\$229.04	\$90.99		\$1,275.55	*187.20
February.....		885.52	134.58	42.35	\$50.50	1,112.95	
March.....		1,010.52	160.19	290.63	159.31	1,620.65	

April.....	1,185.52	296.05	180.40	1,611.97	*45.00
May.....	902.76	19.88	43.08	1,146.97	*8.50
June.....	937.73	243.59	297.39	1,488.71	
H Totals.....	\$5,827.57	\$1,255.13	\$904.84	\$8,206.80	\$26,775.22
					8,206.80
					\$18,568.42

Balance July 1, 1946.....

*Miscellaneous receipts.

†Appropriation for support of State Engineer's Office not including statutory salary appropriations.

REPORT OF STATE ENGINEER

STATEMENT OF FEES COLLECTED BY THE STATE ENGINEER FROM JULY 1, 1944, TO JUNE 30, 1946, INCLUSIVE

Month and year	Total fees received	Proofs of appropriation	Applications — Publications	Fees	Record-ink permits	Proofs of commencement	Proofs of completion	Proofs of beneficial use	Protests	Clerical	Blue prints	Excess collections	Advance for certificates
1944													
July	\$397.00		\$100.00	\$60.00	\$120.00	\$15.00	\$5.00	\$3.00	\$4.00	\$75.00	\$11.00	\$1.00	\$3.00
August	623.10		225.00	140.00	292.10	10.00	3.00	4.00	5.00	22.00	3.00	.....	9.00
September	510.04		150.00	100.00	130.00	12.00	9.00	1.00	7.00	52.00	43.04	5.00	1.00
October	555.60		187.50	122.50	181.60	7.00	5.00	7.00	4.00	29.00	5.50	2.50	4.00
November	516.00		237.50	162.50	12.00	12.00	11.00	17.00	1.00	41.00	4.00	.....	11.00
December	640.00		225.00	140.00	151.00	22.00	4.00	6.00	11.00	47.00	18.00	2.00	14.00
Totals.....	\$3,241.74		\$1,125.00	\$725.00	\$784.70	\$78.00	\$37.00	\$38.00	\$32.00	\$266.00	\$84.54	\$29.50	\$42.00
1945													
January	\$502.90		\$137.50	\$92.50	\$173.90	\$6.00	\$6.00	\$12.00	\$8.00	\$52.00	\$10.00	\$2.00	\$3.00
February	327.00	\$20.00	137.50	92.50	10.00	8.00	5.00	4.00	6.00	30.00	6.00	.....	8.00
March	331.50	10.00	75.00	50.00	120.50	12.00	10.00	8.00	2.00	28.00	6.00	1.00	5.00
April	576.00		237.50	162.50	60.00	13.00	15.00	8.00	6.00	47.00	20.00	.....	11.00
May	842.35		425.00	255.00	110.35	6.00	3.00	2.00	5.00	19.00	8.00	5.00	3.00
June	519.00		150.00	95.00	150.00	15.00	7.00	5.00	3.00	44.00	22.00	.....	16.00
July	705.00		350.00	215.00	50.00	3.00	4.00	4.00	.....	47.00	13.00	3.00	4.00
August	783.85		287.50	182.50	195.85	5.00	13.00	11.00	3.00	59.00	17.00	.....	18.00
September	549.72		112.50	67.50	230.72	5.00	4.00	23.00	2.00	33.00	4.00	.....	12.00
October	1,012.38	10.00	437.50	267.50	173.00	8.00	4.00	6.00	4.00	73.50	8.88	8.00	3.00
November	954.25		362.50	222.50	311.25	1.00	4.00	4.00	8.00	27.00	10.00	.....	3.00
December	782.10		412.50	247.50	60.10	10.00	7.00	1.00	8.00	26.00	7.00	.....	3.00
Totals.....	\$7,886.05	\$40.00	\$3,125.00	\$1,950.00	\$1,695.67	\$92.00	\$82.00	\$88.00	\$55.00	\$485.50	\$131.88	\$52.00	\$89.00
1946													
January	\$624.25		\$237.50	\$152.50	\$125.00	\$16.00	\$15.00	\$2.00	\$2.00	\$38.00	\$38.00	\$7.25	\$1.00
February	894.50	\$10.00	125.00	75.00	101.00	16.00	8.00	9.00	7.00	38.50	4.00	.....	1.00
March	849.60		350.00	215.00	170.00	11.00	12.00	3.00	5.00	41.10	29.50	2.00	11.00
April	1,015.00		437.50	262.50	235.00	10.00	11.00	2.00	.....	45.00	4.00	.....	8.00
May	685.88		237.50	152.50	130.00	12.00	4.00	6.00	.....	100.00	15.88	25.00	3.00
June	992.00		512.50	312.50	80.00	6.00	6.00	6.00	.....	35.00	15.00	11.00	8.00
Totals.....	\$4,561.23	\$10.00	\$1,900.00	\$1,170.00	\$841.00	\$71.00	\$56.00	\$28.00	\$14.00	\$297.60	\$96.38	\$45.25	\$32.00

STATEMENT OF DISBURSEMENTS FROM STATE ENGINEER'S FUND FOR PERIOD JULY 1, 1944, TO JUNE 30, 1946, INCL.

Month and year	Total disbursements	Publications	Refunds	Recording certificates	Blue prints	Deposited with State Treasurer
1944						
July.....	\$566.50	\$187.50	\$88.50	\$3.00	.....	\$287.50
August.....	660.25	187.50	.....	11.00	74.15	387.60
September.....	508.52	175.00	.....	1.00	.....	332.52
October.....	403.85	.....	40.00	5.00	.....	358.85
November.....	408.00	137.50	.....	5.00	.....	246.50
December.....	493.00	100.00	2.00	1.00	.....	390.00
Totals.....	\$3,040.12	\$787.50	\$149.50	\$26.00	\$74.15	\$2,002.97
1945						
January.....	\$565.90	\$187.50	\$2.00	\$21.00	.....	\$355.40
February.....	381.00	100.00	112.50	10.00	.....	188.50
March.....	380.00	125.00	13.50	4.00	.....	237.50
April.....	450.95	112.50	12.50	8.00	.....	317.95
May.....	532.95	187.50	15.00	6.00	56.10	404.35
June.....	536.50	187.50	25.00	4.00	.....	330.00
July.....	593.00	162.50	90.50	16.00	.....	330.00
August.....	823.82	337.50	6.00	3.00	.....	477.32
September.....	773.72	412.50	.....	14.00	.....	417.22
October.....	776.42	212.50	8.00	16.00	.....	540.42
November.....	812.71	187.50	38.50	16.00	.....	587.71
December.....	787.80	350.00	.....	3.00	64.70	370.10
Totals.....	\$7,526.91	\$2,462.50	\$313.50	\$109.00	\$120.80	\$4,521.11
1946						
January.....	\$597.75	\$225.00	\$7.25	\$1.00	.....	\$364.50
February.....	420.00	162.50	.....	1.00	.....	256.50
March.....	284.83	500.00	2.00	11.00	.....	471.83
April.....	163.00	162.80	25.00	8.00	.....	567.80
May.....	477.84	.....	26.00	1.00	38.40	412.44
June.....	716.00	250.00	10.00	3.00	.....	453.00
Totals.....	\$3,959.44	\$1,300.00	\$70.25	\$25.00	\$38.40	\$2,525.79

**STATEMENT OF RECEIPTS AND DISBURSEMENTS, STATE ENGINEER'S
FUND FROM JULY 1, 1944, TO JUNE 30, 1946, INCLUSIVE**

Balance July 1, 1944.....	\$5,572.72	
Receipts July 1, 1944, to June 30, 1946, inclusive.....	15,689.02	
Checks bearing stale date taken back into account June 29, 1946	114.00	
Disbursements July 1, 1944, to June 30, 1946.....		\$14,526.47
Balance July 1, 1946.....		6,849.27
	<u>\$21,375.74</u>	<u>\$21,375.74</u>
Cash Reconciliation—		
Balance in Carson Branch First National Bank, June 30, 1946.....	\$6,113.27	
Less outstanding checks	514.00	
Revolving Fund		\$5,599.27
Balance July 1, 1946.....		1,250.00
		<u>\$6,849.27</u>

**HUMBOLDT RIVER DISTRIBUTION, STATEMENT OF EXPENSES,
JULY 1, 1944, TO JUNE 30, 1946, INCLUSIVE**

Month and year	Salaries	Administration	Total
<i>1944</i>			
July	\$1,485.30	\$589.18	\$2,074.48
August	1,148.81	436.64	1,585.45
September	1,312.81	341.25	1,654.06
October	903.65	540.75	1,444.40
November	641.40	670.51	1,311.91
December	570.00	543.96	1,113.96
Totals	<u>\$6,061.97</u>	<u>\$3,122.29</u>	<u>\$9,184.25</u>
<i>1945</i>			
January	\$570.00	\$23.90	\$593.90
February	300.00	256.40	556.40
March	300.00	41.46	341.46
April	690.00	317.64	1,007.64
May	952.50	478.70	1,431.20
June	727.50	513.81	1,241.31
July	694.00	381.16	1,075.16
August	860.50	729.51	1,590.01
September	685.50	682.10	1,247.60
October	581.50	629.98	1,211.48
November	345.00	675.17	1,020.17
December	566.50	306.23	872.73
Totals	<u>\$7,273.00</u>	<u>\$4,916.06</u>	<u>\$12,189.06</u>
<i>1946</i>			
January	\$566.50	\$213.59	\$780.09
February	666.50	591.18	1,257.68
March	592.75	90.40	683.15
April	697.50	282.62	980.12
May	1,056.50	1,569.82	2,626.32
June	1,042.50	444.09	1,486.59
Totals	<u>\$4,622.25</u>	<u>\$3,191.70</u>	<u>\$7,813.95</u>

LITTLE HUMBOLDT RIVER DISTRIBUTION, STATEMENT OF EXPENSES FROM JULY 1, 1944, TO JUNE 30, 1946, INCLUSIVE

Month and year	Salaries	Administration	Total
<i>1944</i>			
July	\$294.00	\$209.53	\$503.53
August	231.00	318.47	549.47
September	210.00	76.77	286.77
October	210.00	21.27	231.27
November .....	.....	138.82	138.82
December .....	.....	221.42	221.42
Totals	\$945.00	\$986.28	\$1,931.28
<i>1945</i>			
January .....	.....	\$3.99	\$3.99
February	\$210.00	84.20	294.20
March	105.00	32.98	137.98
April	315.00	54.37	369.37
May	406.00	226.65	632.65
June	427.00	157.40	584.40
July	315.00	211.20	526.20
August	210.00	295.36	505.36
September	210.00	74.00	284.00
October	126.00	94.35	220.35
November	210.00	73.40	283.40
December .....	.....	42.66	42.66
Totals	\$2,534.00	\$1,350.56	\$3,884.56
<i>1946</i>			
January .....	.....	\$116.76	\$116.76
February .....	.....	12.75	12.75
March	\$210.00	298.13	508.13
April	360.00	167.63	527.63
May	547.50	324.01	871.51
June	442.50	340.28	782.78
Totals	\$1,560.00	\$1,259.56	\$2,819.56

MUDDY RIVER DISTRIBUTION, STATEMENT OF EXPENSES JULY 1, 1944, TO JUNE 30, 1946, INCLUSIVE

Month and year	Salaries	Administration	Total
<i>1944</i>			
July	\$70.00	.....	\$70.00
August	70.00	.....	70.00
September	70.00	\$1.40	71.40
October	70.00	.....	70.00
November	40.00	.....	40.00
December	40.00	.....	40.00
Totals	\$360.00	\$1.40	\$361.40
<i>1945</i>			
January	\$40.00	.....	\$40.00
February	40.00	.....	40.00
March	40.00	.....	40.00
April	40.00	.....	40.00
May	40.00	.....	40.00
June	70.00	.....	71.40
July	70.00	\$1.40	70.00
August	35.00	.....	35.00
September	110.00	.....	110.00
October	75.00	.....	75.00
November	75.00	1.50	76.50
December	40.00	.....	40.00
Totals	\$675.00	\$2.90	\$677.90
<i>1946</i>			
January	\$40.00	.....	\$40.00
April	40.00	.....	40.00
May	40.00	.....	40.00
June	70.00	.....	70.00
Totals	\$190.00	.....	\$190.00

**PAHRANAGAT LAKE DISTRIBUTION, STATEMENT OF EXPENSES
FROM JULY 1, 1944, TO JUNE 30, 1946, INCLUSIVE**

Month and year	Salaries	Administration	Total
<i>1944</i>			
July	\$95.00	\$82.95	\$177.95
August	155.00	122.80	277.80
September	140.00	120.05	260.05
Totals	\$390.00	\$325.80	\$715.80
<i>1945</i>			
July	\$142.50	\$114.57	\$257.07
August	247.50	122.55	370.05
September	232.50	29.65	262.15
October	112.50	14.85	127.35
Totals	\$735.00	\$281.62	\$1,016.62
<i>1946</i>			
March		\$16.50	\$16.50
June		10.00	10.00
Totals		\$26.50	\$26.50

**CURRENT AND DUCKWATER DISTRIBUTION, STATEMENT OF
EXPENSES FROM JULY 1, 1944, TO JUNE 30, 1946, INCLUSIVE**

Month and year	Salaries	Administration	Total
<i>1944</i>			
July	\$150.00	\$93.00	\$243.00
August	155.00	96.10	251.10
September	155.00	96.10	251.10
October	150.00	93.00	243.00
Totals	\$610.00	\$378.20	\$988.20
<i>1945</i>			
June	\$225.00	\$80.10	\$305.10
July	225.00	76.60	301.60
August	232.50	76.80	309.30
September	232.50	77.45	309.95
October	225.00	77.65	302.65
Totals	\$1,140.00	\$388.60	\$1,528.60
<i>1946</i>			
January		\$12.30	\$12.30
February		39.30	39.30
April		19.50	19.50
June	217.50	237.93	455.43
Totals	\$217.50	\$309.03	\$526.53

**BAKER AND LEHMAN CREEKS DISTRIBUTION, STATEMENT OF
EXPENSES FROM JULY 1, 1944, TO JUNE 30, 1946, INCLUSIVE**

Month and year	Salaries	Administration	Total
<i>1944</i>			
July	\$45.00		\$45.00
August	75.00		75.00
September	112.50	\$1.50	114.00
Totals	\$232.50	\$1.50	\$234.00
<i>1945</i>			
May	\$37.50		\$37.50
June	75.00	\$1.50	76.50
July	75.00		75.00
August	75.00		75.00
September	110.00		110.00
Totals	\$372.50	\$1.50	\$374.00
<i>1946</i>			
May	\$37.50		\$37.50
June	75.00	10.00	85.00
Totals	\$112.50	\$10.00	\$122.50

**LAS VEGAS ARTESIAN BASIN, STATEMENT OF EXPENSES FROM
JULY 1, 1944, TO JUNE 30, 1946, INCLUSIVE**

Month and year 1944	Salaries	Administration	Total
July	\$275.00	\$93.50	\$368.50
August	250.00	365.65	615.65
September	250.00	60.25	310.25
October	250.00	7.80	257.80
November	250.00	38.69	288.69
December	370.00	39.35	409.35
Totals	\$1,645.00	\$605.24	\$2,250.24
1945			
January	\$270.00	\$10.55	\$280.55
February	250.00	20.35	270.35
March	250.00	14.35	264.35
April	250.00	10.15	260.15
May	1,132.23	60.96	1,193.19
June	250.00	94.26	344.26
July	250.00	34.70	284.70
August	250.00	96.09	346.09
September	250.00	13.15	263.15
October	250.00	12.30	262.30
November	250.00	166.15	416.15
December	250.00	11.50	261.50
Totals	\$3,902.23	\$544.51	\$4,446.74
1946			
January	\$250.00	\$27.30	\$277.30
February	250.00	11.40	261.40
March	281.25	14.23	295.48
April	281.25	13.78	295.03
May	281.25	32.23	313.48
June	281.25	14.88	296.13
Totals	\$1,625.00	\$113.82	\$1,738.82

**PAHRUMP VALLEY ARTESIAN BASIN, STATEMENT OF EXPENSES
FROM JULY 1, 1944, TO JUNE 30, 1946, INCLUSIVE**

Month and year 1944	Administration
April	\$16.50
August	300.00
November	25.28
Totals	\$341.78

**NEVADA, COOPERATIVE UNDERGROUND WATER INVESTIGATION
STATEMENT OF DISBURSEMENTS FROM JULY 1, 1945, TO JUNE
30, 1946, INCLUSIVE.**

Month and year 1946	Salaries	Administration	Total
October	\$706.87	\$150.71	\$857.58
November	183.56	.....	183.56
December	461.66	168.97	630.63
Totals	\$1,352.09	\$319.68	\$1,671.77
January .....	.....	\$6,927.68	\$6,927.68
February .....	.....	31.50	31.50
March	\$287.04	230.61	517.65
April	450.00	189.40	639.40
May	450.00	189.05	639.05
June	501.66	299.28	800.94
Totals	\$1,688.70	\$7,867.52	\$9,556.22

NEVADA COOPERATIVE SNOW SURVEY, STATEMENT OF DISBURSEMENTS FROM JULY 1, 1944, TO JUNE 30, 1946, INCLUSIVE

Month and year	Wages	Administration	Total
<i>1944</i>			
March	\$240.00	.....	\$240.00
April	507.50	.....	507.50
Totals	\$747.50	.....	\$747.50
<i>1945</i>			
February	\$40.00	.....	\$40.00
March	195.00	.....	195.00
April	282.50	.....	282.50
May	182.50	.....	182.50
July	50.00	.....	50.00
Totals	\$750.00	.....	\$750.00
<i>1946</i>			
January	\$63.00	\$124.28	\$187.28
February	137.50	81.68	222.18
March	389.00	75.09	464.09
April	126.00	48.24	174.24
May	587.00	122.25	709.25
June .....	.....	60.00	60.00
Totals	\$1,302.50	\$514.54	\$1,817.04

NEVADA COOPERATIVE STREAM MEASUREMENT, STATEMENT OF DISBURSEMENTS FROM JULY 1, 1944, TO JUNE 30, 1946, INCLUSIVE

Month and year	Salaries
<i>1944</i>	
February	\$499.15
March	355.84
May	150.48
November	419.85
Total	\$1,425.32
<i>1945</i>	
March	\$532.14
April	548.01
December	480.02
Total	\$1,560.17
<i>1946</i>	
March	\$583.43

Edward W. Clark

On Monday, April 15, 1946, the Colorado River Commission of Nevada suffered a great loss in the death of EDWARD W. CLARK, who had been an active member since its creation in 1935.

Ed Clark, as he was affectionately known to everyone, was born in San Jose, California, June 1, 1871. His father was identified with early mining on the Comstock Lode but met with financial reverses, and died while Ed was an infant. The widowed mother located at Pioche, Nevada, where she conducted a small hotel for miners. Ed received his early education at her knees and in the elementary school of Pioche until at the age of seventeen he engaged in range cattle raising for himself, and for several years operated a ranch at Wilson Creek.

Possessed of an unusually winning personality, high ideals, fearless and unswerving honesty, natural business ability, his friendships spread throughout a steadily increasing circle of able and influential men, but he never lost touch or wavered in his love for the common people. The history of his life is replete with interesting adventures of pioneer days, and constitutes a bright and entertaining chapter of the development of Nevada. I shall not attempt to record here his outstanding achievements and the various honors that had been conferred upon him, visualizing the bright smile with which he would forbid it. Business, political and religious honors came to him unsought; and in his good deeds and charities, which were endless, he inflexibly followed the sublime rule set down by the great teacher, Jesus Christ, in the Sermon on the Mount.

The newspapers throughout Nevada, and Senators, Congressmen, and Governors representing Western States lament his passing and have paid tribute to his memory. Nevada has lost a great citizen. Those of us on the Colorado River Commission who were given the privilege of working with him through long years have also lost an inspiring association and a precious friend.

ALFRED MERRITT SMITH.



EDWARD W. CLARK
1871-1946

COLORADO RIVER COMMISSION OF NEVADA
Report for the Period July 1, 1944, to May 31, 1946, Inclusive

STATUS JUNE 1, 1946

Governor Vail Pittman, Chairman.

Governor Pittman succeeded Governor E. P. Carville on July 24, 1945, upon the elevation of Governor Carville to the United States Senate.

Alfred Merritt Smith, Secretary.

Member since original appointment by Governor Richard Kirman, April 19, 1935; Secretary by successive reelections. Reappointed to two-year term by Governor Pittman, term expires May 9, 1948.

Charles A. Thompson.

Appointed by Governor E. P. Carville December 23, 1943, to succeed C. A. DeArmond, deceased. Reappointed by Governor Pittman, May 9, 1946, term expires May 9, 1948.

A. E. Cahlan.

Appointed May 4, 1946, by Governor Pittman to succeed Edward W. Clark, deceased. Term expires July 24, 1949.

John V. Mueller.

Appointed May 4, 1946, by Governor Pittman to succeed A. J. Caton, resigned. Term expires July 24, 1949.

INTRODUCTION

The proceedings of the Colorado River Commission have been published as a part of the Biennial Report of the State Engineer, since the year 1935. This has been done partly as a matter of convenience to the Secretary of the Commission, as well as for economy, for the cost is less than publication would be in separately bound reports. The Biennial Reports of the State Engineer receive wide distribution and thereby the records of the work of the commission have been made more generally available to the public.

The principal acts of the commission for the past two years are here recorded, as taken from the minutes of meetings and correspondence in the files and compiled by the secretary.

ACKNOWLEDGMENTS

The history of the Colorado River Commission, since its revamping by the Legislature of 1935, has been a record of continuous work which has been greatly facilitated by various willing and able State officers. Throughout the administration of Governor Richard Kirman, Governor E. P. Carville, and into the present term of Governor Vail Pittman, these State chief executives have spared no effort within their power to increase the use of Colorado River water and Boulder Dam power for the welfare of the State.

It was under the leadership of Senator E. P. Carville, who while Governor of Nevada, was the chairman from 1943 to July 24, 1945, that the best results have been accomplished. The legal and judicial experience of Governor Carville made his participation in conferences held in Washington and also in various western cities, of great value. Controversial questions lost their sinister significance under his calmly impartial and judicial treatment, for in him reposed the friendship and trust of the many engineers, attorneys, and officials. Passing time has but strengthened the opinion of the members of the commission, voiced four years ago, that his contribution to this work was one of the greatest services ever performed for the State by a Governor of Nevada.

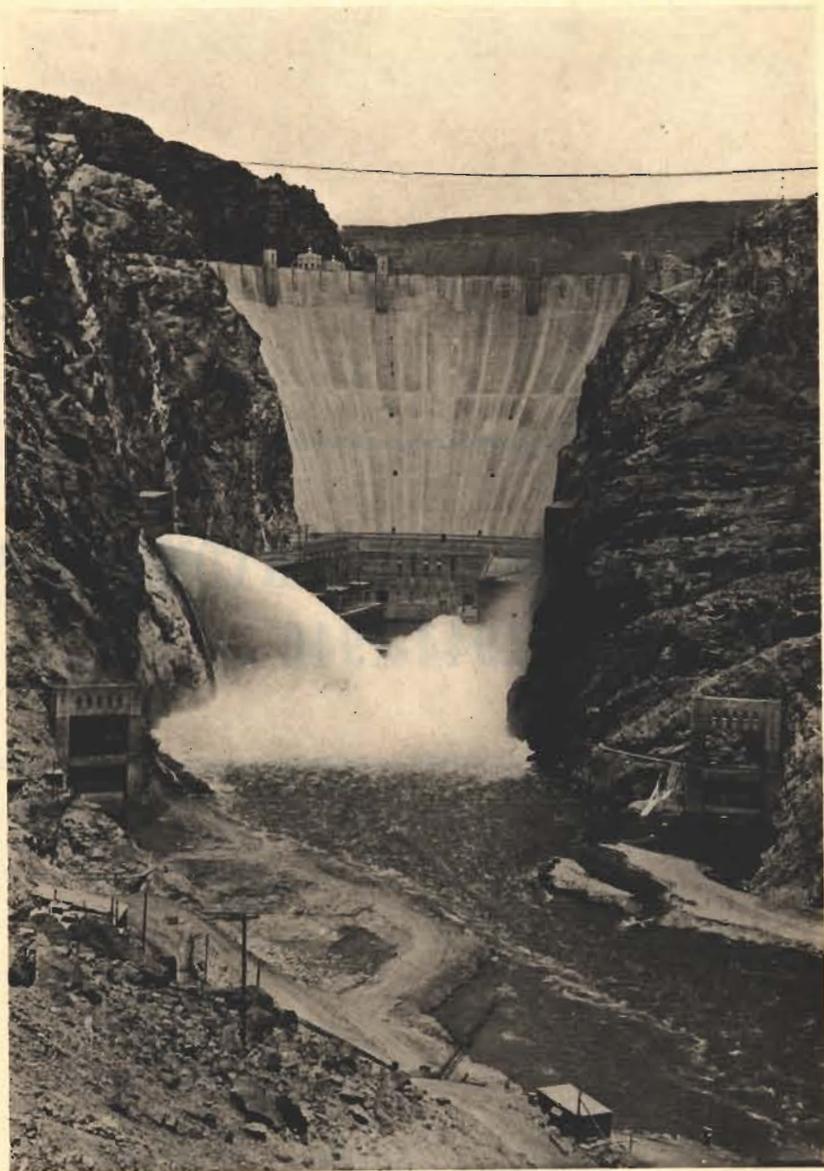
Since assuming executive leadership as successor to Governor Carville, Governor Vail Pittman has vigorously taken up the work and leaves nothing undone to make the most of our heritage in the Colorado River. His open conferences with representatives of labor, with city, county, and State officers, and with representatives of all forms of business in southern Nevada are a new approach to problems discussed in this report, and manifest his great interest.

Since our last report Senator James G. Scrugham, a loyal friend of the commission and staunch supporter of southern Nevada throughout many effective official years, has departed into the great unknown. We mourn his passing. He was our able advisor and helper, and his wide engineering and political experience made his service invaluable. His name will go down the years as one of the great men of the State. Together with the late Senator Key Pittman, he labored unceasingly on the Boulder Dam Project, first in the early years for its construction, and later on for definite revenue, lower energy rates and better regulations for Nevada.

Senator Pat McCarran deserves strong praise for his interest in the southern Nevada power situation. At the time of the passage of the Boulder Canyon Project Adjustment Act in 1940, his work in overcoming the opposition of eastern senators was most effective. He has frequently been called upon by the commission for advice and help, which has never been found lacking.

Future histories of Nevada should include a chapter devoted to the conception and development of the great Boulder Dam Project. A number of prominent Nevada men were leaders in the work from the beginning. Some of them freely spent their own time and money in helping to get the project underway. Among these were Edward W. Clark, Charles Squires, Key Pittman, Emmet D. Boyle, and James G. Scrugham, whose unstinted services to the State should be remembered forever. Several other public officers, among them George W. Malone, Cecil W. Creel, and John Fulton performed most valuable work in Washington for the authorization of the project and also for a share in the Boulder Project income for Nevada.

ALFRED MERRITT SMITH, *Secretary.*



BOULDER DAM

REPORT COLORADO RIVER COMMISSION
1944-1946

ROCKWELL REPORT

On June 27, 1944, the commission received from E. W. Rockwell, Electrical Engineer, a report he had been requested by the secretary to make upon future uses of power in Nevada from Boulder Dam plant. Shortly after the death of Resident Engineer C. F. DeArmond, which occurred on December 2, 1943, Mr. Rockwell had been employed by the commission for a period of three months to temporarily serve as Las Vegas Resident Engineer and study the power problems. In effect, he had been loaned to Nevada by the Metropolitan Water District of Southern California to which company he was obligated to return. The commission was fortunate in securing at that time the services of an efficient and experienced engineer who was thoroughly familiar with Boulder Dam project problems by reason of long service with the large Metropolitan Water District, which includes 12 cities in southern California, several of which receive a portion of their water from the Colorado River aqueduct.

In his report Mr. Rockwell dwells upon the large amount of energy used in Nevada at that time, which included service to the large BMI magnesium plant, totaling 1,500 million kilowatt-hours per year, or twice Nevada's entire Boulder Dam plant allocation. However, at that time all of Nevada users combined from Boulder, apart from the BMI war-time users, consumed only slightly more than 100 million kw-hrs per year. An energy curtailment of 40% was forecast at the end of the war by Rockwell, but it proved to be much greater, and before the war ended the War Production Board shut down the entire \$140,000,000 magnesium plant. This shut-down necessitated major readjustments in power use and distribution among all the Boulder plant allottees and left Nevada with only about her original 100 million kilowatt-hours in use. Since the Rockwell report was issued, the entire power picture has changed, and parts of the report may soon be considered out of date, or subject to revision. The report nevertheless contains information of much present value, and copies of it are available for consultation in the office of the Resident Engineer at Las Vegas, and in the office of the State Engineer at Carson City.

Mr. Rockwell's report contains sections covering the future physical developments of transmission systems, generator and transformer installations and hook-ups, stand-by studies, and an analysis of the "Property Rendered Idle" provision in the Boulder Project Act.

POWER FOR THE "ARIZONA STRIP"

On June 13, 1944, the commission was informed that people living in the town of Littlefield in what is locally known as the "Arizona Strip," an area in the NW corner of Arizona between the States of Nevada and Utah and east of the town of Mesquite, Nevada, desired electric service from Boulder Dam power plant by connection with the transmission line of Overton Power District No. 5, which extends easterly to Mesquite from a connection with Lincoln County Power District's 69 kv transmission line to Pioche.

Although the commission felt that this was primarily Arizona's problem, the secretary was instructed to write a letter to the Colorado River Commission of Arizona on June 13, 1944, stating that Nevada was willing to assist Arizona in any way possible, providing the matter was fully presented by Arizona to the Nevada Commission for examination.

On July 12, 1944, the commission received a letter from M. J. Dougherty, Chairman of the newly organized Arizona Power Authority, stating that he had conferred with the officers of the Littlefield Electric Cooperative at Littlefield, Arizona, which had been assured by Roland M. Gaver, Field Representative of the Rural Electrification Administration, that REA would assist Littlefield in working out its problem, and if necessary, make a loan to finance construction.

The officers of the Littlefield Cooperative had informed the Arizona Power Authority at Phoenix that they were negotiating with Overton Power District No. 5 for a connection at Mesquite and anticipated obtaining an REA loan which would enable them to construct the connecting line to Littlefield and vicinity. However, the legal steps necessary for Arizona to obtain electric energy from Boulder Dam plant had not been taken.

Under the laws of the State of Nevada, the Boulder Contracts and the Boulder Canyon Project Act, Nevada cannot sell any of its energy outside the State. Arizona at that time (and to this date) has no withdrawal of energy from Boulder. It would be necessary for the Littlefield Cooperative to negotiate with the Bureau of Reclamation for energy, either from the State of Arizona's rights or from Metropolitan District's unused energy, as a preliminary step.

E. A. Moritz, Regional Director of the Bureau of Reclamation at Boulder City, informed Littlefield that there was no MWD unused at that time, and that the State of Arizona had entered no withdrawal requests for energy.

The commission was interested in the means of transmission of energy to Littlefield, as it was presumed that area would desire to use the transmission facilities of the Lincoln and Overton Districts in Nevada.

The advisability of transmission of energy over the Lincoln or Overton lines by Nevada to supply an out-of-State agency was questioned by the commission and also by the Lincoln and Overton Power Districts, in that such procedure might lead to an assessment of taxes against these districts if used to transmit power outside their respective districts. Under Nevada law these districts are classified as municipalities and are now tax exempt.

Under dates of February 23, 1945, and August 3, 1945, Alan Bible, Attorney General of Nevada, gave opinion that Lincoln and Overton Districts would be subject to tax liability should they act as transmission agents for power going outside the State of Nevada, or outside their respective districts.

T. J. O'Reilly, Legal Counsel of the Rural Electric Administration differed with the opinion of the Attorney General in that he felt there would be no liability of taxation incurred by these districts transmitting power to the Littlefield Cooperative.

By letter dated August 14, 1945, J. A. Buehler, Chairman of the Lincoln County Power District suggested to the Littlefield directors that their attorneys get this before the Supreme Court of Nevada for a decision. On August 29, O'Reilly wrote Buehler asking if any further action had been taken by the Lincoln District. Buehler replied on September 5 in part as follows:

"We do not recognize that any benefits will accrue to our District by serving out-of-State customers; therefore, further legal negotiations, to determine the tax exemption status, including all costs therewith, now remain the responsibility of the Littlefield Cooperative Power District, the Overton Power District No. 5, or the Rural Electrification Administration."

On September 7 Attorney General Alan Bible gave a further opinion that a tax assessment might be levied on tangible property of the district if the property is used for other than Nevada district business.

Following this opinion, Buehler wrote O'Reilly, outlining the three points in issue, as follows:

"(1) Lincoln County Power District No. 1 will be pleased to enter into a contract with the proper authorities for the transmission of electrical energy over its main line from Boulder Dam to Sheep Mountain Junction, for the Littlefield Cooperative, after

the Supreme Court of Nevada hands down a decision as to the tax status of facilities used in serving Littlefield, provided, however, that the decision does in no manner jeopardize the tax exempt status of the district.

(2) Lincoln County Power District No. 1 offers no objection to the REA or the Littlefield Cooperative requesting an opinion of the Attorney General in the name of this district; however, the attached letter is virtually the opinion of the Attorney General. Therefore, nothing more explicit can be expected from his office. It is our opinion that nothing short of a Supreme Court decision will be conclusive.

(3) We also have no objection to declaratory judgment proceedings being brought in the name of this district. However, since the service to be rendered Littlefield will be primarily by Overton Power District No. 5, we suggest that such proceedings be filed in the name of the Overton Power District. Both the Overton District and the Littlefield Cooperative are and will be serving principally an agriculture area, and their influence in the case of marginal evidence and justifiable decision may result in a more lenient attitude of the court. Any decision, with respect to Nevada power districts would clarify our tax exempt status in the matter, as well as that of Overton."

On April 27, 1946, Buehler stated by letter:

"There is no change in the status of this matter, and we are adamant in our stand that we will not serve the Littlefield Cooperative over our facilities or those of Overton Power District No. 5, until a declaratory judgment freeing our district and Overton Power District of any tax liability whatsoever has been handed down. We believe this fact and our stand in the matter are clear to all concerned, and we certainly trust that none of the interested parties is in violation of this position. To our knowledge, Littlefield is not obtaining service. This is in reply to your last question.

Your Engineer (A. J. Shaver) made a trip to Littlefield on August 10, 1945, and went over the situation with Mr. Blasi and Mr. Frehner of the Littlefield Cooperative, and found at that time that they had entered into a contract for the construction of the lines and facilities; and at this writing I am led to believe the facilities are installed and awaiting service.

The commission and the districts are now awaiting action by the attorneys for the Cooperative and the REA in securing an opinion from the Supreme Court of the State of Nevada."

SURETY BOND OF SOUTHERN NEVADA POWER COMPANY INCREASED

At a meeting of the commission held in Carson City on July 19, 1944, the commission brought up for consideration the possibility that the surety bonds on deposit with the commission by both Southern Nevada Power Company and Lincoln Power District No. 5 might not be adequate to provide the protection to the State which is required by law. At a former meeting the secretary had been asked to supply figures as to what the obligation of present contractors to the State for energy amounts to, for study by the commission. The figures were submitted as requested and were discussed. It was indicated that the bond of Southern Nevada Power Company in the sum of \$15,000 should be doubled, but it was the considered opinion of the commission that the splendid financial and business standing of Southern Nevada Power Company, its large assets and public utility responsibilities greatly minimized any risk by the State on its power contract if, indeed, there was any risk at all, but in order to meet the requirements of the State law it was agreed that the bond should be sufficient to protect the State for 90 days in case of default by the company. The commission, therefore, voted to increase the bond of Southern Nevada Power Company to \$40,000. The bond of Lincoln County Power District No. 5 in the amount of \$25,400, was deemed adequate for their contract and was not increased. The bond of Overton Power District fixed at \$1,000 in 1938, was also considered proper for that district and was not increased.

CONFERENCES REGARDING STAND-BY SERVICE

A delegation from the Los Angeles Department of Water and Power met and conferred with the Commission at Carson City on July 19, 1944, regarding stand-by power and additional generating capacity for Nevada. The group from Los Angeles consisted of:

- E. F. Scattergood, Advisory Engineer.
- A. E. Chandler, Special Consultant.
- H. A. Van Norman, General Manager and Chief Engineer.
- A. R. Arledge, Staff Engineer.
- C. G. Garman, Assistant Chief Electrical Engineer.
- J. H. Mathews, Attorney.

Mr. Scattergood referred to a proposed contract for stand-by service to Nevada, which was described and discussed in our last Biennial Report, and said it was the desire of the City to

have it executed by the State of Nevada, and he urged that action be taken without further delay.

Mr. Scattergood reviewed the history of Nevada's present contract with the City for generating capacity, stating that when it had been worked out and agreed to in Washington, D. C. in 1941, it had been done under much pressure in order to be completed by May 31, for otherwise the Boulder Canyon Adjustment Act would have been lost by default. At that time it was understood by Harold Ickes, Secretary of the Interior, that a special supplemental agreement regarding generating capacity and stand-by provisions and the costs of same would be worked out between the City and Nevada later. Since then agreement had been reached on some points, but the matter of stand-by power supply for Nevada by the City had not been agreed upon.

Mr. Scattergood stated that there was no provision in the "General Regulations" as to stand-by service of generating capacity for Nevada and that is what Los Angeles was endeavoring to work out with Nevada. The present contract provided that Nevada is entitled to electrical energy from Section G-3 (Generator Units A-1 and A-2) up to but not exceeding a combined total of 44,000 kilowatts. Every year one of the units in Section G-3 must be out of service two or three weeks for maintenance purposes. During such idle periods the capacity of G-3 (generator Units A-1 and A-2) would be cut in half and leave both Nevada and Los Angeles without sufficient supply. He stated there is necessity for making provisions with respect to stand-by which would be as uniform as possible over the year. Stand-by can be provided from excess capacity in the power plant under normal reservoir heads at small cost, but if there is a shortage of water the stand-by will have to be provided by steam power in Los Angeles or elsewhere and will cost more than Boulder energy. He said the City proposes in the new agreement that the fixed charges be based on the generating capacity basis or kilowatts, while the operation and maintenance charges will be on a kilowatt-hour consumption basis. It was said that the City had designed transmission lines on the basis of 65,000 kilowatts per generator, or four units per line. In case of low head at the reservoir, each generator would produce only 65,000 kilowatts of energy and there would be no stand-by capacity. When the reservoir head is high the generators would have an output of more kilowatt-hours which could be drawn upon for stand-by. He said that the reservoir was being drawn upon to the limit and the City's stand-by was practically all in Los Angeles steam plants, and that the City

was operating under conditions which were not satisfactory. Mr. Scattergood and the City representatives present referred to the existing arrangement whereby Nevada paid for the generating costs of only that part of the 44,000 kilowatts used out of the capacity Nevada has a right to in Section G-3. The State paid for only what it used of its total contracted capacity, and the City absorbed and made use of the State's unused surplus. Scattergood stated that the City had taken the responsibility for that portion of the 44,000 kilowatts which Nevada did not use, but it would be made available to Nevada whenever she wanted it. He said Nevada should pay on the basis of the kilowatts she is using at the present time, which is on a 65,000 kilowatt rating. He stated that if the dam had went down to 420 feet and our proportionate part of the capacity of the generators went down to 35,000 kilowatts instead of 44,000 (which is our total portion) we would have to get additional power from elsewhere for regular use, in addition to as yet unprovided stand-by. He stated that the situation was unfair to the City, and some better basis of understanding should be reached.

The commission again reviewed the proposed new contract for stand-by and additional generating capacity in executive session after the Los Angeles delegation had departed, and decided that Nevada should continue to maintain its position that the proposed contract was not fair to Nevada and that generator capacity should be based on the average instead of a minimum at lowest reservoir head, and that in case of an emergency as to stand-by, the Secretary of the Interior would rule that Nevada be supplied out of surplus energy within the plant, subject to later adjustment by arbitration. The commission was also unanimous in the opinion that while the World War was in progress the entire Boulder Dam power situation was in a state of uncertainty, or flux, and it would be inadvisable to enter into any new long-term contracts as to generating capacity or for stand-by service until after the end of the war.

THE MEXICAN TREATY

The semiofficial "Committee of Fourteen" which is composed of two delegates from each of the seven Colorado River Basin States who are appointed by their respective Governors to deal with Colorado River problems had, with the exception of Nevada and California, voted to approve a treaty for annual firm delivery of 1,500,000 acre-feet of water to the Republic of Mexico, according to terms prepared and submitted by the U. S. Department of

State. Nevada and California had insisted that this was double the volume of water to which Mexico was entitled and if delivered would result in shortages damaging to the United States during periods of drought, especially after a more complete development of the river in years to come.

On the afternoon of July 19, 1944, a delegation from California, consisting of Assistant Attorney General Arvin B. Shaw, Jr.; Lewis Hauser, Executive Secretary of the Colorado River Board of California, and H. A. Van Norman, A. E. Chandler, and E. F. Scattergood representing the City of Los Angeles, Department of Water and Power, appeared before the Colorado River Commission of Nevada to discuss the advisability of joining forces in opposition to the proposed treaty. After hearing the visitors the commission took the matter under advisement.

Further discussions held at a later date between Governor Carville and Governor Warren of California and members of the commission led to a decision to call a meeting of all western water organizations opposed to the treaty, to be held in Las Vegas, Nevada, on January 12 and 13, 1945.

At the Las Vegas conference about 100 interested persons appeared, and the following water and power users organizations were officially represented:

- Colorado River Commission of Nevada.
- Metropolitan Water District of Salt Lake City, Utah.
- Provo Water Users Association, Utah.
- Hurricane Canal Company, Utah.
- Utah Water Storage Commission.
- Virgin River Water Users Association, Utah.
- Bench Lake Irrigation Co., Hurricane, Utah.
- Utah Water Resources Division.
- St. George and Washington Land Co., Utah.
- LaVerkin Canal Co., Utah.
- Southwestern Water Conservation District, Durango, Colo.
- LaPlata Water Conservation District, Durango, Colo.
- Green River Development Co., Cora, Wyoming.
- Big Horn River Water Users Association, Wyoming.
- Yellowstone Basin Association, Wyoming.
- Wyoming State Farm Bureau.
- Nevada State Farm Bureau.
- Imperial Irrigation District, El Centro, Calif.
- Colorado River Board of California.
- Metropolitan Water District of Southern California.
- Verde Tunnel Reclamation District, Arizona.

Salt River Valley Water Users Association, Arizona.
Gila Valley Irrigation District, Safford, Arizona.
San Carlos Irrigation and Drainage District, Coolidge, Arizona.
Central Arizona Light & Power Co., Phoenix, Arizona.

The conference strongly condemned the proposed treaty with Mexico, and set up a permanent organization to be known as the Colorado River Water Users Association.

A second annual meeting of the new association was convened in Salt Lake City, Utah, on February 11, 12, and 13, 1946, and was equally well attended. Various features of the Colorado River Basin situation were discussed and are recorded in the printed transcript of proceedings issued by that association.

After extended hearings before the Committee of Foreign Relations at Washington, D. C., the treaty had been ratified by the Senate on April 18, 1945. Representatives of Nevada, California, and many water users organizations in the other Colorado River Basin States had appeared before the committee in opposition to endorsement, but under the leadership of Senator Tom Connelly, Chairman of the Foreign Relations Committee, whose native State of Texas secured valuable water rights from the Rio Grande and tributaries in Mexico under the treaty, its ratification was recommended by the committee. On the Colorado River the water users deemed themselves penalized by an excessive allocation to Mexico, and the opinion that a deal had been made exchanging Rio Grande water for Colorado River water was freely expressed by opponents of the treaty.

The work of the opposition, led by California and Nevada, resulted in the adoption by the Senate of several reservations relating to the administration of the treaty, and delivery of water on the Colorado, but the reservations, while beneficial, do not alter the fixed delivery of a minimum of 1,300,000 acre-feet of Colorado River water to Mexico according to a prescribed schedule each year, regardless of any variation in run-off and water supply, excepting only "extraordinary drought." The treaty was ratified in Mexico in September 1945.

A majority of Colorado River water users, represented by organizations, who remain convinced that their rights in the water have been overridden, are not contented to let the treaty matter rest. These irrigation interests believe that fulfillment of the provisions of the treaty will ultimately impair the ability of the United States to provide water within its own borders for lands entitled to water from the river and will also impair the ability of the United States to fulfill its present outstanding water

contracts. At the second Colorado River Water Users Association meeting at Salt Lake City on February 13, 1946, a resolution calling for further work in the matter was adopted with but one dissenting vote, and it should be mentioned that the dissenter objected solely on the ground that the resolution was not strong enough in dealing with such a "vicious" treaty. The Resolution follows:

8. WHEREAS, Grave question exists as to the constitutionality of the treaty between the United States of America and the United Mexican States, signed at Washington February 3, 1944, and other serious questions exist as to the effect of the carrying out of said treaty, if constitutional, upon the contracts executed by the United States of America with States and State agencies in the Colorado River Basin for water and power and upon the rights of water users in said basin; now, therefore, be it

Resolved, That a committee of attorneys, one to be appointed by the directors from each State, proceed to study and investigate:

1. The said constitutional question;
2. The said questions relating to contracts and water rights; and
3. The procedure which should be adopted by the Congress, the Department of State and the American Commissioner, International Boundary and Water Commission, United States and Mexico relative to the carrying out of the treaty and in particular among other things the procedure for authorization of construction of projects under said treaty and the conditions under which said American Commissioner shall exercise the power to determine that water of the Colorado River in excess of 1,500,000 acre-feet a year should be delivered to Mexico.

ENERGY RELINQUISHMENTS AND WITHDRAWALS

Southern Nevada Power Company on September 8, 1944, requested the commission's permission to relinquish 23,000,000 kilowatt-hours of electric energy annually with a maximum demand of 3,730 horsepower, and on September 9, 1944, requested permission to release an additional quantity of 7,000,000 kilowatt-hours with a maximum demand of 2,778 horsepower. Both allotments were a part of the energy being supplied this company under the terms of its contract with the State dated October 10, 1941.

At a meeting of the commission at Carson City, Nevada, September 15, 1944, the relinquishments were approved.

On December 18, 1944, Southern Nevada Power Company requested a further relinquishment of 17,000,000 kilowatt-hours with a maximum demand of 2,000 horsepower, which was granted by the commission subject to the terms of the General Regulations. The relinquishments were requested in anticipation of a

falling off of demand due to closing down the BMI magnesium plant.

The load of Southern Nevada Power Company did not decrease as anticipated, and more energy became necessary to supply the Las Vegas area, so Southern Nevada Power Company has asked that its relinquishment of 17,000,000 kilowatt-hours be cancelled or postponed and had requested an additional withdrawal of 17,000,000 kw-hrs.

On June 1, 1946, Overton Power District Withdrawal No. 13, made on November 8, 1945, for 500,000 kilowatt-hours at 125 horsepower demand additional energy per year, will become effective.

In reviewing relinquishment No. 5 and withdrawal No. 14, the City and the Edison Company have both raised the question as to whether the maximum demand in horsepower to be stated in each relinquishment or withdrawal should be related to the quantity of energy taken under such particular notice. In other words, should each notice stand on its own feet and be considered entirely independent of prior notices? We find one line of thought that each notice bears a relationship to prior notices and to the total energy withdrawn in all notices, in that the total cannot exceed the 44,000 kw to which capacity Nevada is entitled under the contract for Boulder power at present. Inasmuch as the regulations require that relinquishment notices must refer to a particular or specific notice of withdrawal, it seems that each notice does have a definite relationship to prior notices.

The other thought is that the affected allottees are primarily interested in the energy involved and the generating capacity which will be required to produce the net energy withdrawn by the State.

It is quite conceivable also that the State through its contractors may seek to use more energy through improvement of the load factor, and not necessarily create a higher demand on the system. In this case, it would be within the realm of possibility to ask for energy withdrawal and not be able to state a horsepower demand which would accompany or determine the prescribed number of kilowatt-hours, even at 100% load factor.

These questions to date have not been settled, and we look forward to an interpretation by the Secretary of the Interior on his findings.

It will be recalled also that the first four withdrawal notices by the State of Nevada did not state a horsepower requirement, as these withdrawals were made prior to the signing of the agreement and contract for Nevada's power from Boulder; and before

a final determination can be made of the total withdrawal demands to date some determination must be made of the horsepower demands to accompany these first four withdrawals, so that the total withdrawal horsepower demands listed will not or cannot exceed the actual demand on the system as registered by meters. This will also be necessary so that the State and the allottees may know when the State is approaching its total of capacity allotment in section G-3 at Boulder.

APPLICATION FOR DAVIS DAM POWER

On September 2, 1944, the commission learned that no State financial obligation would result from filing an application with the Bureau of Reclamation for power from Davis Dam, yet to be constructed, or by filing applications for energy from any other proposed dam to be built by the Bureau of Reclamation on the Colorado River. On September 15, 1944, the secretary was instructed by the commission to file a blanket application in order to establish priority at Davis Dam, which he did by letter dated September 15, 1944, which was acknowledged by the Bureau by letter, as follows:

Boulder City, Nevada, September 25, 1944.

DEAR MR. SMITH: I have your letter of September 15, 1944, in which the State of Nevada, through its Colorado River Commission, made a request for an allocation of electric energy from any of the dams proposed to be constructed on the Colorado River within economic transmission range of points in the State of Nevada.

The Bureau is interested in receiving all possible applications for power at this time so that it may study the economical problems involved in delivering power to your region. Your request will be considered as a formal application for power to meet the requirements of the State.

Yours very truly,

E. A. MORITZ, *Regional Director.*

At a meeting of the Commission in Reno on January 30, 1946, it was decided to request a definite quantity of energy and generating capacity from Davis Dam, and the secretary was asked to request 45,000 kilowatts of generating capacity (which equals one of the units to be installed), and for energy in approximately the amount of 200,000,000 kilowatt-hours per year. The secretary accordingly addressed the following letter to the Bureau:

January 31, 1946.

E. A. MORITZ, *Director, Region No. III, U. S. Bureau of Reclamation, Boulder City, Nevada.*

DEAR MR. MORITZ: This letter is supplementary to our letter to you of September 18, 1944, to which you replied on September 25, 1944.

Nevada intends to apply to the Bureau of Reclamation for electric energy from Davis Dam in the amount of approximately 45,000 kilowatts at a load factor of 50% or about 200,000,000 kilowatt-hours annually.

The Colorado River Commission of Nevada in a meeting at Reno, Nevada, on January 30, 1946, stated it would like to have information as to probable rate, where the point of delivery will be, and such other information as may be available now bearing upon the intended application.

Very truly yours,
COLORADO RIVER COMMISSION OF NEVADA,
By ALFRED MERRITT SMITH, *Secretary*.

In an informal conference with Mr. Moritz at Boulder City on February 18, 1946, Mr. Moritz stated that Nevada's application established the State's priority over private agencies, and by letter he acknowledged the request of the State, stating that our questions concerning the Davis withdrawal could be discussed at a meeting called by him on March 8, at which all power allottees from Boulder Dam plant would be present at Boulder City to go over related problems.

The commission was of the opinion that securing generating capacity at Davis Dam will be beneficial, for although Davis energy may cost more than energy does at Boulder, Davis energy would be free from the restrictive withdrawal regulations which hamper our use of Boulder Dam power. It is thought that no special legislative Act will be necessary to secure this capacity at Davis for it will be allotted to the State by the Bureau of Reclamation and be paid for by the State out of proceeds from the energy as it is sold. The installation of a generator at Boulder Dam, on the other hand, requires a firm contract between the State and the Bureau of Reclamation setting up fixed annual payments, and as such cannot be made without special authority from the Legislature unless suitable contracts for sale of energy assure the payments. The Constitution of Nevada provides that no agency may financially obligate the State excepting by legislative Act.

PROPOSED BOULDER POWER FOR EUREKA NEVADA

During 1940 diamond drilling was begun on the Richmond-Eureka gold-silver-lead mining properties at Eureka, Nevada, and was continued through 1944, disclosing large extensions of good ore bodies at depths which had been worked in the upper levels in past years. Checks on the new ore development were made by the U. S. Bureau of Mines and the Nevada State Bureau

of Mines, and have indicated a long future life for the mines and district.

The Eureka Corporation, Ltd., which is in control of this property has represented to the commission that its power requirements would be 5,000 hp, and stated it was interested in securing Boulder power. A resumption of mining on this property would stimulate additional use of energy throughout the Eureka district.

It was thought that the present transmission line between Boulder Dam and Pioche might be extended from Pioche to Ely, and thence to Eureka. There is a large power demand at Ely and the adjacent towns which is now supplied by a local company which buys energy from Kennecott Copper Corporation's smelter steam power plant for retail distribution. The waste heat of the smelter is used to operate steam boilers and a 25,000 kilowatt power plant which furnishes energy to the smelters, turoblowers, compressors, etc., while the surplus goes to the several neighboring towns, McGill, Ruth, Ely and Kimberly by service of Ely Light & Power Co.

Reports made to the Nevada Public Service Commission by Kennecott Copper Corporation indicate a yearly output of about 121,000,000 kilowatt-hours per year at a cost of \$838,300, exclusive of taxes and insurance which were not reported. The figures are for the year of 1943. The figures indicate a production cost of 6.9 mills per kilowatt-hour, but the other unreported costs could make it as much as 7.5 mills. The sale of surplus energy to Ely Light & Power Company amounting to about 2,500,000 kilowatt-hours per year absorbs some of the production cost. Kennecott has been but little interested in Boulder power, although it could be delivered at a lower rate than their present production cost. Without support by Kennecott and the people of Ely, delivery of Boulder power there would not be economically feasible, so the commission has temporarily abandoned the idea, and has instead made a preliminary study of the cost of constructing a direct transmission line from Pioche to Eureka. These figures are as follows, and were prepared by A. J. Shaver, Resident Engineer for the Commission at Las Vegas.

**PRELIMINARY COST ESTIMATE—POWER EXTENSION SERVICE
TO EUREKA, NEVADA**

SUMMARY—Cost of Facilities:

138 kv line, 300 miles, Pioche to Eureka @ \$3,500.....		\$1,050,000
Transformers		75,000
Extras, incidentals		25,000
Total		\$1,150,000
Cost of Operation, Power, Retirement, Interest—		
A. Purchased Power—	<i>Annual cost</i>	<i>Mills per kwhr.</i>
30,000,000 annually	\$68,730.00	2.291
B. Operating Costs—		
Lines and substations.....	24,750.00	.825
Total power and operating.....	\$93,480.00	3.116
C. Capital Charges, Interest	31,000.00	1.033
D. Amortization	39,640.00	1.321
Total all charges	\$164,120.00	5.470
Detail of Costs—		
A. Power Cost—		
Falling water charge		1.254
*Generating charges .....		.628
State of Nevada charge.....		.300
Total		2.182
Plus transmission and transformation, est. 5%.....		.109
Total power cost, per Kwhr.....		2.291
B. Operating Cost—		
Maintenance and repairs ½%	\$5,750	
Patrolling lines, 300 miles @ \$25 per mile		
per year	7,500	
Supervision and Engineering 1%.....	11,500	
	\$24,750	.825
Total power and operating cost.....		3.116
*Average generating cost (excluding DPC) based on actual 1943-1944 operating years charges—		
C. Interest—		
REA long-term loan \$1,150,000 @ 2%.....	\$23,000	
Working fund, say \$200,000 @ 4%.....	8,000	
Total	\$31,000	1.033
D. Amortization—		
\$1,150,000 by sinking fund method in 20		
years @ 4%	\$39,640	1.321
Grand total all charges		5.470

This is based on transmission at 138,000 volts which will result in considerable line losses, but the construction cost will be very much lower than if higher voltage line should be built all the way between Boulder and Pioche. Advantage would be taken by use of the 69,000 volt line extending between Boulder and Pioche,

which was designed for easy conversion to 138 kv. Further engineering studies should be made, and possibility of other markets in the northern Nevada counties need to be investigated.

It has been stated by southern Nevada interests that all of Nevada's allotment of Boulder Dam power amounting to 750,000,000 kilowatt-hours per year, should be reserved for use in southern Nevada. It is represented that all of it may not be enough for southern Nevada uses, so why spend money on long transmission lines to Ely, Eureka, or other points in Northern Nevada? One answer to this may be that other power plants are planned for the Colorado River, such as at Bridge Canyon and Davis, from which energy can be put on Nevada lines by interconnections to augment the present Boulder supply.

CONTROL OF BMI WATER SUPPLY SYSTEM

At a meeting on September 15, 1944, Commissioner Caton stated that if the Government should release Basic Magnesium Inc., property at Henderson as surplus, the State should obtain ownership of the pipeline and pumping plant water supply from Lake Mead. The commission instructed Secretary Smith to write both to Defense Plant Corporation and the War Production Board setting forth the State's interest after a preliminary investigation had been made by Mr. Shaver.

At a meeting on October 25, 1944, Smith stated that Shaver reported the city of Las Vegas had been considering securing a lease or making purchase of the water supply plant. The Attorney General had stated that a legislative Act would be necessary to give the State authority to buy or lease. Revenue for repayment to the State would be obtained by sale of water. The passage of such an Act could not be assured.

A meeting was held by the Las Vegas Chamber of Commerce at Las Vegas on November 3, 1944, to review the local water situation, and was attended by Smith and Shaver who discussed the pipeline matter with Clark County and Las Vegas officials. The opinion was unanimous that the pipeline should not be allowed to fall into private hands or be salvaged as surplus property.

On October 28, 1944, Smith wrote to Chas. B. Henderson, Chairman, Reconstruction Finance Corporation, and to Jesse H. Jones, Secretary of Commerce, asking that the State, through its Colorado River Commission, be given first consideration in any plans for disposal. By reply from Mr. Jones dated November

13, 1944, and from Mr. Henderson dated November 8, 1944, each stated that all equipment and facilities not presently in operation but installed as part of the Magnesium Plant by Defense Plant Corporation would be retained in stand-by condition, and proposals for its disposition would not be accepted until the plant had been declared surplus to war requirements, at which time they would be glad to negotiate with Nevada.

Meantime, Art Loforth, an engineer in the employ of the Department of Highways, had been kindly loaned to the commission by Robert Allen, State Highway Engineer and Chairman of the Nevada State Planning Board, to make a report on the water supply system. Loforth died before his report was finished. The work was completed by Shaver, whose report is reproduced here, as follows:

MEMORANDUM CONCERNING THE ADJUSTED VALUE OF THE WATER SYSTEM AT THE BASIC MAGNESIUM PROJECT, HENDERSON, NEVADA.

March 21, 1946.

We have been supplied with the figures on the actual war-time cost of building the entire water system serving the Basic Project at Henderson, Nevada, and this study is an attempt to convert this cost to a present-day value; or a value commensurate with the actual cost, less depreciation, if built on a basis other than the war-time level at which it was originally constructed.

There are two main practices in determining the present-day value or worth of capital plant; one by the original cost-less depreciation-plus improvements method; and the other by the present-day replacement cost.

We have chosen the former in this instance, with some assumptions to be taken, as the latter could not be made under today's market conditions and the limited time in which this study was to be made. Today's markets are too unstable to get cost estimates or bid estimates on materials and equipment.

On the tabulation sheet attached hereto, and made a part hereof, are listed the costs of the project as given us by the Basic Project personnel, and broken down as to groupings of plant, viz:

Intake Pumping Station—		
Structures	\$366,122.52	
Equipment	239,728.00	
Power line	118,090.51	
Grading and excavation.....	73,257.95	
Roadway	251,422.92	
Causeway	235,965.18	
Fencing	9,489.26	
Protective works.....	245.91	
		\$1,294,322.25
Booster Pumping Station—		
Structures	\$112,316.53	
Equipment	331,484.44	
Grading and excavation.....	13,461.68	
Reservoir	77,858.25	
		535,120.90

Pressure Pipe Line—		
Complete intake to terminal reservoir and reservoir to Magnesium plant.....	\$2,221,131.85	2,221,131.85
Terminal reservoirs	\$428,551.37	428,551.37
Water Treatment Plant—		
Structures	364,748.92	
Equipment	288,569.08	
Brine lines	22,713.45	
Const. items	11,954.99	
		687,986.44
Grand total		\$5,167,112.81

In contemplating the original study that Loforth and I were setting up, we arbitrarily divided the costs as shown by the groupings of plant items into material and labor, each at 50 percent of the total. However, in going into more detail I have, in column 1 of the sheet attached, divided the material and labor values into percentages which I feel more equitably divide the costs between these two major accounts. The percentages allotted to each are my own estimates and are based upon what knowledge I have of construction in utility work. I believe they are fair estimates.

Columns 1 and 2 give the cost of each material and labor broken down on the percentage basis that has been chosen for each particular construction item, *i. e.*, structures, equipment, power lines, grading, roads, etc, etc. It is interesting to note that on the basis I have chosen, the totals show that we have arrived at a breakdown of 41% of the total cost being materials and 59% labor. This is only a variation of 9% from the original assumed percentage breakdown proposed.

Inasmuch as the cost of materials and equipment is materially affected by labor costs, we feel it is only fair to apply a correction factor on the material items due to excessive labor costs caused by the war and the urgency in which the plant was built. We have assumed an excess cost of 20%. This is borne out later in an analysis of the labor costs, which will be explained in a later paragraph. Column 3 then gives us the material cost, after this reduction has been applied.

Column 4 gives us the adjusted labor cost, this cost also being reduced due to war-time excesses and overtime pay. I have arrived at the correction to be applied, as follows:

5 days regular pay.....	40 hours
Saturday, time and half.....	12 hours
Sunday, double time.....	16 hours
Total work week.....	68 hours

If work was done on regular time, with work week limited to give 8-hour days per week, and work not rushed as was done under war-time stress, the total hours worked in a seven day period would be 56 hours. This difference of 12 hours represents an increase in labor hours of $12/56$ or 21.4%. This is the factor used in adjusting the labor costs, as shown in column 4.

Column 5 is the total of the material and labor costs of columns 3 and 4, and gives the adjusted original cost if done on a peace-time basis.

I have depreciated column 5 (total adjusted cost) for a 4-year period,

as the plant is now about 4 years old. The annual depreciation, in percentages, have been taken from tables of the Wisconsin Public Service Commission, Union Traction, Stone & Webster, American Institute of Electrical Engineers, and the Marwick, Mitchell Company, and I believe give a very fair depreciation value. Column 6 gives the present day value, which is original adjusted cost less depreciation. We have no figures for replacement or addition to plant, so this item must of necessity be left out of this study. We are satisfied, however, that very little addition has been made to the original plant.

Present day value of the entire plant under this process of reasoning has been set at \$3,497,211.

During the completion of this present study, the rough draft of the Loforth figures came to this office and I would like to compare them with this study. I have shown only totals of each capital breakdown in Column 7, but I give you herewith the detail of one such account to show the process used in determining the present cost:

Intake Pumping Station—

Structures—

Original cost		\$366,122.52
Material 50 percent.....	\$183,061.26	
Labor 50 percent.....	183,061.26	
Depreciation materials 2½% yearly for 4 years	\$18,306.13	
Labor reduced 33⅓%	61,020.42	
Total reduction		79,326.55
Net		\$286,795.97

You will note the items of roadways, excavations, and causeways have not been depreciated under the Loforth study, as will be borne out in the detail attached hereto. I doubt very much if this is a true picture of the value of this construction, as surely some depreciation must be taken on such items. Roadways, particularly paved roadways, will depreciate; and causeways will sluff off and become depreciated by time and erosion alone. In the study made in this office we have taken depreciation on these items, with the exception of excavating, on which no depreciation was taken.

If roadways and causeways in Loforth's study had been depreciated 10 percent and 2½ percent annually, respectively, on half the cost of these items, the Loforth total for the entire capital structure would be \$3,984,316; which is some \$487,105 more than the value determined under the present study.

For rough figuring, I believe we may safely assume the present day value of this pumping system in its entirety is between \$3,500,000 and \$4,000,000.

Comments: Just as a check, I have assumed some other values to begin with, and have followed through with adjustments and depreciations, and find the following:

If we take the original cost of materials from column 1, and reduce this cost 10%; add the adjusted net labor cost from column 4, and depreciate the total an average of 3.63% annually (as found from the study), we arrive at a net total present day value of \$3,681,281.

Or if we take the original cost from column 1 without reduction;

add the adjusted labor cost from column 4, and depreciate the total, we arrive at a present day value of \$3,865,173.

These figures are within the \$3,500,000 to \$4,000,000 valuation suggested as a rough figure.

There are other check methods but I have shown only these two, as the others will fall within the limits we have determined from this study.

I presume you will understand that this is not a final valuation to be placed upon this capitalization, as a further or more detailed study and breakdown between material costs and labor would without doubt lead to some other figures. No two men would quite arrive at the same valuation, unless they used exactly the same method as I have used, and use the same depreciation annually that I have chosen from the tables.

It may be well argued also at this time that if the plant were to be built today, it would cost as much if not more than the original. But the fact remains that the present day value of this particular plant is about as has been found by this study.

A. J. SHAVER.

March 20, 1946.

LOFORTH STUDY

Intake Pumping Station—

Structures—

Original cost		\$366,122.52
Materials, 50 percent.....	\$183,061.26	
Labor, 50 percent.....	183,061.26	
Depreciation 2½% for 4 years.....	\$18,306.13	
Labor, reduced ⅓.....	61,020.42	
		<u>79,326.55</u>
Net value		\$286,795.97

Equipment—

Original cost		\$239,728.00
Materials, 50 percent.....	\$119,864.00	
Labor, 50 percent.....	119,864.00	
Depreciation, 4% for 4 years.....	\$19,178.24	
Labor reduced ⅓.....	39,954.67	
		<u>59,132.91</u>
Net value		\$180,595.09

Power Line—

Original cost		\$118,090.51
Materials, 50 percent.....	\$59,045.25	
Labor, 50 percent.....	59,045.26	
Depreciation, 2½% for 4 years.....	\$5,904.53	
Labor reduced ⅓.....	19,681.75	
		<u>25,586.28</u>
Net value		\$92,504.23

Grading and Excavating Roadway and Causeway—

Original cost		\$560,646.05
Materials, 50 percent.....	\$280,323.03	
Labor, 50 percent.....	280,323.02	
No depreciation.		
Labor reduced ⅓.....	\$93,441.01	
		<u>93,441.01</u>
Net value		\$467,205.04

Fencing—

Original cost		\$9,489.26
Materials, 50 percent.....	\$4,744.63	
Labor, 50 percent.....	4,744.63	
Depreciation, 4% for 4 years.....	\$759.14	
Labor reduced ⅓.....	1,581.54	
		<u>2,340.68</u>
Net value		\$7,148.58

Protective Works—

Original cost		\$245.91
Materials, 50 percent.....	\$122.96	
Labor, 50 percent.....	122.95	
Depreciation, 4% for 4 years.....	\$19.67	
Labor reduced ⅓.....	40.98	
		<u>60.65</u>
Net value		\$185.26

Total		\$1,034,434.17
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LOFORTH STUDY—Continued

Booster Pumping Station—		
Structures—		
Original cost		\$122,316.53
Materials, 50 percent.....	\$61,158.27	
Labor, 50 percent.....	61,158.26	
Depreciation, 4 yrs. 2% or 8%.....	\$4,892.66	
Labor reduced $\frac{1}{3}$	20,386.09	
		<u>25,278.75</u>
Net value		\$97,037.78
Equipment—		
Original cost		\$331,484.44
Materials, 50 percent.....	\$165,742.22	
Labor, 50 percent.....	165,742.22	
Depreciation, 16% for 4 years.....	\$26,518.76	
Labor reduced $\frac{1}{3}$	55,247.41	
		<u>81,766.17</u>
Net value		\$249,718.27
Grading and Excavating—		
Original cost		\$13,461.68
Materials, 50 percent.....	\$6,730.84	
Labor, 50 percent.....	6,730.84	
No depreciation.		
Labor reduced $\frac{1}{3}$	\$2,243.61	
		<u>2,243.61</u>
Net value		\$11,218.07
Reservoir—		
Original cost		\$77,858.25
Materials, 50 percent.....	\$38,929.12	
Labor, 50 percent.....	38,929.13	
Depreciation, 16% for 4 years.....	\$6,228.66	
Labor reduced $\frac{1}{3}$	12,976.38	
		<u>19,205.04</u>
Net value		\$58,653.21
Total		\$416,537.00
Pressure Pipe Line—		
Original cost		\$2,221,131.85
Materials, 50 percent.....	\$1,110,565.92	
Labor, 50 percent.....	1,110,565.93	
Depreciation 2 $\frac{1}{2}$ % or 10% for 4 years.....	\$111,056.59	
Labor reduced $\frac{1}{3}$	370,188.64	
		<u>481,245.23</u>
Net value		\$1,739,886.62
Terminal Reservoirs—		
Original cost		\$428,551.37
Materials, 50 percent.....	\$214,275.68	
Labor, 50 percent.....	214,275.69	
Depreciation 12% for 4 years.....	\$25,713.08	
Labor reduced $\frac{1}{3}$	71,435.23	
		<u>97,148.31</u>
Net value		\$331,403.06

LOFORTH STUDY—Continued

Water Treatment Plant—		
Structures—		
Original cost		\$364,748.92
Materials, 50 percent.....	\$182,374.46	
Labor, 50 percent.....	182,374.46	
Depreciation 2% or 8%.....	\$14,589.96	
Labor reduced $\frac{1}{3}$	60,791.49	
		<u>75,381.45</u>
Net value		\$289,367.47
Equipment—		
Original cost		\$288,569.08
Materials, 50 percent.....	\$144,284.54	
Labor, 50 percent.....	144,284.54	
Depreciation 20% for 4 years.....	\$28,856.91	
Labor reduced $\frac{1}{3}$	48,094.85	
		<u>76,951.76</u>
Net value		\$211,617.32
Brine Lines—		
Original cost		\$22,713.45
Materials, 50 percent.....	\$11,356.72	
Labor, 50 percent.....	11,356.73	
Depreciation 40% for 4 years.....	\$4,542.69	
Labor reduced $\frac{1}{3}$	3,785.58	
		<u>8,328.27</u>
Net value		\$14,385.18
Construction Items—		
Original cost		\$11,954.99
Materials, 50 percent.....	\$5,977.49	
Labor, 50 percent.....	5,977.50	
Depreciation 20% for 4 years.....	\$1,195.50	
Labor reduced $\frac{1}{3}$	1,992.50	
		<u>3,188.00</u>
Net value		\$8,766.99
Total		<u>\$524,137.00</u>

At present the BMI plant and facilities are the property of War Assets Administration, whose resident agent is J. M. Montgomery Company, who are endeavoring to negotiate leases on different parts of the plant with interested chemical companies.

Several chemical manufacturing companies are now operating at the plant, and they are making constructive changes in some of the buildings to meet their needs. As yet these chemical companies have only 3 or 5 year occupancy contracts. If War Assets Corporation should desire to liquidate this plant at a later date, the State should insist on its priority for acquiring the water supply system, which can be of great value as water stand-by

for the artesian system now supplying Las Vegas and the surrounding valley, as well as being absolutely necessary to operations of any nature at Henderson.

STATE ENERGY SERVICE CHARGE

Several times during the past five or six years the commission had been requested by its southern Nevada contractors to reduce or eliminate the State's charge of .3 mill per kilowatt-hour, which is levied upon contractors to meet commission expenses and accumulate a reserve. On September 8, 1944, a letter was received by Governor Carville from J. H. Buehler, Chairman, Lincoln County Power District No. 1, one of the larger contractors, reading in parts as follows:

"The (Lincoln County Power) District feels that all users of Nevada's allotment of power should be subject to the same treatment and subject to the same charges, irrespective of classification as to power districts, private utilities, or Federal Government agencies. We can see no justice by the State in charging Nevada's private utilities and power districts .3 mill per kilowatt-hour and the Defense Plant Corporation (only) .05 mill per kilowatt-hour."

"We further feel, that in view of the fact that the commission now has a substantial reserve, the .3 mill charge to Nevada power consumers should be reduced to not more than .1 mill, at least until such time that the commission's reserve is inadequate to meet its need."

This communication was discussed in commission's meeting of September 15, 1944, but no action was taken at that time.

At a meeting of the commission in Las Vegas on October 17, 1945, after Governor Carville had been succeeded by Governor Pittman as the State's chief executive, it was explained to Mr. Buehler and Mr. Clark that during the war, Defense Plant Corporation had requested Nevada to deliver all unused power allotted to it under the Boulder Act for immediate use at BMI plant. The Government officials objected to payment of any State service charge, or to the State holding back any power in reserve to meet its own prospective needs. Nevada commission representatives and the Attorney General went to Washington, where conferences with representatives of the Secretary of the Interior, Harold Ickes, resulted finally in Nevada agreeing to deliver all of its power that could safely be spared, and after much debate, instead of free delivery, the government agreed to pay the State .05 mill per kilowatt-hour on a total of 376,000,000 hours during the

period ending May 31, 1945. We appreciated this consideration by the Secretary of the Interior as the War Department was probably in a position to commandeer all of our unused energy without making any payment to the State.

Governor Pittman and the commission were of the opinion that the State's contractors, who have continuously been cooperative and helpful, might be given the benefit of the service-charge money received from the Government on this war-time contract, which amounted to \$18,800. With this as the intention, Smith introduced a resolution to reduce the State charge to .1 mill until the credit to the contractors amounted to \$18,800 before restoring the .3 mill rate. Clark suggested that no action be taken on the resolution, but that instead of such action prior to January 1, 1946, the commission budget its expenses for 1946 and fix the State charge in a sufficient amount to cover it. This proposal was discussed, but no action was taken or instructions issued to the secretary. In the absence of action on Smith's proposed resolution Smith moved that it be tabled, which was carried.

This matter was made first order of business at the first meeting for 1946, held January 30 in Reno, at which time J. H. Buehler representing Lincoln Power District, and Lloyd Compton, Assistant Manager of Southern Nevada Power Company, were present.

Smith stated as his opinion that the surplus of approximately \$85,000, which had accumulated over a period of ten years, should be kept intact as a reserve, and not to be used to defray the expenses of the commission. The Nevada power contractors had suggested that it be used until reduced to \$15,000, during which time the State charge be eliminated. Smith read a memorandum as follows:

Total State expense, January 1—December 1, 1945.....	\$13,174.02
Average per month, January 1—December 1, 1945.....	1,097.83
Total income from .3 mill charge, June 1, 1944, to July	
31, 1945 (not including revenue from water sales).....	38,161.97
Average per month.....	3,180.16
If reduced from .3 mill to .1 mill per kilowatt-hour the	
average per month would have been.....	1,060.08
By comparison—	
Monthly expense.....	\$1,097.83
Income @ .1 mill.....	1,060.08
	<hr/>
Deficiency per month would have been.....	\$37.75

Governor Pittman suggested a reduction to .1 mill, with reservations. This opinion was then embodied in a motion introduced by Caton, as follows:

"I move that the State charge for service to power contracts,

heretofore fixed at .3 mill per kilowatt-hour of electric energy consumed be reduced to .1 mill per kilowatt-hour beginning January 1, 1946; provided, that when the existing surplus has been reduced to \$65,000, the rate shall again be raised until the surplus has reached \$85,000."

The motion was unanimously carried.

PUBLIC MEETING, LAS VEGAS, NEVADA, AUGUST 1945

A meeting at Las Vegas with various agencies interested in Boulder power was called by Governor Pittman for August 20, 1945. Commissioners Clark, Caton and Thompson were absent because of illness, hence there was no quorum; and no formal action could be taken on any matter, but a large number of persons had assembled, so the meeting went forward on an informal basis.

The State and commission were represented by:
Governor Vail Pittman, Chairman.

Alfred Merritt Smith, Secretary.

Lloyd Compton, Assistant Manager Southern Nevada Power Company.

A. J. Shaver, Resident Engineer of the Colorado River Commission at Las Vegas.

Hon. Alan Bible, Attorney General of Nevada.

Other persons were present as follows, also a number whose names were not obtained.

Archie Grant, Capitalist, Las Vegas.

John Cahlan, Las Vegas Review-Journal.

E. W. Allen, Realtor.

Ragnald Fyhen, Nevada Central Labor Council.

Al Forgeron, Secretary, State Federation of Labor.

Harry DePaoli, President, State Federation of Labor.

P. A. McCarran, U. S. Senator for Nevada.

Berkeley Bunker, U. S. Representative for Nevada.

Carl Hyde, Manager of the Las Vegas Chamber of Commerce.

Joe McQuilken, Statistician of the Las Vegas Chamber of Commerce.

K. M. Masden, Agent, Teamsters Union.

J. K. Ryan, Agent, International Hodcarriers and Building and Common Laborers.

Ed Safford, Business Agent, I.B.E.W.

Wm. Robbins, International Representative I.B.E.W.

Dr. Hemington, Surgeon at Basic Magnesium Plant.

Guernsey Frazer, Assistant General Manager J. M. Montgomery Company.

C. G. Petrie, Planning Engineer, City of Las Vegas and County of Clark.

Anthony Sanders, International Union Operating Engineers.

W. B. Byrne, Henderson Chamber of Commerce.

Tom Fennessy, Acting City Manager of Las Vegas.

H. H. Gillings, General Manager of J. M. Montgomery Co.

Leo McNamee, Attorney, Las Vegas, Nevada.

Chairman Pittman stated that the meeting had been called in response to a letter from the Nevada Central Labor Council, represented by Ragnald Fyhen, who had written suggesting a meeting in Las Vegas as soon as convenient and had stated that organized labor in Clark County was greatly disturbed by rumors and statements that electric power for the State of Nevada would not be available for postwar industries at the Henderson BMI plant in the near future.

Fyhen briefly restated the fear of his organization that existing energy contracts at BMI would expire within six months, after which no power would be available to industries wishing to continue postwar operations.

Secretary Smith detailed the legal conditions and regulations under which power from Nevada's allotment could be withdrawn and used. These consist of:

1. Formal application to the commission for a definite amount of energy in kilowatt-hours per year, and the maximum demand in horsepower.

2. Determination by the commission of the financial standing of the applicant, and the fixing of a bond to be supplied to make the State whole in case of default or sudden termination of applicant's operations.

3. Notice served by the commission upon the Secretary of the Interior, the Director of Power at Boulder City, and to each of the allottees of the amount of energy to be withdrawn, and the effective date of withdrawal (6 months to 3 years depending on the quantity) of energy according to a schedule in the Federal General Regulations for Generation and Sale of Power at Boulder Dam Plant. The Schedule of Notices of Withdrawal as fixed in the said General Regulations, Boulder Canyon Adjustment Act of 1940, were read. Notices of relinquishment of energy by the State are identical in time. Following is the mandatory schedule:

SCHEDULE OF NOTICES OF WITHDRAWAL OF ENERGY

A notice which together with all prior notices given by the same State within 12 consecutive months.

Exceeds in maximum demand horsepower	And does not exceed in maximum demand horsepower	Period of notice, months
0	5,000	6
5,000	12,500	12
12,500	20,000	10
20,000	40,000	24
40,000		36

These regulations, explained Smith, are far more elastic and liberal than those of the original Boulder Canyon Project Act but nevertheless were an obstacle to immediate or demand use of Nevada power. The present contractors in Nevada had not found the regulations difficult, for their loads have been fairly constant and did not fluctuate rapidly, hence the contractors had been able to anticipate needs and order power in advance to meet their requirements.

It was stated that in normal times the regulations, although a restriction, were largely compensated for by other benefits to be derived from use of Nevada's low-cost power. Any new industry locating in Nevada near Boulder Dam would require time to build and equip a plant, during which time the six months or one year notice of power withdrawal could be running. As soon as the withdrawal became effective the initial 5,000 to 12,500 horsepower could be put to use at net cost, for Nevada makes no profit from this power, as do private power companies supplying power on short demand. In proof, he cited the present costs to Southern Nevada Power Company, which had averaged about 2.3 mills per kilowatt-hour at Boulder Dam switchboard.

Smith said that a statement had been published and circulated to the effect that Nevada could not quote any figure on cost of power to be supplied was incorrect and misleading. Nevada power at the busbar was sold and would continue to be sold at the falling water, amortization, replacement, operation and maintenance charges as fixed from time to time by the Government and as billed to the State of Nevada. To this is added a charge of .3 mills per kilowatt-hour to maintain the Colorado River Commission. (This charge has since been reduced to .1 mill.)

The operation of the BMI Magnesium Plant at Henderson was a war-time emergency procedure. While that plant was under construction, Defense Plant Corporation called upon each of the Boulder power allottees to supply all power each could spare for

its operation. All allottees unhesitatingly complied. Nevada contracted to supply 147,000,000 kilowatt-hours for two years for the period ending May 31, 1945, plus an additional 82,000,000 kilowatt-hours during the second year ending May 31, 1945, at the Government rates for generation and sale of firm energy, plus a charge of five hundredths of one mill per kilowatt-hour to the State. That war-time obligation expired on June 1, 1945, and neither BMI, or its successors RFC or WAA, had requested any further withdrawal or use of energy from Nevada's allotment. The share Nevada supplied had been only about one-tenth of the total power used at BMI, the balance being furnished by the California allottees, who now continue under their own special war-time contract to supply the very much shrunken volume needed since the magnesium plant shutdown. These California allottees are obligated to supply BMI with energy until six months after the official termination of the war.

DPC lost some money under its contract with Nevada for energy, for BMI failed to use all the energy contracted for, and for which we had to pay the Government, and for which in turn they had to pay Nevada. The commission made an effort to have RFC renew the contract, but DPC refused to enter into a new contract for a fixed amount of energy, and Nevada can legally contract on no other basis.

Lloyd Compton, Assistant Manager of Southern Nevada Power Company, which is the major contractor for Nevada's power, related in detail the work of his company to secure additional transformer stand-by capacity, and also, on behalf of the commission, the use of major Generator N-7, which is a unit that had been installed on emergency order of DPC to generate the energy Nevada and California had agreed to supply. Compton had acted in an advisory capacity to the commission, as well as in the interest of his employer, the Southern Nevada Power Company.

Generator N-7 and appurtenant transformers and switches (designated Secs. G-7 and T-7 by the Bureau of Reclamation) had been installed under emergency conditions at the order of Defense Plant Corporation to meet the imperative war-time need for more generating equipment at Boulder to supply the BMI plant. The commission offered to take one-half of this generator, for which Southern Nevada Power Company offered to underwrite the charges. As there would be Nevada use for all of this capacity, there would have been but little or no risk involved.

The City and Edison did not favor Nevada securing any part

of Generator N-7, for the reason that the City wants one-half of N-7 capacity as stand-by, figuring that one generator in the plant would always be shut down half the time for repairs. Edison said if it could have the other half of N-7 they would use it to generate Metropolitan Water District's unused energy, and buy and use it. Metropolitan Water District of Southern California is obligated to the Government for a large amount of energy which it must pay for annually whether or not it is generated or used. E. A. Stansfield, sent from Washington to Los Angeles to represent RFC, favored this procedure as it helps out Metropolitan Water District and its many taxpayers.

Nevada considered asking for the entire N-7 generator, as the State also has a public to serve, but could see no way in which to finance it on a fixed charge of probably \$385,000 per year, unless a definite market could be found for the surplus energy it could produce. Without contracts for this surplus the commission could not obligate the State for all of N-7 unless it should be authorized by Act of the Legislature. The California allottees declined to contract to take and pay for the surplus energy in N-7 under these conditions.

The Nevada Commission decided that it would keep out of N-7 but ask that the contract proposed to the Californians be short term not to exceed the official duration of the war and six months thereafter, or at most not more than two years, at the end of which time N-7 would again be open for sale, or use, subject to Metropolitan Water District's prior claim to it. At the time this machine was installed Metropolitan Water District had been given the right to obtain it on two years advance notice.

Nevada's desire to obtain the use of N-7 was prompted by the fact that it was already installed and in operation and could be made available at once, while it will require about 3 years to install a new major unit at Boulder plant after it has been authorized.

Smith described the State's present contract with the City of Los Angeles for generating capacity which was made in Washington, D. C. at the time the Boulder Canyon Project Adjustment Act was passed. Under this agreement up to 44,000 kilowatts of capacity are available to Nevada from the City's A-1 and A-2 generators. When this capacity has been exhausted by withdrawals, additional generating capacity must be secured elsewhere. He said 44,000 kws. was more than enough to meet Nevada's needs under present contracts with Nevada companies, but the commission had for two years been trying to work out a

new agreement with the City which would give the State additional capacity up to a total of 65,000 kw, and also provide generating stand-by.

Failing to reach an agreement with the City on this, the commission had decided to let it rest during the war, while conditions were unsettled.

Other persons present voiced an opinion that the State should contract for a major unit, whether or not it could dispose of all its capacity, in order to be ready to immediately supply present and prospective industries, saying that payments on the unused capacity could be made from the annual revenue of \$300,000 received by the State from the Boulder Project in lieu of taxes. Nevada men explained that this money goes into the State funds, and any withdrawal of State funds would require legislative approval.

Senator McCarran stated that he was of the opinion that the General Regulations which are a part of the Boulder Canyon Project Adjustment Act did not apply to Defense Plant Corporation's emergency contract or to Generator N-7 which DPC had installed to fill the war-time emergency, for that emergency had resulted in Nevada's immediate need for power, which should be supplied at once.

Commissioner Smith replied that under the Regulations, only when all allottees and the Secretary of the Interior consent to waive withdrawal notices could power be immediately supplied to anyone. The General Regulations and withdrawal notices had governed Nevada's use even during wartime, and immediate use of Nevada power for war emergency needs had been obtained only by securing legal waivers from all allottees, and the Government had also posted a bond of \$10,000 with the State, in the same manner as other contractors are required to do.

In order that action might be taken by a quorum of the commission, the meeting recessed to go to the home of Commissioner Clark, who due to illness had been unable to attend the morning session. Thereafter at Mr. Clark's residence, and with Mr. Clark present and voting, a motion was made and carried that Governor Pittman appoint a committee to confer with the California allottees and RFC on power matters, and endeavor to secure demand energy for the Henderson industries. For this purpose Governor Pittman immediately appointed the following committee:

Alfred Merritt Smith, State Engineer, Chairman.

Lloyd Compton, Assistant Manager Southern Nevada Power Company.

A. J. Shaver, Resident Engineer, Colorado River Commission.

H. H. Gillings, Superintendent J. M. Montgomery Company at Henderson, Agent for RFC.

Since appointment of this committee its members have held various conferences with the California allottees, and worked on several plans designed to secure demand energy for use in Nevada, as outlined elsewhere in this report.

NEGOTIATIONS FOR DPC GENERATOR UNIT N-7

The agreement between Defense Plant Corporation and the several allottees for power supply to BMI expired on May 31, 1945. Sections G-7 and T-7 used in this wartime work were released, and the Secretary of the Interior was left free to arrange for their use by other parties. A letter to the commission dated May 5, 1945, from E. A. Stansfield, Power Procurement Office, Defense Plant Corporation, stated that DPC was open to receive proposals from the Boulder power contractors for transfer of its rights in Sections G-7 and T-7 (comprising main generator N-7 and appurtenant transformer, etc.).

On May 8, 1945, after conferring with all members of the commission, at Los Angeles, the commission informed Stansfield by letter that it could not now submit a plan whereby it would individually assume the rights to Generator N-7 and appurtenant transformer T-7, but was interested in being a party to any collective plan for use of N-7 with other allottees. This was a necessary statement for the reason that no financial obligation can be assumed by the commission excepting by Act of the Legislature.

Shortly thereafter the State unofficially learned that the Los Angeles and Edison Company were negotiating with Defense Plant Corporation for exclusive use of generator N-7, subject to prior contractual claims of Metropolitan Water District, which held a right to take it over on two years advance notice.

Governor Carville and Senator McCarran insisted to DPC and the Bureau of Reclamation that no plans for use or transfer of N-7 generator be made which did not include Nevada's request for use of one-half of its capacity.

There followed a meeting with Stansfield and all Boulder power allottees in Los Angeles on July 3, 1945, and thereafter other

meetings with the California allottees, all to no purpose so far as working out a collective use agreement on generator N-7. Meantime Stansfield and Sam Husbands for DPC, declined to renew or extend the existing BMI energy contract with the State more than one month, from May 31 to June 30, 1945. The State finally proposed to eliminate its .05 mill service charge, but to no avail in securing an extension and the contract expired on June 30, 1945.

DPC wished to be relieved of the financial burden of N-7. Edison Company and the City had a plan to take it over to use for generating Metropolitan Water District's power (contracted and paid for by Metropolitan Water District but unused), which seemed fair, inasmuch as Nevada could not get into the picture without an Act of her Legislature authorizing such an obligation. The commission also believed at this time that the financial responsibility would be too much for the State to assume until it had about exhausted its present contracted permissible use of up to 44,000 kilowatts on the City's generators A-1 and A-2.

REQUIREMENTS OF BASIC MAGNESIUM, INC., AND J. M. MONTGOMERY CO.

During this period Defense Plant Corporation had transferred the former interests of Basic Magnesium, Inc., to Reconstruction Finance Corporation, for which J. M. Montgomery Company of Los Angeles became operating agent. A little while later RFC transferred its control to War Assets Administration, with J. M. Montgomery Company continuing as operating agent for WAA at Henderson. J. M. Montgomery Company had leased some buildings and equipment to several independent chemical companies, whose future requirements were roughly estimated to be 500-, 000,000 kilowatt-hours at 65,000 kilowatt demand, by H. H. Gillings, Manager for the J. M. Montgomery Co. Gillings was disturbed at the prospect of not being able to supply these lessees with power after the State's contract with the Government had expired on June 30, 1945, and after the DPC contract with other allottees running until June 30, 1946, had also expired. His company called on the State to help work out the problem for them.

It might seem to be an easy solution to simply supply them with energy out of the State's allotment of 750,000,000 kilowatt-hours of firm power when asked for it. But that procedure is not easy, for the various regulations and conditions governing withdrawal and use must be complied with.

PLY PLANT

By A. J. SHAVER, Highway Department of Nevada.

	Column 5 Adjusted cost Col. 3 + 4	Annual depreciation Percent	Column 6 Depreciated value, 4 yrs.	Column 7 Loforth- Shaver values
Intake Pumping Station	\$290,335	2.5	\$261,302	
Structures.....	190,944	4.5	156,574	
Equipment.....	93,480	2.5	84,132	
Power Line.....	57,581	.....	57,581	
Grading and excav	198,323	10.0	118,993	
Roadway.....	185,469	5.0	148,375	
Causeway.....	7,498	5.0	5,998	
Fencing.....	194	15.0	78	
Protective Works.....				
Total.....	1,023,824		\$833,033	\$1,034,434
Booster Pumping Station	\$89,067	2.5	\$80,160	
Structures.....	264,028	4.5	216,503	
Equipment.....	10,581	.....	10,581	
Grading and excav	61,469	5.0	49,175	
Reservoir.....				
Total.....	\$425,145		\$356,419	\$416,537
Pressure pipeline compl reservoirs, and res plant.....	1,758,248	3.0	\$1,547,258	\$1,739,887
Terminal reservoirs.....	\$338,341	3.0	\$297,740	\$331,403
Water Treatment Plant	\$289,246	2.5	\$260,321	
Structures.....	229,239	5.0	183,339	
Equipment.....	17,980	10.0	10,788	
Brine lines.....	9,447	3.0	8,313	
Construction items				
Total.....	\$545,912		\$462,761	\$524,137
Grand total.....	\$4,091,470	Avg. 3.63	\$3,497,211	\$4,046,398

TABULATED ADJUSTED APPRAISEMENT OF BASIC MAGNESIUM WATER SUPPLY PLANT

By A. J. SHAVER, *Resident Engineer Colorado River Commission of Nevada*, and ART LOFORTH, *Engineer State Highway Department of Nevada*.

	BMI book value	Percent	Column 1 Materials	Percent	Column 2 Labor	Column 3 Materials reduced 20%	Column 4 Labor reduced 21.4%	Column 5 Adjusted cost Col. 3 + 4	Annual depreciation Percent	Column 6 Depreciated value, 4 yrs.	Column 7 Loforth-Shaver values
Intake Pumping Station—											
Structures.....	\$366,122.52	50	\$183,061.26	50	\$183,061.26	\$146,449	\$143,886	\$290,335	2.5	\$261,302	
Equipment.....	239,728.00	75	179,796.00	25	59,932.00	143,837	47,107	190,944	4.5	156,574	
Power Line.....	118,090.51	40	47,236.20	60	70,854.31	37,789	55,691	93,480	2.5	84,132	
Grading and excavation.....	73,257.95	.....	.....	100	73,257.95	.....	57,581	57,581	.....	57,581	
Roadway.....	251,422.92	20	50,284.58	80	201,138.34	40,228	158,095	198,323	10.0	118,993	
Causeway.....	235,965.18	.....	.....	100	235,965.18	.....	185,469	185,469	5.0	148,375	
Fencing.....	9,489.26	30	2,846.78	70	6,642.48	2,277	5,221	7,498	5.0	5,998	
Protective Works.....	245.91	20	49.18	80	196.73	.39	155	194	15.0	78	
Total.....	\$1,294,322.25		\$463,274.00		\$831,048.25	\$370,619	\$653,205	\$1,023,424		\$833,033	\$1,034,434
Booster Pumping Station—											
Structures.....	\$112,316.53	50	\$56,158.26	50	\$56,158.27	\$44,927	\$44,140	\$89,067	2.5	\$80,160	
Equipment.....	331,484.44	75	248,613.33	25	82,871.11	198,891	65,137	264,028	4.5	216,503	
Grading and excavation.....	13,461.68	.....	.....	100	13,461.68	.....	10,581	10,581	.....	10,581	
Reservoir.....	77,858.25	25	19,464.56	75	58,393.69	15,572	45,897	61,469	5.0	49,175	
Total.....	\$535,120.90		\$324,236.15		\$210,884.75	\$259,390	\$165,755	\$425,145		\$356,419	\$416,537
Pressure pipeline complete, intake to terminal reservoirs, and reservoirs to Magnesium plant.....	\$2,221,131.85	40	\$888,452.74	60	\$1,332,679.11	\$710,762	\$1,047,486	\$1,758,248	3.0	\$1,547,258	\$1,739,887
Terminal reservoirs.....	\$428,551.37	25	\$107,137.84	75	\$321,413.53	\$85,710	\$252,631	\$338,341	3.0	\$297,740	\$331,403
Water Treatment Plant—											
Structures.....	\$364,748.92	50	\$182,374.46	50	\$182,374.46	\$145,900	\$143,346	\$289,246	2.5	\$260,321	
Equipment.....	288,569.08	60	173,141.45	40	115,427.63	138,513	90,726	229,239	5.0	183,339	
Brine lines.....	22,713.45	40	9,085.38	60	13,628.07	7,268	10,712	17,980	10.0	10,788	
Construction items.....	11,954.99	30	3,586.50	70	8,368.49	2,869	6,578	9,447	3.0	8,313	
Total.....	\$687,986.44		\$368,187.79		\$319,798.65	\$294,550	\$251,362	\$545,912		\$462,761	\$524,137
Grand total.....	\$5,167,112.81	41	\$2,151,288.52	59	\$3,015,824.29	\$1,721,031	\$2,370,439	\$4,091,470	Avg. 3.63	\$3,497,211	\$4,046,398

TABULATED ADJUSTED APPRAISEMENT

By A. J. SHAVER, *Resident Engineer Colorado River Commission of Nevada*

	BMI book value	Percent	Column 1 Materials
Intake Pumping Station—			
Structures.....	\$366,122.52	50	\$183,061.26
Equipment.....	239,728.00	75	179,796.00
Power Line.....	118,090.51	40	47,236.20
Grading and excavation.....	73,257.95	.....	.....
Roadway.....	251,422.92	20	50,284.58
Causeway.....	235,965.18	.....	.....
Fencing.....	9,489.26	30	2,846.78
Protective Works.....	245.91	20	49.18
Total.....	\$1,294,322.25		\$463,274.00
Booster Pumping Station—			
Structures.....	\$112,316.53	50	\$56,158.26
Equipment.....	331,484.44	75	248,613.33
Grading and excavation.....	13,461.68	.....	.....
Reservoir.....	77,858.25	25	19,464.56
Total.....	\$535,120.90		\$324,236.15
Pressure pipeline complete, intake to terminal reservoirs, and reservoirs to Magnesium plant.....	\$2,221,131.85	40	\$888,452.74
Terminal reservoirs.....	\$428,551.37	25	\$107,137.84
Water Treatment Plant—			
Structures.....	\$364,748.92	50	\$182,374.46
Equipment.....	288,569.08	60	173,141.45
Brine lines.....	22,713.45	40	9,085.38
Construction items.....	11,954.99	30	3,586.50
Total.....	\$687,986.44		\$368,187.79
Grand total.....	\$5,167,112.81	41	\$2,151,288.52

cover stand-by charges and losses incident to transferring the generation of the energy from one section of the Boulder Power Plant to another. For example, the transferring of 100,000,000 kilowatt-hours from the generating sections used for the City of Los Angeles and the State of Nevada is equivalent to increasing generating costs by 0.5 mills for each kilowatt-hour so transferred, which loss exceeds the amount available to cover such losses.

Thus, you can see that the City does not receive 3.25 mills per kilowatt-hour for the energy which will be made available to the State of Nevada under the proposed contract; but it receives 2.5 mills per kilowatt-hour to cover steam replacement costs plus 0.375 mills per kilowatt-hour to cover other contingencies above mentioned, or a total of 2.875 mills per kilowatt hour.

(2) You stated that some of the prospective customers had made statements that they could receive energy in Los Angeles at a lower rate than is being offered in Nevada, and that the rate to some of our customers represented a maximum of 3 mills per kilowatt-hour. Our lowest rate schedule is the P-3 Schedule, known to us as the Electro-Chemical and Metallurgical Schedule, and is based on surplus hydro-electric energy. In order for a customer to avail himself of this schedule, he must make specific request to the Department of Water and Power, City of Los Angeles, and enter into a contract, which usually includes a fuel clause termination charge and other contractual arrangements. The City of Los Angeles has only had two customers on the P-3 Schedule, one being the Aluminum Reduction Plant at Torrance, California, and the other being the Western Electro-Chemical Company of Los Angeles. The Aluminum Reduction Plant, under the contract period of July 1, 1942, to December 1, 1944, paid an average rate of 6.14 mills per kilowatt-hour. Included in this cost was the readiness to serve charge and the contract termination charges. If the Aluminum Reduction Plant had represented a more stable position and had paid rates in the P-3 Schedule only, without the other contractual requirements, the average rate would have been, for the twenty-nine months, 4.09 mills per kilowatt-hour. The lowest rate they ever received under the P-3 Schedule was for one month (October 1942) which was 3.06 mills per kilowatt-hour.

The other customer, The Western Electro-Chemical Co., received power under the P-3 Schedule from January 1, 1944, to March 1, 1946. During this period their average rate was 3.7 mills per kilowatt-hour, with the lowest rate of 3.02 mills per kilowatt-hour, which occurred in January 1945, and the highest date of 6.21 mills per kilowatt-hour, which occurred in February 1944. During the last three months of operation their production has fallen off and the load decreased to the point where it is no longer economical for them to receive service under the P-3 Schedule and therefore they are now receiving service under the P-1 Schedule, which is the general power schedule for all large industrial customers.

(3) Several months ago a meeting was held in Boulder City with officials of the Bureau of Reclamation to discuss future generating capacity for the States of Nevada and Arizona. At that time, Mr. Moritz requested the City of Los Angeles, as Generating Agent, to

Nevada's right to Boulder Dam power is subject to rigid withdrawal restrictions. Under the Boulder Canyon Project Act, notice of from 6 months up to 3 years must be given in advance of withdrawal to the Bureau of Reclamation and to other allottees, the length of time depending upon the amount of energy, before it can be taken away from the California allottees, who are *obligated* by the Government to take and use it all the time Nevada does not. The State must also give similar advance notices when it desires to turn back any power.

Sufficient power to supply the indicated BMI needs, although they were not definitely stated, are sufficiently large to require two or three years time before it could be made available under these Federal regulations. Most of the lessees who contemplate coming into BMI plant will require service almost immediately to be supplied on demand. At present these operators are offered only 3 or 5 year leases by War Assets Administration, which is no more than the time it will require to obtain Nevada power in a large block under withdrawal rules.

The California allottees, who had made firm contracts to take and pay for all Boulder energy, prior to the construction of the dam, are, of course, the only agencies capable of supplying demand energy at Henderson. The commission requested them to submit terms. Meetings were held in Los Angeles, each of which was attended by about twenty persons representing Southern California Edison Company, Ltd., the Los Angeles Department of Water & Power, and the State of Nevada, on October 19, November 29, and December 12, 1945, and on March 15, 1946. Each of the meetings was attended by Governor Vail Pittman, Attorney General Alan Bible, State Engineer Alfred Merritt Smith, with Lloyd Compton, Assistant Manager Southern Nevada Power Co., A. J. Shaver, Resident Engineer for Colorado River Commission, and H. H. Gillings, Manager, J. M. Montgomery Company, present as advisors to the Nevada group.

After the first meeting, Edison Company, with the City concurring, submitted a proposal which was studied and discussed at the second meeting and some changes were made in the original draft. At the close of a third meeting on December 12, 1945, the proposal stood as follows:

EDISON COMPANY PROPOSAL TO SUPPLY DEMAND ENERGY

1. Edison and City are willing to make Boulder energy available to the State of Nevada or Southern Nevada Power Company solely for use at the Basic Magnesium Project and operations incidental thereto.

2. The rate for such energy delivered at Boulder Power Plant shall be 50¢ per month per kw of 30 minute maximum demand up to 35,000 kw, with a minimum payment of \$12,500 per month, plus 2.50 mills per kw-hr. For all demands in excess of 35,000 kw the charge shall be \$1 per month per kw of 30 minute maximum demand; provided however, there shall be no obligation to supply over 35,000 kw.

3. Because it is estimated that it will be necessary for Edison and the City to replace approximately one-half of the Boulder energy to be delivered under this proposal, the rate per kw-hr for one-half of the energy delivered shall be further subject to an oil clause providing for adjustment of the rate on the basis of 0.2 mills per kw-hr for each 10¢ per barrel increase or decrease in the posted price for fuel oil in the Los Angeles Basin as compared with the present price of \$1.10 per barrel, exclusive of sales tax, said fuel adjustment being computed to the nearest .01 mill per kw-hr.

4. The above rates and charges are based on the maintenance by the purchaser of a weighted average monthly power factor of not less than .85. If such power factor is less than .85 then the charges per kw and per kw-hr set forth in (2) above shall be increased by the ratio of .85 to the actual weighted monthly average power factor.

5. The contract for service to be for five years with the above minimum monthly payment guaranteed for the term of the contract.

6. Nothing in this proposal shall require Edison and/or the City to impair service to their other customers in order to deliver energy hereunder, and Edison and the City reserve the right to reduce or discontinue service under this contract without penalty other than a pro rata reduction in the monthly demand payments when such reduction or discontinuance of service is required in order to maintain service to Edison and/or the City's other customers.

Part 5 of the proposal provides for a 5-year contract but has no provision for cancellation. This was discussed briefly during the meeting of December 12, 1945, but nothing definite agreed upon. It is suggested part 5 be amended to read as follows:

5. The contract for service to be for five years with the above minimum monthly payment guaranteed for a minimum period of two years with cancellation of the contract permitted upon six months written notice to Edison and City.

January 31, 1946.

At a fourth conference on March 15, 1946, the State requested that the energy rate be reduced to 2.25 mills, the contract be made for three years instead of five, and that the "oil clause" (sec. 3) be omitted.

The City objected to each of these changes, and furthermore indicated that the contract should be made contingent upon or subsequent to clearing up the issues of "property rendered idle" and "stand-by service," as yet unsettled with the State.

Edison Company did not refuse to make the desired modifications, but said they wished to restudy the problem if a three-year contract is desired, instead of the 5-year contract, saying their

proposal was based upon a 5-year contract and made allowance for a low-water year in Lake Mead storage. Gillings stated that he would have to confer with his lessees at BMI before agreeing to the 2.5 rate offered in the 5-year proposal.

MINUTES OF A MEETING OF THE COLORADO RIVER COMMISSION OF NEVADA

Held at Las Vegas, Nevada, May 16, 1946

The meeting was called to order in the Legion Room at the Las Vegas City Hall at 10 a. m. by the Chairman, Governor Vail Pittman.

The following persons were present:

Governor Vail Pittman, Chairman, Carson City.

Alfred Merritt Smith, Member-Secretary, Carson City.

John V. Mueller, Member, Reno, Nevada.

A. E. Cahlan, Member, Las Vegas, Nevada.

C. A. Thompson, Member, Pioche, Nevada.

A. J. Shaver, Resident Engineer, Las Vegas, Nevada.

Lloyd Compton, Southern Nevada Pacific Company, Las Vegas, Nevada.

Alan Bible, Attorney General, Carson City, Nevada.

H. H. Gillings, J. M. Montgomery Co., Henderson, Nevada.

Ragnald Fyhen, Nevada Organized Labor, Las Vegas, Nevada.

Archie C. Grant, Las Vegas, Nevada.

John F. Cahlan, Review-Journal, Las Vegas, Nevada.

Carl Hayes, Nevada Teamsters, Las Vegas, Nevada.

Kenneth Walsh, Los Angeles, California.

A. Petrie, Las Vegas, Nevada.

M. B. Byrne, Henderson, Nevada.

Wm. M. Doak, Henderson, Nevada.

J. Ray Coulter, Henderson, Nevada.

Fred D. Gibson, Henderson, Nevada.

W. E. Hemington, M.D., Henderson, Nevada.

A. T. Newall, Stauffer Chemical Co., Henderson, Nevada.

The minutes of the meeting of March 18, 1946, were read and approved.

Governor Pittman stated that he did not go to Washington, D. C., as contemplated after the last meeting, as after a talk with H. H. Gillings, who had been in communication with Senator McCarran and representatives of War Assets Administration, it appeared that if a satisfactory agreement could not be reached very soon it would be preferable to have our congressional delegation come to Las Vegas with representatives of WAA and

probably RFC to meet here with men from Nevada and Los Angeles in an effort to reach an agreement suitable to all. Such a step had been approved by Senators McCarran, Carville, and Congressman Bunker.

The Secretary read the following letter received by the chairman from Chief Engineer S. B. Morris of the Los Angeles Department of Water and Power.

April 25, 1946.

HONORABLE VAIL PITTMAN, *Governor of the State of Nevada, Carson City, Nevada.*

MY DEAR GOVERNOR PITTMAN: The other day, while we were discussing the proposal that the City of Los Angeles and the Southern California Edison Company make 200,000,000 kilowatt-hours of electrical energy available to the State of Nevada for use at Basic Magnesium, several questions arose regarding the rates:

- (1) The rate proposed to Nevada.
- (2) The rate at which the City of Los Angeles sells electricity in Los Angeles under its lowest rate schedule (P-3).
- (3) Future use of an additional generating unit in conjunction with the State of Nevada.
- (4) The renewal of the present contract with the Reconstruction Finance Corporation.

In reply to question (1), rate proposed jointly by the City of Los Angeles and the Southern California Edison Company was made last fall and represented our best thinking at that time. Since then, conditions have changed for the worse. The run-off of the Colorado River is lower than anticipated and the price of fuel oil has increased from \$1.10 to \$1.25 per barrel. This means that for at least the next year all of the energy furnished to the State of Nevada must be generated by steam; and, under the rate proposed to you, the City of Los Angeles would have to absorb one-half of this incremental increase in fuel cost. Therefore, the proposal is better, from your standpoint, at this time than it was at the time it was offered.

As you know, the rate offered was 2.5 mills per kilowatt-hour, plus a demand charge of 50 cents per kilowatt of maximum demand. The 50 cent monthly demand charge, when applied to 25,000 kilowatts of maximum demand and an annual use of 200,000,000 kilowatt-hours at not less than 85 percent power factor, will amount to 0.75 mills per kilowatt-hour which, added to the 2.5 mill energy charge, results in a total rate to the State of Nevada of 3.25 mills per kilowatt-hour for energy delivered at the high voltage bus at Boulder power plant.

Of the 0.75 mills per kilowatt-hour resulting from the demand charge, one-half of this amount, or 0.375 mills per kilowatt-hour, will be required to repay to the Government the actual cost of that portion of the generating equipment used to produce this energy without any allowance for time out for overhaul, for decreased capacity as a result of low water, or for capacity which may not be usable by other allottees at the Boulder power plant. The remainder goes to the City of Los Angeles and the Southern California Edison Company to partially

make studies in order to determine the needs for additional generating equipment and proper procedure for making such generating equipment available to the States, having in mind the stand-by and other desirable requirements. The following week meetings were held in Los Angeles with representatives of the States of Nevada and Arizona, and from these meetings came proposals for four different schemes. These schemes have been written up and wiring diagrams prepared, and are now in the hands of your representative, Mr. Shaver, and other representatives present at those meetings, awaiting their comments. It was requested that all comments be in our hands by the first of May in order that the letter can be forwarded to the Bureau of Reclamation at an early date, so that they may proceed on the detailed cost studies in connection with the various schemes proposed. After these studies have been completed by the Bureau of Reclamation, the various representatives can again sit down and decide upon the best scheme and then request the Government to proceed accordingly. The City will gladly assist Nevada in its efforts to assume the responsibility of a generating unit; and if there is any spare capacity available in this unit, the City will be able to make use of it.

(4) You requested information as to whether the City would be willing to renew the present contract with the Reconstruction Finance Corporation. When this contract was prepared, a little over a year ago, the war in Europe and Japan was still in progress and no one was able to predict the end, although it was the general feeling at that time it could not last much longer. A clause was included in the contract that permitted the renewal of the contract at rates to be negotiated at the time of renewal. Since then, the war has terminated and the Basic Magnesium Plant is no longer being used for its original purpose. Therefore, a renewal of the contract with the Reconstruction Finance Corporation is not indicated at this time. However, if the contract with the Reconstruction Finance Corporation were to be renewed, the rate would not be different from that now being proposed to Nevada.

Should you care to discuss this matter further with the City and the Southern California Edison Company, we shall be glad to meet with you at your convenience. You probably realize that the time is getting short and there are many questions to be ironed out, such as the use of N-7 which involves the Defense Plant Corporation, and other factors which all require time to negotiate.

Kindest personal regards,

Sincerely,

SAMUEL B. MORRIS,

General Manager and Chief Engineer.

H. H. Gillings stated that he had made a number of trips to consult officials of War Assets Administration in Washington, D. C., and with representatives of Southern California Edison Company on behalf of J. M. Montgomery Company. Two weeks previously he had met with Messrs. Bauer and Hinson of Edison Company, and Morris of the Los Angeles Department of Water & Power, and among other things had said to them that they had

as allottees of Boulder energy, benefited to the extent of over one million dollars by the operation of Basic Magnesium, Incorporated, and he had urged them for an immediate settlement of the demand power rate business. We had on the previous day received information that a rate to consist of the firm energy rate, plus 1 mill, plus 50¢ per kilowatt demand, with an oil clause to start from \$1.10 per barrel would be offered, and that the Board of the Los Angeles Department of Power and Light would meet today, May 16, to formulate and submit to Nevada an offer agreeable to both Edison and the City. The adjusted rate would be a little over 3 mills per kilowatt-hour. The proposal had not been confirmed, but would probably be the next day, and would be satisfactory to operators at BMI. He said Edison Company thought it would lose money on the contract the first year, but would recoup in following years. There had been some discussions as to transmission losses, estimated at 1½%, which might have to be adjusted. The contract could not require Nevada to make an energy withdrawal request. Gillings said it was not the best contract possible, but it would do and fill the need and enable industry to continue at BMI plant. He spoke of rapid growth there, saying that when these negotiations began a few months ago their demand was 18,000 kilowatts but now it was 28,000 kilowatts. He said that 90 days should be allowed to perfect the agreement.

Lloyd Compton and A. J. Shaver spoke of the effect of power and load factors.

A. E. Cahlan asked how the State would proceed with respect to meeting the monthly cash payments. Gillings replied that there would be two contracts. The first contract would be between WAA and Nevada for supply of energy at the agreed rate which WAA would pay, including the cash payments. The second contract would be between Edison Company and Nevada, wherein Nevada agrees to buy the energy under the terms and rate specified.

Smith related progress on plans for Nevada's installation of a generator, saying a joint request by the City and Nevada for study of four schemes for installation of two generators, one for Nevada and one for the City had been submitted to the Bureau of Reclamation at Boulder City and the bureau had replied that the work of preparing plans and financial estimates would be undertaken promptly.

The general meeting was adjourned at 12:15 p. m., and the commission went into an executive session at 12:25 p. m.

The chairman said he had discussed with the members the necessity of employing electrical engineers, and they had decided to employ Lloyd Compton and H. H. Gillings at a rate of \$15 per day for such time as they might be called upon to serve the commission, plus the legal State rates for travel and subsistence.

Commissioner Smith moved that Lloyd Compton and H. H. Gillings be employed at \$15 per day for time given to the Colorado River Commission and that monthly bills for engineering services be submitted by them for time devoted to the work, inclusive of legal State expenses. Commissioner Thompson seconded the motion, which was unanimously passed.

Commissioner Smith moved that Lloyd Compton and H. H. Gillings be compensated for time, travel, and living expense at the same rate embodied in the former motion (\$15 per day plus legal State travel and living expense) for the time spent on business of the commission since Vail Pittman took office on August 20, 1945. Commissioner Thompson seconded the motion, which was unanimously passed.

Commissioner Smith moved that the commission's engineers, Compton and Shaver, be instructed by the commission to make a study and submit a report upon present and prospective power requirements in Nevada to be supplied from Boulder Dam. The motion was seconded by Mueller and unanimously passed.

Commissioner Cahlan moved that engineers Shaver, Compton, and Gillings be requested to prepare a brief detailing negotiations for securing Davis Dam power for use in Nevada with which to supplement power from Boulder, also stating the need for such energy and supplying related information regarding Davis Dam for submission to Nevada's U. S. Senators and Member of Congress, and to the commission. The motion was seconded by Mueller and unanimously passed.

Commissioner Cahlan moved that A. J. Shaver be asked to prepare a brief or statement as to the status of industry at BMI Plant, and its probable future expansion, to include an inventory of mines producing metals and minerals that can be economically processed and/or fabricated at BMI, and that the statement be released to the press of Nevada. The motion was seconded by Thompson and unanimously passed.

Attorney General Alan Bible was asked by Commissioner Cahlan if it is necessary for the commission to prepare an annual budget. Attorney General Bible replied that the commission was under no compulsion to prepare and submit a budget. Governor Pittman stated that it would be difficult to forecast expense. The commission decided to proceed as in the past and meet expenses

as necessary out of surplus provided by the State's service charge for energy. The Attorney General said in his opinion the State could not properly demand delivery of the commission's surplus into the General State Fund.

Governor Pittman asked Attorney General Bible for an opinion as to whether the secretary, who is also the State Engineer, could not be paid a salary or otherwise be compensated for his service. The reply was that under the State constitution no salary could be paid, but the commission could, if it desired, compensate the secretary on a basis of \$10 per day for service rendered in the same way that the other members are paid. Discussion followed but no action was taken.

The members of the commission expressed regret over the resignation of A. J. Caton which occurred on April 27, 1946. It was ordered that the following resolution be made a part of the minutes:

RESOLUTION

WHEREAS, Albert J. Caton has been a most valuable and active member of this commission since its creation by the Legislature of Nevada in 1935, and has continuously during that long period given freely of his time and experienced business ability for careful study of our numerous problems; and

WHEREAS, Because of ill health and a necessity for conserving his strength, which has been difficult because of necessary travel and frequent absences from his home in order to attend meetings at great distances, he has decided to resign from the commission; and

WHEREAS, His wide engineering and financial services to this body have greatly aided in its work and will be greatly missed by the members to whom he also endeared himself by his high-minded optimism and fine personality; now, therefore, be it

Resolved, That the commission extends to Al Caton its thanks for the privilege and pleasures of long official and personal association, and hopes for his rapid recovery to good health.

It was moved, seconded, and passed that the following memorial resolution be written into the minutes:

MEMORIAL RESOLUTION

EDWARD W. CLARK

MEMBER, COLORADO RIVER COMMISSION OF NEVADA

APRIL 19, 1935, TO APRIL 15, 1946

WHEREAS, The Colorado River Commission deeply feels the loss by death of its esteemed member, Edward W. Clark, and it desires to record a statement as to his exemplary life, as follows:

STATEMENT

On Monday, April 15, 1946, death took from Nevada one of the State's most valued citizens, Edward W. Clark, at the age of seventy-five years. His passing was mourned throughout the State by countless friends, and the record of his long and useful life has been ably detailed and published throughout the west by the press of the State. He had been a member of the Colorado River Commission of Nevada since 1935. The commission is inexpressibly saddened by the loss of so valuable a member and well-loved friend.

Long prior to the time Ed Clark became a member of the Colorado River Commission, he was one of the practical dreamers who visualized the harnessing of the mighty Colorado River by Boulder Dam. He did much to bring into being that colossal structure, the greatest engineering work ever conceived and built by man. He was the advisor and assistant of the engineers and statesmen who made possible that great contribution to modern civilization, and when the dream became a thing of steel and concrete, his then small Southern Nevada Power Company was the first in Nevada to contract for energy from the allotment he had helped to secure for his State.

Ed Clark's achievements as a pioneer and in following through on the development of southern Nevada make an imposing list. His advance to the place of high esteem he held in the hearts and minds of the people, and to the various business, political, and religious honors he held at the end of his life, was won by continuous effort, travail, and conflict through the years for what he believed to be right.

His early education was received from his fine widowed mother, who worked for a living for herself and children in the little mining town of Pioche. Later he attended the public grade school. While yet a youth, Ed took a man's place in the rough life of the west. He was successively miner, stage driver, cattleman, merchant, freighter. As a young man he became County Treasurer. Advancing years found him a banker, civic and political leader, president and owner of the Southern Nevada Power Company. Possessed of fine mental ability and a great capacity for study and hard work, his education steadily proceeded in fields most beneficial to the State. Various business enterprises now prospering were aided in locating in Nevada by Ed Clark. To many persons in all walks of life he gave a helping hand in time of need, and also supplied the words of cheerful encouragement that again

made them raise their eyes to the horizon and go forward. His faith in humanity and investments in his country brought him modest wealth, but the money he gave freely in assistance to his fellow men will never be counted. His was the traditional rise of the poor boy to honor and wealth as a result of faith, honesty and work, a saga of Americanism.

Long will the memory of Ed Clark remain with the great host of friends he leaves in Nevada; now, therefore, be it

Resolved, That this statement and resolution be spread upon the minutes and be made a part of the permanent records of this commission, and that copies thereof be sent to members of his family, and to U. S. Senator Pat McCarran, U. S. Senator E. P. Carville, and Congressman Berkeley Bunker of Nevada.

COLORADO RIVER COMMISSION OF NEVADA

GOVERNOR VAIL PITTMAN, *Chairman*.

ALFRED MERRITT SMITH, *Secretary*.

The meeting recessed at 2 p. m., to reconvene at 4 p. m. in the office of the Resident Engineer.

Meeting called to order at 4 p. m., in the office of the Resident Engineer, A. J. Shaver, by Chairman Pittman. Present were all members and engineers Shaver, Compton, and Gillings.

Engineer H. H. Gillings informed the commission that he had called Harry Bauer, General Manager of Edison Company at Los Angeles by long distance telephone, and that Bauer said he had talked with City representatives and all were now agreed in principle and ready to go ahead on the contract.

Gillings said the procedure would be for War Assets Administration, successors to RFC, to request the Secretary of the Interior and the California allottees for an extension of time under the provisions of the contract known as "Districts 1945 Resale Contract," for a period of 90 days, in which to work out details of the new energy contract.

The second step would be a contract between WAA and Nevada, in which WAA will agree to take energy and pay for it as required by Edison Company.

The third and last step will be a contract between Nevada and Edison Company in which Edison Company will agree to deliver the energy at BMI according to certain terms.

After discussion by Cahlan and Mueller, the commission requested Gillings, as representative for J. M. Montgomery Company, agent for WAA, to write a letter to the commission agreeing

to apply for an extension of six months on the present contract, during which extension of time the State will prepare the contract with Edison Company to receive energy service for five years, the rate to be the firm energy rate plus one mill, plus 50¢ per kilowatt demand charge up to 35,000 kilowatts, and subject to an agreed oil clause, as approved by the Los Angeles City Board and the Edison Company.

The commission then jointly prepared and sent the following wire to Senators Pat McCarran, E. P. Carville, and Congressman Berkeley Bunker, Washington, D. C.:

"Gillings has advised Colorado River Commission of Nevada this date following meeting of the commission in Las Vegas that Montgomery Company is to request the Washington office of War Assets Administration on May 17 to exercise its option as provided in present power contract (Number and Symbol I Ir-1458) and extend this contract another six months after the May 31 expiration date. State of Nevada will continue negotiations for five-year contract with California allottees for power supply to take effect on termination of extended contract based on rates and conditions the Colorado River Commission of Nevada have reason to believe are favorable. Every effort should be made to obtain extension of present Basic contract by War Assets Administration. Appreciate your keeping us advised of progress made by War Assets Administration with the Secretary of the Interior in securing extension of present contract for six months."

COLORADO RIVER COMMISSION OF NEVADA.

ALFRED MERRITT SMITH, *Secretary*,

The meeting was recessed at 5:30 p. m., subject to recall upon order of the chairman.

FINANCIAL HISTORY OF THE COLORADO RIVER COMMISSION

The State Controller, Henry C. Schmidt, at the request of Hon. Clark J. Guild, Judge of the First Judicial District, Nevada, had Deputy Kerwin L. Foley prepare the following statement of administration expenditures made by the Colorado River Commission from the date of its first creation on February 20, 1923, at which time \$5,000 was appropriated "to collect and arrange all data and information connected with the Colorado and its tributaries which may affect or be of interest to the State of Nevada."

In successive years many appropriations were made by the Legislature to the first commission to carry on this work.

On March 20, 1935, the Act creating the original commission was repealed and a new commission created (Chap. 71, Nev. Stats. 1935), having increased authority and new duties. At the same time an appropriation of \$25,000 was made to sustain the work of the commission. This money, for the first time in the history of the commission, was to be repayable to the State Treasury out of revenues derived from the sale of electric energy.

OFFICE OF
STATE CONTROLLER

CARSON CITY, NEVADA, February 26, 1946.

JUDGE CLARK J. GUILD, *First Judicial District, Carson City, Nevada.*

DEAR JUDGE GUILD: In reply to your letter of 19 February 1946, the figures on assessed valuation and tax rate of Clark County will be submitted to you by the Nevada Tax Commission. The expenditures made by the Highway Department in Clark County since just prior to the construction of Boulder Dam and to date will be submitted to you by the Highway Department.

The administration expenditures made by the Colorado River Commission from its inception to date are as follows:

From 1 January 1923 to 31 December 1923.....	\$1,908.15
From 1 January 1924 to 31 December 1924.....	918.55
From 1 January 1925 to 31 December 1925.....	2,611.44
From 1 January 1926 to 31 December 1926.....	1,561.44
From 1 January 1927 to 31 December 1927.....	3,196.18
From 1 January 1928 to 31 December 1928.....	15,213.10
From 1 January 1929 to 31 December 1929.....	4,292.04
From 1 January 1930 to 31 December 1930.....	6,298.68
From 1 January 1931 to 30 June 1931.....	549.33
From 1 July 1931 to 30 June 1932.....	555.28
From 1 July 1932 to 30 June 1933.....	448.61
From 1 July 1933 to 30 June 1934.....	196.38
From 1 July 1934 to 30 June 1935.....	799.11
From 1 July 1935 to 30 June 1936.....	2,741.11
From 1 July 1936 to 30 June 1937.....	6,593.20
From 1 July 1937 to 30 June 1938.....	6,001.99
From 1 July 1938 to 30 June 1939.....	10,886.73
From 1 July 1939 to 30 June 1940.....	12,738.50
From 1 July 1940 to 30 June 1941.....	12,887.38
From 1 July 1941 to 30 June 1942.....	11,298.91
From 1 July 1942 to 30 June 1943.....	7,946.85
From 1 July 1943 to 30 June 1944.....	10,823.21
From 1 July 1944 to 30 June 1945.....	12,676.37
From 1 July 1945 to 27 February 1946.....	7,654.53

Total administration expenditures from 1 January 1923
to 27 February 1946..... \$140,597.07

A financial report of the Colorado River Commission from 1 January 1923 to 27 February 1946 is as follows:

Balance January 1, 1923.....	\$0.00
Appropriation 1923 Statutes, page 36.....	5,000.00
	\$5,000.00
Less 1923 administration disbursements.....	1,908.15
Balance December 31, 1923.....	\$3,091.85

Balance January 1, 1924.....	\$3,091.85
Less 1924 administration disbursements.....	918.55
Balance December 31, 1924.....	\$2,173.30
Balance January 1, 1925.....	\$2,173.30
Appropriation, 1925 Statutes, page 197.....	2,000.00
	\$4,173.30
Less 1925 administration disbursements.....	2,611.44
Balance December 31, 1925.....	\$1,561.86
Balance January 1, 1926.....	\$1,561.86
Less 1926 administration disbursements.....	1,561.44
	\$0.42
Less reversion to General Fund.....	.42
Balance December 31, 1926.....	\$0.00
Balance January 1, 1927.....	\$0.00
Appropriation, 1927 Statutes, page 132.....	4,000.00
	\$4,000.00
Less 1927 administration disbursements.....	3,196.18
Balance December 31, 1927.....	\$803.82
Balance January 1, 1928.....	\$803.82
Appropriation, 1928 Statutes, page 7.....	15,000.00
	\$15,803.82
Less 1928 administration disbursements.....	15,213.10
Balance December 31, 1928.....	\$590.72
Balance January 1, 1929.....	\$590.72
Appropriation, 1929 Statutes, page 149.....	10,000.00
	\$10,590.72
Less 1929 administration disbursements.....	4,292.04
Balance December 31, 1929.....	\$6,298.68
Balance January 1, 1930.....	\$6,298.68
Less 1930 administration disbursements.....	6,298.68
Balance December 31, 1930.....	\$0.00
Balance January 1, 1931.....	\$0.00
Appropriation, 1931 Statutes, page 183.....	1,000.00
	\$1,000.00
Less January 1, 1931 to June 30, 1931 administration disbursements..	549.33
	\$450.67
Less reversion to General Fund.....	450.67
Balance June 30, 1931.....	\$0.00
Balance July 1, 1931.....	\$0.00
Appropriation, 1931 Statutes, page 189.....	5,000.00
	\$5,000.00
Less July 1, 1931 to June 30, 1932 disbursements.....	555.28
Balance June 30, 1932.....	\$4,444.72

Balance July 1, 1932.....		\$4,444.72
Less July 1, 1932 to June 30, 1933 disbursements.....		448.61
		<u>\$3,996.11</u>
Less reversion to General Fund.....		3,996.11
Balance June 30, 1933.....		\$0.00
Balance July 1, 1933.....		\$0.00
Appropriation, 1933 Statutes, page 346.....		1,000.00
		<u>\$1,000.00</u>
Less July 1, 1933 to June 30, 1934 disbursements.....		196.38
Balance June 30, 1934.....		\$803.62
Balance July 1, 1934.....		\$803.62
Appropriation, 1935 Statutes, page 151.....		25,000.00
		<u>\$25,803.62</u>
Less July 1, 1934 to June 30, 1935 disbursements.....		799.11
		<u>\$25,004.51</u>
Less reversion to General Fund.....		4.51
Balance June 30, 1935.....		\$25,000.00
Balance July 1, 1935.....		\$25,000.00
Less July 1, 1935 to June 30, 1936 disbursements.....		2,741.11
Balance June 30, 1936.....		\$22,258.89
Balance July 1, 1936.....		\$22,258.89
Add Receipts—		
Sale of power to Southern Nevada Power Co.....		1,193.18
		<u>\$23,452.07</u>
Less Disbursements—		
Cost of sale of power to Southern Nevada		
Power Company	\$747.26	
Administration costs	6,593.20	
		<u>7,340.46</u>
Balance June 30, 1937.....		\$16,111.61
Balance July 1, 1937.....		\$16,111.61
Add Receipts—		
Contingent receipts	\$50.60	
Sale of Power to Southern Nevada Power Co.....	35,144.05	
		<u>35,194.65</u>
		<u>\$51,306.26</u>
Less Disbursements—		
Cost of sale of power to Southern		
Nevada Power Company.....	\$26,346.67	
Administration	6,001.99	
		<u>32,348.66</u>
Balance June 30, 1938.....		\$18,957.60

Balance July 1, 1938.....		\$18,957.60
Add <i>Receipts</i> —		
Sale of power to Southern Nevada Power Company	\$94,719.59	
Contingent receipts	68.70	
		<u>94,788.29</u>
Less <i>Disbursements</i> —		\$113,745.89
Cost of sale of power to Southern Nevada Power Company	\$66,511.86	
Payment on 1935 loan from General Fund.....	5,000.00	
Administration	10,886.73	
		<u>82,398.59</u>
Balance June 30, 1939.....		\$31,347.30
Balance July 1, 1939.....		\$31,347.30
Add <i>Receipts</i> —		
Sale of power to Southern Nevada Power Company	\$42,813.42	
Sale of power to Overton Power District No. 5.....	3,129.37	
Sale of power to Lincoln County Power District No. 1.....	57,880.84	
Colorado River Commission of Arizona.....	50.00	
		<u>103,873.63</u>
Less <i>Disbursements</i> —		\$135,220.93
Cost of sale of power to Southern Nevada Power Company	\$28,450.35	
Cost of sale of power to Lincoln County County Power District No. 1 and Overton Power District No. 5.....	33,548.21	
Machinery and equipment costs.....	22,819.96	
Administration	12,738.50	
		<u>97,557.02</u>
Balance June 30, 1940.....		\$37,663.91
Balance July 1, 1940.....		\$37,663.91
Add <i>Receipts</i> —		
Sale of power to Southern Nevada Power Company	\$56,414.35	
Sale of power to Overton Power District No. 5.....	5,023.70	
Sale of Power to Lincoln County Power District No. 1.....	46,623.68	
Colorado River Commission of Arizona.....	250.00	
Refund on travel.....	139.25	
		<u>108,450.98</u>
Less <i>Disbursements</i> —		\$146,114.89
Cost of sale of power to Southern Nevada Power Company	\$35,486.57	
Cost of sale of power to Lincoln County Power District No. 1.....	30,494.77	
Cost of sale of power to Overton Power District No. 5.....	1,846.84	
Reserve Account	50,189.24	
Administration	12,687.38	
		<u>130,704.80</u>
Balance June 30, 1941.....		\$15,410.09

Balance July 1, 1941.....		\$15,410.09
Add Receipts—		
Sale of power to Southern Nevada Power Company	\$71,444.88	
Sale of power to Overton Power District No. 5.....	5,492.52	
Sale of power to Lincoln County Power District No. 1.....	47,492.96	
Refund on travel.....	3.15	
		<u>124,433.51</u>
		\$139,843.60
Less Disbursements—		
Cost of sale of power to Southern Nevada Power Company	\$38,582.68	
Cost of sale of power to Lincoln County Power District No. 1.....	28,184.14	
Cost of sale of power to Overton Power District No. 5.....	1,932.92	
Reserve account	38,969.14	
Administration	11,298.91	
		<u>118,967.79</u>
Balance June 30, 1942.....		\$20,875.81
Balance July 1, 1942.....		\$20,875.81
Add Receipts—		
Sale of power to Southern Nevada Power Company	\$126,078.79	
Sale of power to Overton Power District No. 5.....	53,657.09	
Sale of power to Lincoln County Power District No. 1.....	6,997.80	
Miscellaneous refund	3.04	
		<u>186,736.72</u>
		\$207,612.53
Less Disbursements—		
Administration	\$7,946.85	
Cost of power.....	157,252.43	
Repayment to General Fund.....	20,000.00	
		<u>185,199.28</u>
Balance June 30, 1943.....		\$22,413.25
Balance July 1, 1943.....		\$22,413.25
Add Receipts—		
Sale of power to Southern Nevada Power Company	\$180,467.72	
Sale of power to Lincoln County Power Company	41,951.97	
Sale of power to Overton Power Company	8,174.22	
Sale of power and water to Basic Magnesium.....	233,864.19	
		<u>464,458.10</u>
		\$486,871.35
Less Disbursements—		
Administration	\$10,823.21	
Cost of power	430,549.04	
		<u>441,372.25</u>
Balance June 30, 1944.....		\$45,499.10

Balance July 1, 1944.....		\$45,499.10
Add Receipts—		
Sale of power to Southern Nevada Power Company	\$177,133.67	
Sale of power to Lincoln County Power Company	51,271.92	
Sale of power to Overton Power Company	9,875.42	
Sale of power and water to Basic Magnesium.....	383,552.51	
Sale of automobile	500.00	
Sale of proceeding of Colorado River Water Users Association	250.00	
		<u>622,583.52</u>
		\$668,082.62
Less Disbursements—		
Administration	\$12,676.37	
Cost of power	581,369.48	
		<u>594,045.85</u>
Balance June 30, 1945.....		\$74,036.77
Balance July 1, 1945.....		\$74,036.77
Add Receipts—		
Sale of power to Southern Nevada Power Company	\$128,772.05	
Sale of power to Lincoln County Power Company	33,317.80	
Sale of power to Overton Power Company	6,076.70	
Sale of power and water to Basic Magnesium.....	34,471.19	
Contingent receipts	10.00	
		<u>202,647.74</u>
		\$276,684.51
Less Disbursements—		
Cost of power	\$168,906.60	
Administration	7,654.53	
		<u>176,561.13</u>
Balance February 23, 1946.....		\$100,123.38

Very truly yours,

HENRY C. SCHMIDT,

State Controller.

By KERWIN L. FOLEY, *Deputy.*

The present balance of \$100,123.38 has been accumulated over expenses since July 1, 1936, when sale of power began.

Attention is called to items labeled "Reserve Account" for the years ending June 30, 1941, and June 30, 1942. This was not reserve account, but is money that was paid to the Bureau of Reclamation for Generating Costs, and includes components for amortization, replacements, operation, and maintenance. In other years it will be observed that this expense was included with "Sale of power to contractors," together with the energy, or "falling water" cost.

For strict historical accuracy of expenses, items aggregating

\$13,725.13 should be added. These comprise relief appropriations made by the Legislature in the years 1929 and 1931 for Colorado River Commission work, of which \$11,541.64 was for the relief of George W. Malone, secretary for the original commission, and the remaining \$2,183.49 for the relief of others.

CONFERENCE WITH CHEMICAL MANUFACTURERS AT LAS VEGAS

This meeting was held at BMI plant offices on December 5, 1945. Present were the following:

Hardesty Chemical Company—

S. J. Cohen, President.

Stewart Oxygen Company—

D. J. Will, Vice President and General Manager.

Western Electrochemical Company—

Kenneth Walsh, President; Joseph C. Schumacher, Vice President; Fred Gibson, Manager; Robert Burns.

Stauffer Chemical Company—

John Stauffer, President; Paul Brallier, Manager; Roger Gunder.

State of Nevada—

Governor Vail Pittman; Alfred Merritt Smith, State Engineer; A. J. Shaver, Resident Engineer for the Colorado River Commission of Nevada; Lloyd Compton, Assistant Manager of Southern Nevada Power Company.

Colorado River Commission—

Governor Vail Pittman, Ed W. Clark, Alfred Merritt Smith.

Interested Parties—

Guernsey Frazer, Public Relations Manager for J. M. Montgomery Company; A. E. Cahlan, Editor Las Vegas Review-Journal; Ragnald Fyhen, American Federation of Labor, and Local Labor Unions.

The meeting had been called on very short notice in order for the State representatives to meet and become acquainted with the presidents and general managers of several chemical manufacturing companies who had been assembled at Henderson to discuss with the commission their related problems in regard to locating branches of their respective industries at the Basic Magnesium, Inc., plant, using building and equipment left idle when the large magnesium metal reduction plant was closed down by the Defense Plant Corporation.

The manufacturers desired more information in regard to

what the State could do in regard to supply and cost of power. The Governor's committee, with H. H. Gillings and Lloyd Compton as spokesman, related the steps that had been taken by the State and Southern Nevada Power Company with respect to obtaining interim demand power during the interval of time when withdrawal notices for State power would be running. They stated that the outline of an agreement had been submitted by Southern California Edison Company with the approval of the City of Los Angeles Department of Water & Power, which contemplated supply of power at a rate which the committee representatives stated would approximate 3.25 mills per kilowatt-hour for purchase of up to a total of 30,000 kilowatts. Further details of the proposed agreement were not discussed with the general group at that time.

D. J. Will stated that his company was then obtaining power in Washington State from the Bonneville plant at about 2 mills per kilowatt-hour. He said they expected to get power there for still less, as the Government was talking of releasing excess power as dump power for which there was no present market. This would probably be available at about 1 mill per kilowatt-hour. Exception was taken to Will's statement by Lloyd Compton, who said that there was a "ratchet" clause in the contracts which compelled companies using Bonneville energy to purchase additional power from private power companies at the prevalent or existing commercial rates when Bonneville power was short, or was needed for other purposes. Compton expressed an opinion that if the Government for any reason whatever, elected to sell very low-price power at Bonneville or elsewhere at less than the actual cost of production—the difference to be made up by the taxpayers—it would be a subsidy over which we would have no control. Boulder Dam power had no such advantage, and under the law must be sold at fixed costs which included the firm energy falling water rate of 1.244 mills per kilowatt-hour, plus the cost of generation, and the State cannot offer it for less than the actual cost of production. He stated that the present contract we are trying to negotiate with Edison Company and the City of Los Angeles contemplates an overall cost of approximately 3.25 mill power, but we hope to get it for 3 mills. Compton said that the allottees we are dealing with must know what load will be required at BMI in order for us to get a contract. Discussion followed, indicating quite definitely that the future BMI load would vary from 20,000 to 60,000 kilowatts, and could not be definitely stated.

Compton said that any load in excess of 30,000 kilowatts would probably have to be replaced by steam energy generated by Edison Company and the City of Los Angeles. He said at this time it was not possible to exactly peg the rate the Nevada contractors would have to pay for this power under the proposed contract, but it would not be above 3.25 mills per kilowatt-hour.

Gillings stated that he would ask the Reconstruction Finance Corporation to underwrite the proposed contract for power to be made with the City and Edison Company. He stated that RFC owns the large BMI property which cost some \$140,000,000, and has this great investment to protect. The operation of the various chemical companies and other manufacturers who would like to locate there would preserve the investment and defray much of the great expense which otherwise would have to be met by RFC to protect and maintain the property on an idle status. He said that until recently RFC and its successor War Assets Administration had a desire to liquidate all of their many plants as rapidly as possible and take the losses, but that now, especially at the BMI plant, their attitude seemed to be changing and they are spending considerable money at Henderson, possibly equal to one million dollars a year to keep that property up, and have also been encouraging the chemical men to come in and locate there.

In response to a question, Compton stated that in his opinion the interim power rate, which would be not more than 3.25 mills, might be less when power became available to the manufacturing companies under the State regulations and withdrawals, but in any event it would be sold at net cost.

General discussion followed, in which it was stated that Nevada's firm power right in Boulder Dam plant is about 750,000,000 kilowatt-hours annually, subject to certain minor annual reductions, and that at the present time not more than 100,000,000 kilowatt-hours are being withdrawn and used by Nevada. The total energy generated at Boulder Dam ranges between 4 and 5 billion kilowatt-hours per year, out of which Nevada's 100,000,000 is a comparatively trivial amount. A great total ranging around 4½ billion kilowatt-hours per year is transmitted to the California allottees. These allottees are obligated by the Government to take this power, and in order to do so have spent vast sums for transmission lines to Los Angeles. These allottees use all of the power they can obtain from Boulder Dam plant, as it is lower in cost than steam generated energy. When we ask for energy under any other conditions than the legal General

Regulations established for Nevada and Arizona withdrawals, as we are doing now in this interim demand contract, they must replace a part or all of the power released by steam power which costs more, and we must expect to pay the difference. They are also supplying us with stand-by service for this interim power, which further increases the cost.

Gillings stated that he was absolutely sure the BMI load would be over 30,000 kilowatts to begin with, with the outlook very favorable for an increase up to 50,000 or 60,000.

Compton stated in summing up the proposal that RFC be asked to underwrite the proposed demand contract with Southern Nevada Power Company as to the advance monthly payments required.

Kenneth Walsh, President of Western Electrochemical Company, stated that Nevada's only asset in this situation is the low power rate the State could make available. He said other conditions are unfavorable for an industrial center at Basic. Mr. Cohen, President of the Hardesty Chemical Company concurred, saying the whole set-up depends upon the power rate. Discussion turned upon freight rates over the Union Pacific Railroad which were highly unfavorable for the location of any industry at Basic. Transportation by truck for their particular products was also unfavorable. Terminal rates and water transportation in Los Angeles and at eastern points were lower and very much more favorable. The entire group of chemical men present said that something must be done about freight rates, for that was quite as important to them as the matter of location and cheap power.

Al Cahlan stated that Union Pacific would have a new president next year who he hoped would be favorably inclined to freight rate reductions. Mr. Gillings suggested that a committee be set up to work on the rate structure and confer with the railroad. Discussion followed as to procedure, with an opinion that after definite figures had been worked out as to tonnage and rates for comparison, the entire group might meet with the railroad officials and be more effective than a committee of one or two. Mr. Cohen said that in any approach to the railroad officials we should not allow a consideration of their agreements with other railroad companies to enter in or influence us. The proposition should be to give the railroad definite figures as to tonnage we would be able to supply at certain rates, and if such rates could not be made there would be no tonnage at all from Boulder Dam, and that there would be no business there for the railroad company.

Mr. Sam Cohen of Hardesty Chemical Company stated that

the Union Pacific was taking full advantage of the remote location and lack of competition at Boulder Dam. Reference was made to chlorine worth \$35 per ton upon which the railroad freight rate to the eastern market is fixed at \$35 per ton. He said that work must be done to have these rates adjusted because Nevada does not have much to trade on in getting industries to come in there. He stressed the point that once they located at Basic they would have a large tonnage of freight.

Cohen stated that his company would be operating in Basic at that time if it were not for some unexplained delays in Washington. He said that they had been waiting for authorization from RFC to begin construction since last August, and have several car-loads of material at Basic now.

Referring again to the power rate, Mr. Gillings stated that he could give a definite rate after he had talked to RFC in regard to underwriting the interim power proposal.

Cohen repeated that he had been trying to push contracts with the RFC since last August and had a man located in Washington for that purpose. Gillings said that Senator McCarran had been very helpful with their problems and in their approach to RFC. Mr. Walsh and others present complimented Mr. Gillings on the work that he had done in their behalf.

Cohen said he had told Senator McCarran that there seemed to be some influences working against Nevada in regard to getting industries started at Basic. He cited several instances of industries going to Texas, California, and other locations, large industries which are investing some five to fifteen million dollars each. The inference was that some of these could have done much better by coming to Basic.

Al Cahlan said that much might be accomplished with closer contact with former United States Senator Henderson, now with RFC. Mr. Cohen stated that he had been in contact with Mr. Henderson and also with Mr. Sam Husbands who seemed to be quite familiar with all of the problems. Mr. Gillings said that Mr. Stansfield of RFC was a splendid person to work with and had been very cooperative and helpful.

Ragnald Fyhen, representing American Federation of Labor, asked if it would not help the situation if labor had a representative on any committee which might be sent to Washington to confer with RFC in this matter. The reaction of the group was favorable to his suggestion. John Stauffer, President of the Stauffer Chemical Company, said that probably the presence of a labor representative urging the underwriting of the contract

and other features might have more effect on Washington officials than the approach of representatives of industry.

Mr. Will, Vice President and General Manager of the Stewart Oxygen Company, asked if there would be any objection to their locating a part or all of their plant outside the area and away from the BMI enclosures, and if that would have any effect upon their power rate. He was assured by Mr. Compton that it would not affect their rate. Mr. Will explained that considerable dust is created by their operation and that it would be necessary for them to locate some distance away from buildings and other plants in order not to become liable for property damage through dust. Compton said it might be necessary to talk over their proposed location in regard to transmission lines, etc.

On March 15, 1946, H. H. Gillings listed present prospective power users at BMI Plant as follows:

	<i>Kilowatts</i>
Western Electro-Chemical Co. (5-year contract).....	14,000
Hardesty Chemical Co.....	1,000
Stewart Oxygen Co. (2,000-5,000).....	2,000
Stauffer Chemical Co. (5-year contract).....	15,000
New York & Ohio Company.....	500
Electro-Metropolitan Corporation (prospective)	15,000
Glenn Martin Co. (prospective).....	2,000
U. S. Vanadium Corporation.....	4,000
Total	53,500

FINANCIAL**COLORADO RIVER COMMISSION OF NEVADA****Statement of Receipts and Disbursements for the Operating Year 1944-1945***Power Account—*

Balance July 1, 1944.....	\$1,300.00	
1944-1945 receipts	583,458.44	
Total		\$584,758.44
<i>Less Disbursements—</i>		
To U. S. for 1944-1945 costs.....		581,411.89
Balance July 1, 1945.....		*\$3,346.55

Commission Fund Account—

Balance July 1, 1944.....	\$44,199.10	
Receipts 1944-1945	46,044.09	
Total		\$90,243.19

Commission Expenses, Carson City Office—

Compensations	\$515.88	
Travel expense	2,372.24	
Express and postage.....	59.05	
Telephone and telegraph.....	273.54	
Supplies and equipment.....	1,459.72	
Publications and printing.....	211.10	
Miscellaneous	646.09	
Total Carson City Office.....		\$5,537.62

Commission Expenses, Las Vegas Office—

Compensations	\$5,510.00	
Travel expense	801.17	
Express and postage.....	18.73	
Telephone and telegraph.....	161.68	
Supplies and equipment.....	21.95	
Rent	480.00	
Miscellaneous	108.42	
Total Las Vegas Office.....		7,101.95

Total expense		12,639.57
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Balance July 1, 1945.....		\$77,603.62
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*Of this amount, \$1,300 is advance payment by Southern Nevada Power Company for metering equipment installed at Boulder power plant by the Bureau of Reclamation. This amount is held in reserve pending receipt of a bill from the Bureau, and the balance of \$2,046.55 represents a reserve built up by the Southern Nevada Power Company on generating charges.

COLORADO RIVER COMMISSION OF NEVADA

**Statement of Receipts and Disbursements for the Period July 1, 1945,
to June 1, 1946**

<i>Power Account—</i>		
Balance July 1, 1945.....	\$3,346.55	
Receipts July 1, 1945, to June 1, 1946.....	232,500.48	
Total		\$235,847.03
<i>Less Disbursements—</i>		
To U. S. for costs July 1, 1945, to June 1, 1946.....		225,123.84
Balance June 1, 1946.....		*\$10,723.19
<i>Commission Fund Account—</i>		
Balance July 1, 1945.....	\$77,603.62	
Receipts July 1, 1945, to June 1, 1946.....	24,749.31	
Total		\$102,352.93
<i>Commission Expenses, Carson City Office—</i>		
Compensations	\$390.50	
Travel expense	2,321.02	
Express and postage.....	42.50	
Telephone and telegraph....	192.82	
Supplies and equipment.....	229.96	
Publications and printing.....	64.20	
Miscellaneous	372.50	
Total Carson City Office.....		\$3,613.50
<i>Commission Expenses, Las Vegas Office—</i>		
Compensations	\$4,985.26	
Travel expense	1,189.70	
Express and postage.....	19.73	
Telephone and telegraph....	316.13	
Supplies and equipment.....	1.85	
Rent	440.00	
Miscellaneous	107.83	
Total Las Vegas Office.....		7,060.50
Total expense		10,674.00
Balance June 1, 1946.....		\$91,678.93

COMMENTS

An optimistic view may be taken of the possibilities of future industrial development in Southern Nevada through the use of electric energy from Boulder Dam. Although the best procedure may not seem clear and is troublesome just now as a part of the generally muddled postwar economic picture, it is our belief that it is being worked out in a satisfactory way.

The power from Boulder Dam Plant allotted to Nevada under the Boulder Project Act amounts to slightly less than 18 percent of the total firm energy output, or about 750,000,000 kilowatt-hours per year. This power belongs to the State forever, and only a very small part of it can be lost by nonuse, and that only

*Of this amount \$1,300 is advance payment by Southern Nevada Power Company for metering equipment installed at Boulder Power Plant by the Bureau of Reclamation. This amount is held in reserve pending receipt of a bill from the Bureau, and the balance of \$9,423.19 represents a reserve built up by the Southern Nevada Power Company on generating charges.

to Arizona on demand, which is a remote contingency. Any part of this power can be withdrawn by Nevada, subject to the advance notices of withdrawal and upon our providing the generating machinery, transformers, and other facilities. The existing withdrawal regulations probably will not adversely affect the desire of any well established and substantial electrochemical industry from locating near Boulder Dam in order to secure use of Nevada's low-priced energy. This energy, which is sold at net cost, will prove to be an electro magnet to attract industry. All too soon Nevada's allotment, large though it now seems, will be absorbed and we shall be looking for more from other Colorado River plants yet to be built. Looking ahead in anticipation of that need, we have requested the Bureau of Reclamation for an allotment of 45,000 kilowatts of generating capacity at Davis Dam when the dam has been completed and the energy becomes available. A transmission line may be required for transmission of the energy from Davis Dam to the Boulder Dam-Las Vegas area, although this necessity could be obviated by an exchange of Davis energy for Boulder energy. This Davis Dam energy will not only supply southern Nevada's future requirements for more energy, but should also supply Nevada's need for immediate delivery or demand energy we should have, but which was not provided for under the Boulder Project Acts.

Davis Dam and plant is being constructed under very different national legislation than was Boulder Dam. Nevada can obtain generating capacity in the Davis plant without assuming any obligation other than to pay the charge for energy as it is sold, including amortization of the machinery used for its generation. If the State should fail to meet the monthly charges, the equipment will be turned over to other agencies, as it always remains the property of the Government.

The commission has always thought that it should not request the installation of a major generator at Boulder Dam plant until full use of it is assured by Nevada and other allottees. The cost of such machinery and its installation will range between \$3,000,000 and \$4,000,000, a large sum for Nevada, and the commission has no authority to speculate upon future use of energy to defray it. California allottees have never in the past agreed to contract with Nevada for use of the excess capacity, or for excess kilowatt-hours. It appears now, from recent conferences, that a satisfactory agreement will be worked out whereby Nevada will install generating machinery and Los Angeles will use our excess generating capacity and also provide stand-by service. As this is written, plans and negotiations are in progress and the prospect

of solution of the problem is good. Three different diagrams of schemes for installation of two major units, one by Nevada and one by Los Angeles, are being studied by the Bureau of Reclamation, Division of Power, at Boulder City. The outlook for general acceptance of one of these plans is very favorable.

A danger to Nevada in full benefit and use of Boulder energy lies in competition with lower-priced Government-subsidized power at Bonneville, where a rate of as low as 2 mills per kilowatt-hour might be offered under certain conditions. This may cause some industries now contemplating establishment in the Las Vegas area to go to Bonneville instead. Nevada may not be able to successfully compete with power subsidized by the Government at Bonneville or elsewhere, if it should be offered to the public at prices lower than possible at Boulder, where there is no subsidy and contracts had to be made for repayment of construction before the dam was built. But it seems likely that the differential will be very small. A slightly higher rate may be offset by other advantages to be had in Nevada, such as better climate, lower taxes, better labor and transportation factors. The warm climate of southern Nevada is conducive to continuous all-year operations and attractive living conditions. Other large hydro-electric installations on the Colorado River near Boulder Dam will eventually be constructed and afford new energy which Nevada may buy at low rates. Davis Dam, 67 miles downstream from Boulder Dam is under construction and will have an installed capacity of 225,000 kilowatts and supply 800,000,000 kilowatt-hours of firm energy. The Davis reservoir will have a capacity of 1,600,000 acre-feet. Bridge Canyon Dam and plant, to be of 650,000 kilowatts installed capacity, and just above Boulder Dam, will probably be built next, and will be followed by the Kanab Creek project with 1,250,000 kilowatts of installed capacity, located about 120 miles airline distance northeast of Boulder Dam. These new systems will be interconnected with the Boulder Dam transmission lines and should tend to keep the energy rates low. The Rockwell report, mentioned herein, contemplates such interconnecting systems with a uniform voltage of 220,000, and contains diagrams showing how it probably would be accomplished.

As this is being written, two new members take seats on the commission by appointment of Governor Pittman. A. E. Cahlan, distinguished and able newspaper editor and publisher of Las Vegas succeeds Edward W. Clark, deceased. John V. Mueller, well known engineer in Nevada, replaces A. J. Caton, whose eleven years of continuous valuable work on the commission ends with his resignation because of ill health.

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