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TENTH ANNUAL REPORT
OF THE
Upper Colorado
River Commission



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JANUARY 1, 1959

TENTH ANNUAL REPORT
OF THE
Upper Colorado
River Commission



SALT LAKE CITY, UTAH
JANUARY 1, 1959

IVAL V. GOSLIN
ENGINEER - SECRETARY

UPPER COLORADO RIVER BASIN

COLORADO RIVER STORAGE PROJECT AND PARTICIPATING PROJECTS

UPPER COLORADO RIVER COMMISSION

Public Law 485, 84th Congress



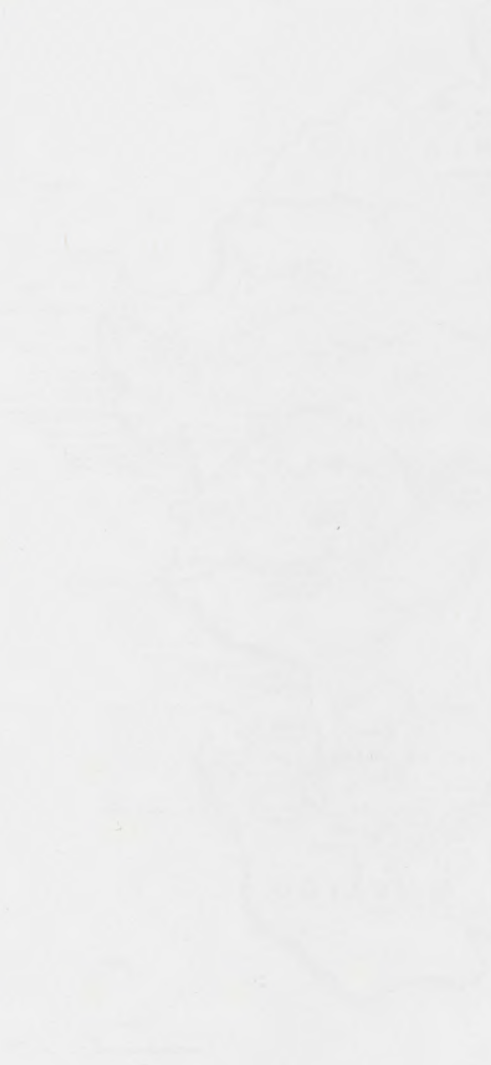
STATE OF NEW YORK

IN SENATE

JANUARY 1, 1900

REPORT

OF THE





UPPER COLORADO RIVER COMMISSION

Ray Building / Room 103 / 366 South Fifth East Street

Salt Lake City 2, Utah

March 25, 1959

Mr. President:

The Tenth Annual Report of the Upper Colorado River Commission, as required by Article VIII (d) (13) of the Upper Colorado River Basin Compact, is enclosed.

The budget of the Commission is included in this report as Appendix B.

This report has also been transmitted to the Governor of each State signatory to the Upper Colorado River Basin Compact.

Respectfully yours,

Ival V. Goslin
Engineer-Secretary

The President
The White House
Washington 25, D.C.

Enclosure

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I. Preface

Article VIII (d) (13) of the Upper Colorado River Basin Compact requires the Upper Colorado River Commission to "make and transmit annually to the Governors of the signatory States and the President of the United States of America, with the estimated budget, a report covering the activities of the Commission for the preceding water year."

Article VIII (1) of the By-Laws of the Commission specify that "the Commission shall make and transmit annually on or before April 1 to the Governors of the states signatory to the Upper Colorado River Basin Compact and to the President of the United States a report covering the activities of the Commission for the water year ending the preceding September 30."

This Tenth Annual Report of the Upper Colorado River Commission has been compiled pursuant to the above directives with one exception. That exception being that we have included the period beyond September 30, 1958 to December 31, 1958 in this report in conformity with the practice of previous years when the reports have included periods as late as March of the year following "the previous September 30" of the Compact requirement. Our objective for future reports will be to conclude the report as of September 30 of the previous water year as stipulated in both the Compact and the By-Laws and to compile it during the period between October 1 and December 31 in order to avoid the pressure of events that follow immediately after the first of each year.

This Annual Report includes, among other things, the following:

Membership of the Commission, its Committees, Advisers, and staff;

Roster of meetings of the Commission;

Brief discussion of the activities of the Commission;

Brief discussion of the Storage Units and participating projects and of the status of their construction or investigations;

Appendices containing:

Fiscal data, such as: budget, balance sheet, statements of revenue and expense, etc;

List of construction contract awards for Units and projects of the Colorado River Storage Project;

Second Annual Report of Secretary of the Interior on financial status of Colorado River Storage Project and participating projects;

List of gaging stations used by the Commission and transmountain diversions from the Upper Colorado River Basin.

The First Annual Report of the Upper Colorado River Commission contained several important documents that constituted "the law of the river." Our supply of this report is depleted. Because copies of these documents are not readily available elsewhere in printed form, we are again including them as appendices. These documents are:

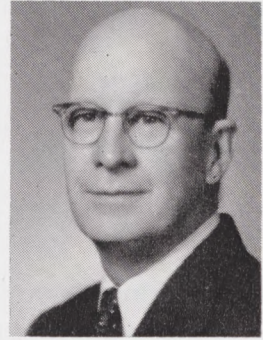
- (a) Colorado River Compact;
- (b) Upper Colorado River Basin Compact;
- (c) Mexican Water Treaty

The By-Laws of the Upper Colorado River Commission were amended during the past year. Copies of the amended By-Laws are also included as an additional appendix.

II. Commission



Edwin C. Johnson
Commissioner for
Colorado



John H. Bliss
Commissioner for
New Mexico



Robert J. Newell
Chairman
Commissioner for
United States



George D. Clyde
Vice-Chairman
Commissioner for
Utah



Earl Lloyd
Commissioner for
Wyoming

III. Committees

The Committees of the Commission convened when required during the year.

Committees and their membership, at the date of this report, are as follows (The Chairman and the Secretary are ex-officio members of all committees, Article V (4) of By-Laws):

STANDING COMMITTEES

Engineering Committee

Ival V. Goslin, Chairman	H. T. Person
R. M. Gildersleeve	Earl Lloyd
L. R. Kuiper	Jay R. Bingham
Stephen E. Reynolds	Wayne D. Criddle
David P. Hale	

Legal Committee

E. R. Callister, Jr., Chairman	Felix L. Sparks
J. Stuart McMaster	Laurence Davis
Irwin S. Moise	Thomas O. Miller
Claud Mann	Ray L. Moses

Budget Committee

John H. Bliss, Chairman	Norman W. Barlow
Felix L. Sparks	Jay R. Bingham

SPECIAL COMMITTEES

Finance Committee

Norman W. Barlow, Chairman	Wayne D. Criddle
I. J. Coury	Felix L. Sparks

Education and Information Committee

Edwin C. Johnson, Chairman	Earl Lloyd
John H. Bliss	Jay R. Bingham

IV. Advisers to Commissioners

The following individuals contributed greatly of their time and efforts as advisers to their respective Commissioners:

UNITED STATES OF AMERICA

Legal

J. Stuart McMaster, Field Solicitor
U. S. Department of the Interior
Salt Lake City, Utah

Laurence Davis, Assistant General Counsel
The Navajo Tribe
Window Rock, Arizona

James D. Geissinger, Regional Solicitor
U. S. Department of the Interior
Denver, Colorado

Engineering

J. R. Riter, Chief Development Engineer
Bureau of Reclamation
Denver, Colorado

G. B. Keesee, Area General Engineer
Bureau of Indian Affairs
Gallup, New Mexico

COLORADO

Legal

Felix L. Sparks, Director
Colorado Water Conservation Board
Denver, Colorado

Ray L. Moses, Legal Counsel
Colorado Water Conservation Board
Alamosa, Colorado

Engineering

R. M. Gildersleeve, Chief Engineer
Colorado Water Conservation Board
Denver, Colorado

Leonard R. Kuiper, Supervising Hydraulic Engineer
Colorado Water Conservation Board
Denver, Colorado

Frank C. Merriell, Consulting Engineer
Grand Junction, Colorado

L. N. McClellan, Consulting Engineer
Denver, Colorado

NEW MEXICO

Legal

Irwin S. Moise, Attorney-at-Law
Albuquerque, New Mexico

Claud S. Mann
Special Assistant Attorney General
Albuquerque, New Mexico

Engineering

Stephen E. Reynolds, State Engineer
Santa Fe, New Mexico

David P. Hale, Engineer
New Mexico Interstate Stream Commission
Santa Fe, New Mexico

UTAH

Legal

E. R. Callister, Jr., Attorney General
Salt Lake City, Utah

Engineering

Jay R. Bingham, Director
Utah Water and Power Board
Salt Lake City, Utah

Wayne D. Criddle, State Engineer
Salt Lake City, Utah

WYOMING

Legal

Thomas O. Miller, Attorney General
Cheyenne, Wyoming

Engineering

H. T. Person, Dean of College of Engineering
University of Wyoming
Laramie, Wyoming

Alternates in Absence of Commissioner

Joe L. Budd
Big Piney, Wyoming

Norman W. Barlow
Cora, Wyoming

V. Staff

Members of the staff of the Upper Colorado River Commission, at the time of compiling this report, are:

Ival V. Goslin, Engineer-Secretary

Paul A. Rechard, Senior Engineer

Mrs. Clara H. Wallace, Administrative Assistant

Barney L. Whatley, Treasurer

Richard T. Counley, Assistant Treasurer

Mrs. Lois P. Crowder, Official Reporter

VI. Meetings of the Commission

During the period covered by this report, the Commission met six times as follows:

Meeting No. 56	December 20, 1957	Special Meeting Cheyenne, Wyoming
Meeting No. 57	March 17, 1958	Regular Meeting Boise, Idaho
Meeting No. 58	August 14, 1958	Adjourned Regular Meeting Denver, Colorado
Meeting No. 59	September 15, 1958	Annual Meeting Boise, Idaho
Meeting No. 60	September 23 & 24, 1958	Adjourned Annual Meeting Santa Fe, New Mexico
Meeting No. 61	December 11, 1958	Special Meeting Salt Lake City, Utah

VII. Activities of the Commission

Within the scope and limitations of Article I (a) of the Upper Colorado River Basin Compact, "... to secure the expeditious agricultural and industrial development of the Upper Basin, the storage of water ..." and under the powers conferred upon the Commission by Article VIII (d) pertaining to making studies of water supplies of the Colorado River and its tributaries and the power to "... do all things necessary, proper or convenient in the performance of its duties ... , either independently or in cooperation with any state or federal agency," the principal activities of the Commission have consisted of: (A) research and studies of an engineering and hydrologic nature of various phases of the water resources of the Colorado River Basin; and, (B) an education and information program designed to aid in securing appropriations of funds by the United States Congress for the construction, planning and investigations of various units and projects of the Colorado River Storage Project and participating projects that were authorized for construction in Public Law 485, 84th Congress.

A. ENGINEERING — HYDROLOGY

During the past year it has become evident to everyone concerned with problems of investigation, planning and operation in the Colorado River Basin that the time is rapidly approaching when additional new dams, power generating facilities and water utilization projects will be having their effects upon the operation of existing facilities on the Colorado River System. The problems involved, although they directly relate to Storage Units and irrigation projects of the Colorado River Storage Project located in the Upper Colorado River Basin, are problems involving the interest and consideration of technicians of the entire Colorado River Basin.

Because the Colorado River Storage Project is a water resources development plan of the Upper Colorado River Basin, the Upper Colorado River Commission has determined that the active participation in investigations, studies and plans related to the present and future construction and operation of water-regulating, water-diversion, power-generating, water-utilization facilities is both necessary and expedient. The Commission has a primary duty in representing the four Upper Division States to do all things necessary both to protect the interest of its member States in the water resources of the Colorado River and to aid in seeing that those resources are developed in the best and most expeditious manner possible. In recognition of this responsibility,

which is accompanied by the necessity for making numerous engineering and hydrologic studies, the Commission has reorganized and reactivated its Engineering Committee. As will be noted in the lists of Committee members on page 12, this Committee is composed of two members representing each of the four Upper Division States with the Commission's Engineer-Secretary as chairman. The By-Laws of the Commission provide that the Federal Representative may appoint members to the Committee, but the Department of the Interior has determined that under the circumstances now existing in the Colorado River Basin, it is not advisable for the Department to allow its personnel to sit as active members of Committees of interstate policy-making organizations. The Engineering Committee is actively working on many technical problems, and is available to give guidance and recommendations to the Engineering staff and the Commission.

Reservoir Filling Studies

Since the Committee was reorganized in August of 1958, it has held several meetings for the purpose of discussing studies of procedures for filling Glen Canyon Reservoir. The Engineering Committee made the following basic recommendations to the Commission regarding the problems of filling the Upper Basin reservoirs currently under construction.

1. That the Engineering Committee and the Commission staff should make studies of Upper Basin reservoir filling problems using a wide range of criteria in order to know the adverse effects as well as the beneficial effects of assumed criteria;
2. That the continuing of filling studies should be the primary activity of our staff for the present;
3. That each State, insofar as it is able, should assign personnel to this problem to work through the Commission as a coordinating and directing agency;
4. That the Secretary of the Interior be requested to assign personnel to aid with reservoir filling studies and to make available basic data and information to the Upper Basin Engineering Committee on the same basis as personnel, basic data, and information are made available to the Lower Basin Engineering Group.
5. That all studies be made with the understanding that they are exploratory and not for publication, and that they are to be on the subject of filling Upper Basin reservoirs as contrasted with long-term operating procedures.
6. That the Engineering Committee, insofar as possible, confine its activities to fact-finding and making of studies as bases for recommendations to the Commission.

The background available to and considered by the Committee in arriving at the above recommendations included the facts that filling the Upper Basin reservoirs first became of paramount importance when problems related to the outlet gates at Glen Canyon Dam were made public, and it became known that pondage of about a million acre-feet of water would be necessary during construction. In order to answer questions from interested entities and to provide a basis for preparing an Annual Report to Congress under the terms of Section 6 of the Colorado River Storage Project Act, it became necessary for the U. S. Bureau of Reclamation to develop assumed criteria for a study of filling Glen Canyon Reservoir, which the Bureau called "Hydrologic Bases for Financial Analysis." These "Bases" were prepared using average flows of the river and were formally presented to representatives of all seven States of the Basin at a meeting in Washington, D. C. on October 24, 1957. During that same meeting, Lower Basin representatives introduced criteria for the long-term operation of Glen Canyon reservoir which they felt would be more appropriate.

At a subsequent meeting in Las Vegas, Nevada, on December 4 and 5, 1957, the two sets of criteria were discussed. It was decided that a group of engineers of the Lower Basin would meet with engineers of the Bureau of Reclamation for the purpose of studying the technical problems related to filling Glen Canyon Reservoir. This group, known as the Lower Basin Engineering Group, held several meetings with engineers of the Department of the Interior. The Lower Basin Engineering Group modified the earlier studies of the Department, which were based on average stream flows, by preparing studies using a recorded sequence of years of stream flows.

The recommendations of the Engineering Committee were approved by the Commission, and, in accordance with those recommendations, the Commission staff has devoted most of its time to engineering studies pertaining to criteria for filling Glen Canyon Reservoir. A great many assumed conditions and combinations of assumed conditions under which water might be stored in Glen Canyon Reservoir, released from Glen Canyon, stored in Lake Mead and released from Lake Mead, are being studied. Effects are being determined of the many combinations of assumed conditions on such significant items as: (a) date first power production at Glen Canyon could be expected; (b) annual and total energy produced at Glen Canyon and Hoover power plants, individually and combined; (c) date Glen Canyon Reservoir could first be filled; (d) amount of contract firm power that might be produced at Hoover and annual deficiencies in contract firm power; (e) amount of secondary power possible; (f) amount of water in storage at end of each year; (g) releases from Lake Mead in excess of downstream consumptive uses; (h) other significant hydrologic information.

The Commission's Engineering Committee had one joint meeting with engineers of the Department of the Interior for the purpose of a general discussion of Glen Canyon Reservoir studies that had been made.

By letter of September 26, 1958 our Engineering Committee has been invited to meet with the Lower Basin Engineering Group and the engineers of the Department of the Interior for a review of a series of objective studies made by the Lower Basin and Department Engineers relating to the filling of Glen Canyon Reservoir and the coordination of operations respecting storage and release from Glen Canyon Reservoir and Lake Mead and for a discussion of such additional studies as may be appropriate.

With the approval of the Commission, our Engineering Committee has accepted this invitation with the understanding that committee members cannot commit the agency or political subdivision that they represent, and that discussions of studies shall be confined to developing facts and determining the effects on filling Upper Basin Reservoirs of various hydrologic assumptions, and that all studies shall be exploratory and not for publication. At the time of writing this report, the initial joint meeting of the three groups of engineers has not been scheduled. It is expected to be held early in 1959.

Stream-Gaging Stations

The Commission is continuing its study of the stream-gaging program in the Upper Colorado River Basin with respect to future operation of the Storage Units and participating projects of the Colorado River Storage Project now under construction, as well as relative to an adequate hydrologic network and to future research into the Inflow-Outflow Method of measuring stream depletions in the Upper Basin and in each state thereof. Several stream-gaging conferences have been held with officials of the U. S. Geological Survey and Bureau of Reclamation. Due to budgetary limitations, the U. S. Geological Survey found it necessary to abandon the gaging station on the Colorado River at Hite, Utah at the end of the 1958 water year, and to request financial support, which was granted, from the State of Arizona in order to continue operation of the station on the Colorado River near Grand Canyon, Arizona.

Studies made by the Geological Survey, the Bureau of Reclamation and our office show that, as far as quantitative measurements of stream flow of the Colorado River at Hite, Utah are concerned, substantially the same results can be obtained by using a combination of records of other stations in the vicinity. The gaging station on the Colorado River near Grand Canyon, Arizona is regarded by representatives of all seven Colorado River Basin States as being a key station of national signif-

icance that may be necessary for successful river operation. Therefore, vigorous efforts are being made to have this station re-established as one supported entirely by Federal funds.

The Commission is continuing the collection, assembling, and analyzing of hydrographic records pertaining to the entire Colorado River Basin.

Reports on proposed water-development projects compiled by various Federal and State agencies have been examined and analyzed in order to ascertain the effects of such projects on the overall development of the water resources of the river system.

Forecasts of Stream Flow

Forecasts of water supply have not been made by the Engineering Department, nor have any findings of fact pertaining to water deliveries or stream depletions been made. Forecasts of stream flow made by various other agencies are to be found in the files of the Commission.

B. EDUCATION — INFORMATION

The Upper Colorado River Commission has directed its Education and Information efforts toward promoting interstate cooperation, harmony, and united efforts; developing an understanding in other sections of the United States of the problems of the Upper Colorado River Basin; and the creation of a favorable attitude on the part of Congress toward the development of the industrial and agricultural resources of the Upper Colorado River Basin.

The Commission has continued to cooperate with members of the Congressional Delegations from the Upper Colorado River Basin States and with officials of the Department of the Interior and the Bureau of Reclamation in seeking appropriations of funds by the Congress for the construction of the Storage Units and participating projects authorized for construction in Public Law 485, as well as funds for the investigations of additional participating projects that are given priority in planning in the Colorado River Storage Project Act. As part of this cooperation, the Commission's Engineer-Secretary has been stationed in Washington, D. C., at intermittent periods acting as liaison between the Congress and States and various departments of Government, supplying information, arranging and taking part in Congressional hearings, and providing other assistance requested.

The Special Committee on Education and Information has met several times during the past year and has studied and recommended activities for the Commission on matters of Education and Information.

On the recommendation of the Education and Information Committee, the brochure and pamphlet, both of which are entitled "The Colorado

River Storage Project," have been revised and republished to reflect changes to be made in the construction of proposed projects as the result of additional investigations and planning. Both of these publications are based upon the authorizing Act, P. L. 485, 84th Congress (70 Stat. 105). They illustrate and explain the major features in the initial phase of the Upper Colorado River Basin development.

Negotiations are presently underway to secure two 13½ minute films for use in our public information program. One film would highlight the reclamation features of the Upper Basin development and the other would emphasize the vast recreational values to the Nation to be derived from the Colorado River Storage Project and participating projects.

The Commission's Relief Model of the Upper Colorado River Basin and adjacent areas has been on display in the State Office Building in Denver, Colorado for over a year. It continues to be a real object of interest, especially to tourists from other parts of the country. The Commissioners of our respective states and our staff have continued to actively urge the Department of the Interior and the Bureau of Reclamation to proceed as rapidly as efficiently practicable with investigations of additional participating irrigation projects and with the completion of definite plan reports and construction of projects currently authorized by Congress. The Secretary of the Interior is also being urged to certify the economic justification of the Curecanti Storage Unit on the Gunnison River in western Colorado in order that its construction may be started at an early date.

The Upper Colorado River Commission is continuing the policy of cooperation with water organizations in all parts of the nation that have similar or mutual problems related to the orderly and progressive development of natural resources. During the past year this policy paid real dividends. In conjunction with sponsors of other water-development projects in many other States, concentrated cooperative efforts resulted in the appropriation by Congress of initial construction funds for nine new reclamation projects, two of which were in the Upper Colorado River Basin, and 50-60 rivers and harbors improvement and flood control projects throughout the United States in spite of the rigid budgetary limitations imposed by the Bureau of the Budget at the beginning of the Second Session of the 85th Congress that would have prevented the construction of "new start" water-development projects.

C. LEGAL

In conformity with a recommendation by its Legal Committee, the Upper Colorado River Commission at the date of this report is negotiating for the service of a full-time Legal Counsel as a first step towards creation of a legal section to act for the Commission.

Presently the Commission does not include a legal division in its organization. The Legal Committee is composed of legal advisers to the Commissioners from the respective States. The legal adviser to a Commissioner from a given State is employed by and is responsible to that State. The Chairman, who is a representative of the Federal Government, has his own legal advisers whose services are furnished by the United States. In some instances the legal adviser to a Commissioner is the Attorney General of his State. In other cases the legal adviser is a special attorney employed by the State. Therefore, the personnel of the Legal Committee of the Upper Colorado River Commission changes from time to time.

In accordance with the By-Laws of the Commission the Chairman and the Engineer-Secretary are ex-officio members of the Legal Committee.

During the past year the members of the Legal Committee have worked in close cooperation with one another in keeping in touch with litigation pending in the Supreme Court between Arizona and California involving the use of waters of the Colorado River. They have also kept the members of the Commission informed concerning important aspects of this history-making lawsuit.

In order to adequately protect the interests of the four Upper Division States of the Colorado River Basin in their interests in and rights to the use of the waters of the Colorado River System, the Commission on October 10, 1958 filed a petition to intervene before the Federal Power Commission in the matter of an application for a license by the Arizona Power Authority to construct the Colorado River Project (Project No. 2248) consisting of the proposed Bridge Canyon Development and Marble Canyon Development.

At its meeting in Salt Lake City on December 11, 1958 the Commission amended Article III paragraph (1) of its By-Laws and changed the location of the principal office of the Commission from Grand Junction, Colorado to Salt Lake City, Utah. The amended By-Laws are printed in Appendix J of this report.

In recent years there have been hundreds of requests for the Commission's first Annual Report which contained the **Colorado River Compact**, the **Upper Colorado River Basin Compact**, the **By-Laws of the Upper Colorado River Commission**, and the **Treaty Between the United States and Mexico Relating To The Utilization Of The Waters Of The Colorado And Tijuana Rivers And Of The Rio Grande**. The Commission's supply of its first annual report is exhausted. Because the above legal documents are not readily available elsewhere in printed form, they have been included in this annual report as Appendices G to J inclusive.

VIII. Colorado River Storage Project and Participating Projects

A. APPROPRIATIONS OF FUNDS BY THE UNITED STATES CONGRESS

In his budget message to the Second Session of the 85th Congress on January 13, 1958, the President recommended that Congress appropriate \$38,425,000 to the Upper Colorado River Basin Fund for fiscal 1959. Of this sum \$35,000,000 were designated for Glen Canyon Dam; \$2,500,000 for Flaming Gorge Dam; \$205,000 for transmission lines; and \$720,000 for advanced planning of participating projects and the Curecanti Storage Unit. The President did not recommend construction funds for Navajo Dam and Reservoir. There was a proposal in the budget request that \$1,500,000 of the unobligated funds appropriated for fiscal 1958 for the Navajo Storage Unit be transferred to the Flaming Gorge Storage Unit.

Early in 1958 it became apparent that the prime contractor constructing Glen Canyon Dam would be able to maintain an economic rate of construction and earn about \$10 million more than Congress had appropriated for fiscal 1958. The President recommended and the Second Session of the 85th Congress met this situation by making available an additional \$10 million in a supplemental appropriation bill applicable to fiscal 1958.

As for the fiscal year 1958, the Bureau of the Budget again did not recommend the appropriation of funds for the initiation of construction of the Paonia Project in Colorado and the Vernal Unit of the Central Utah Project in Utah during fiscal year 1959, or for the commencement of "new start" projects in other areas of the seventeen reclamation States.

Due to the recession in the national economy and the resulting increase in unemployment, the President on March 8, 1958 amended his original budget request to Congress by recommending the appropriation of additional funds for accelerating the progress of water development projects already under construction. Of the \$71,000,000 (\$46,000,000 for regular reclamation projects and \$25,000,000 for small project loans) \$29,050,000 were recommended by the President for accelerating construction of projects in the Upper Colorado River Basin, \$14,000,000 for Glen Canyon; \$7,000,000 for the Navajo Dam; \$8,000,000 for Flaming Gorge and \$50,000 for advanced planning. The President's amended

budget recommendation brought the total request to Congress for funds for the Upper Colorado River Basin Fund to \$67,475,000; although no monies were recommended for starting new projects.

At hearings held in Washington, D. C. before the Appropriations Committees of the Senate and House of Representatives much evidence and strong arguments were presented by the Governors and Members of Congress of the four Upper Division States, Members of the Upper Colorado River Commission, and project sponsors in support of the amended budget request and for additional funds with which to start the construction of the Paonia Project and Vernal Unit of the Central Utah Project. On June 9, 1958 the House Appropriations Committee reported a bill recommending \$66,173,585 for the Colorado River Storage Projects and participating projects, but with no funds for "new start" projects. The House of Representatives passed this bill after adding \$1,000,000 to initiate building of the Paonia Project. The appropriations bill reported by the Senate Committee on Appropriations on June 2, 1958 contained \$68,033,335 for the Colorado River Storage Project and participating projects and included \$1,000,000 for the Vernal Unit of the Central Utah Project as well as the \$1,000,000 for the Paonia Project previously added by the House of Representatives.

Due to the differences between the appropriations bill passed by the House and Senate the bills were sent to a Conference Committee for reconciliation. After many sessions the Conference Committee finally agreed to a bill that was subsequently approved by both Houses of Congress on August 20, 1958, only a few days before the adjournment of the 85th Congress. The final amounts appropriated for fiscal 1959 were the same as those in the Senate-passed bill, and were as follows:

Glen Canyon Storage Unit	\$47,960,000
Flaming Gorge Storage Unit	10,098,335
Navajo Storage Unit	7,000,000
Paonia participating project	1,000,000
Vernal Unit of Central Utah Participating Project....	1,000,000
Transmission Lines	205,000
Advanced Planning	770,000
<hr/>	
Total Appropriations to Upper Colorado River Basin Fund	<u>\$68,033,335</u>

Due to the fact that appropriations of funds by the U. S. Congress have adequately kept pace with the progress of the U. S. Bureau of Reclamation and its contractors on projects on which work is underway, and there have been no major unforeseen emergencies, construction of

the Glen Canyon, Flaming Gorge and Navajo Storage Units is, in general, either approximately on schedule or ahead of schedule. Appendix C of this report consists of a tabulation of contract awards relative to the Colorado River Storage Project and participating projects that have been made by the U. S. Bureau of Reclamation through calendar year 1958.

B. FISCAL DATA — COLORADO RIVER STORAGE PROJECT

Section 6 of the Act authorizing the construction and operation of the Colorado River Storage Project and participating projects (Act of April 11, 1956, 70 Stat. 105) stipulates that on January 1 of each year the Secretary of the Interior shall report to the Congress for the previous fiscal year upon the status of the revenues from, and the cost of constructing, operating and maintaining the Colorado River Storage Project and participating projects. Appendix D of this report consists of the SECOND ANNUAL REPORT ON THE COLORADO RIVER STORAGE PROJECT AND PARTICIPATING PROJECTS of the Secretary of the Interior to the Congress of the United States for the fiscal year ending June 30, 1958.

C. AUTHORIZED STORAGE UNITS

(Information relative to Storage Units and participating projects has been obtained from reports on investigations and activities of the U. S. Bureau of Reclamation, Department of the Interior.)

The construction of four Storage Units of the Colorado River Storage Project and eleven participating projects was authorized in Section 1 of the Public Law 485. The four authorized Storage Units are at Glen Canyon on the Colorado River in Utah and Arizona, Flaming Gorge on the Green River in Wyoming and Utah, Navajo on the San Juan River in New Mexico and Colorado and Curecanti on the Gunnison River in Colorado. Combined they will provide about 34,670,000 acre-feet of reservoir capacity and produce about 1,167,000 kilowatts of installed generating capacity.

1. Glen Canyon Storage Unit

The Glen Canyon Dam and Reservoir will comprise the key Storage Unit and will be the largest of the initial four. It will provide about 80% of both the storage and generating capacity and will be roughly comparable in size to Hoover Dam and Lake Mead. The concrete gravity-arch dam located in northern Arizona on the Colorado River, 12.4 miles downstream from the Utah-Arizona state line, and 15.3 miles upstream from Lees Ferry will rise 573 feet above the river. It will be a little lower than Hoover Dam and will be the second tallest dam in the United States. The reservoir will have a capacity of 28 million acre-

feet and will extend 186 miles upstream on the Colorado River, and 71 miles up the San Juan River. The power house, which will be located at the toe of the dam, will have eight generating units with a total installed capacity of 900,000 kilowatts.

Construction Activities

During the past year construction of the Glen Canyon Dam has progressed at a rate either according to schedule or slightly ahead of schedule. The prime contractor for the dam and power plant anticipates that by the end of January or early in February the coffer dams can be closed and the Colorado River will be diverted through the two diversion tunnels 41 feet in diameter, one on each side of the river. Excavation of the inclined spillway tunnels and the keyways for the dam has progressed rapidly. Improvements have been made to the pilot plant that is being constructed for removing undesirable lightweight materials from the concrete aggregates. Cableway towers and runways for placing concrete in the dam are being erected. A water line to the concrete mixing plant has been completed.

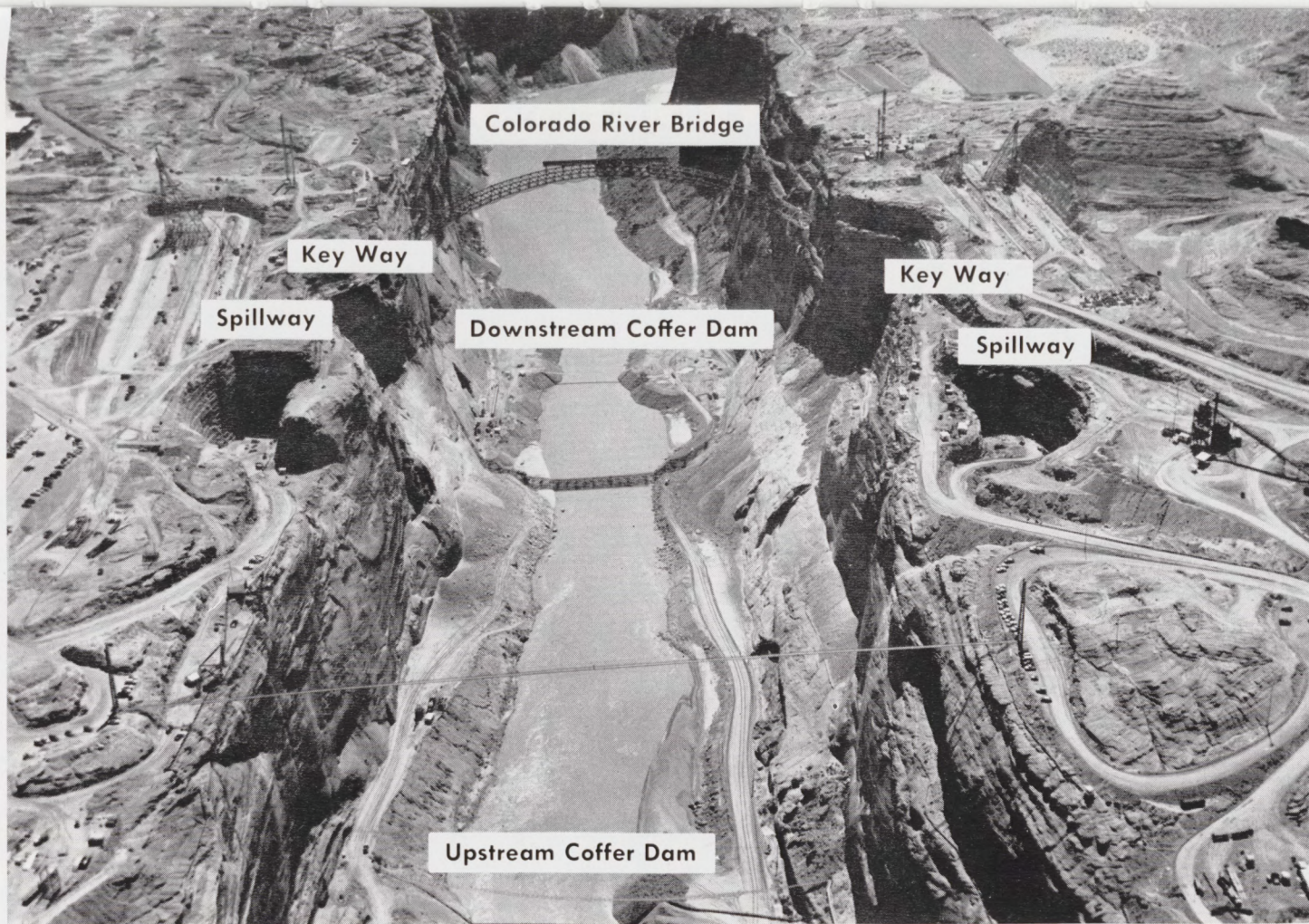
A twenty-five bed hospital has been constructed and work has continued on streets, utilities, barracks, mess halls and housing for the key personnel of the contractor.

On August 6, 1958 the Colorado River Bridge that will carry highway traffic across the canyon of the Colorado River had its steel arch sections joined. The bridge and its approaches should be completed during January or February 1959. A celebration in honor of its opening is scheduled for February 20, 1959.

The twenty-five mile access highway from Bitter Springs, Arizona to Page has been completed. The State of Utah dedicated the fifty-seven miles of highway between Kanab and the Arizona-Utah state line. After completion of the Colorado River bridge it is expected that Arizona will undertake improvement of the remaining nine miles of highway between the bridge and the Arizona-Utah state line, which will bring the entire section of highway from Bitter Springs to Kanab to primary highway standard.

Work has been substantially completed on streets, water distribution and sewage collection system and for a warehouse, laboratory and municipal building to serve the Government portion of the town of Page, Arizona.

In December, 1957 a contract was awarded for constructing the first group of 100 residences to house Bureau of Reclamation construction personnel. The second schedule of 100 homes was started in June, 1958. Sufficient housing has now been completed to permit moving the Glen Canyon Dam project office from Kanab, Utah to Page, Arizona. A number of leases and permits have been issued in Page to private busi-



Glen Canyon Dam Site
Aerial view looking downstream at construction work on Glen Canyon.

U. S. Bureau of Reclamation Photo

ness interests for the construction of motels, cafes, grocery and dry good stores, lumber yards, filling stations and numerous other establishments necessary in a busy, thriving community.

Total contracts awarded by the Bureau of Reclamation for the Glen Canyon Storage Unit now amounts to \$125,000,000.

2. Flaming Gorge Storage Unit

The Flaming Gorge Dam and Reservoir will be located on the Green River in northeastern Utah, 40 miles north of Vernal, Utah, and 32 miles downstream from the Utah-Wyoming state line. The dam will be a concrete thin-arch structure rising 445 feet above the river. The reservoir will have a capacity of 3,930,000 acre-feet and will extend upstream 94 miles, nearly to the town of Green River, Wyoming. The power plant will have an installed generating capacity of 108,000 kilowatts.

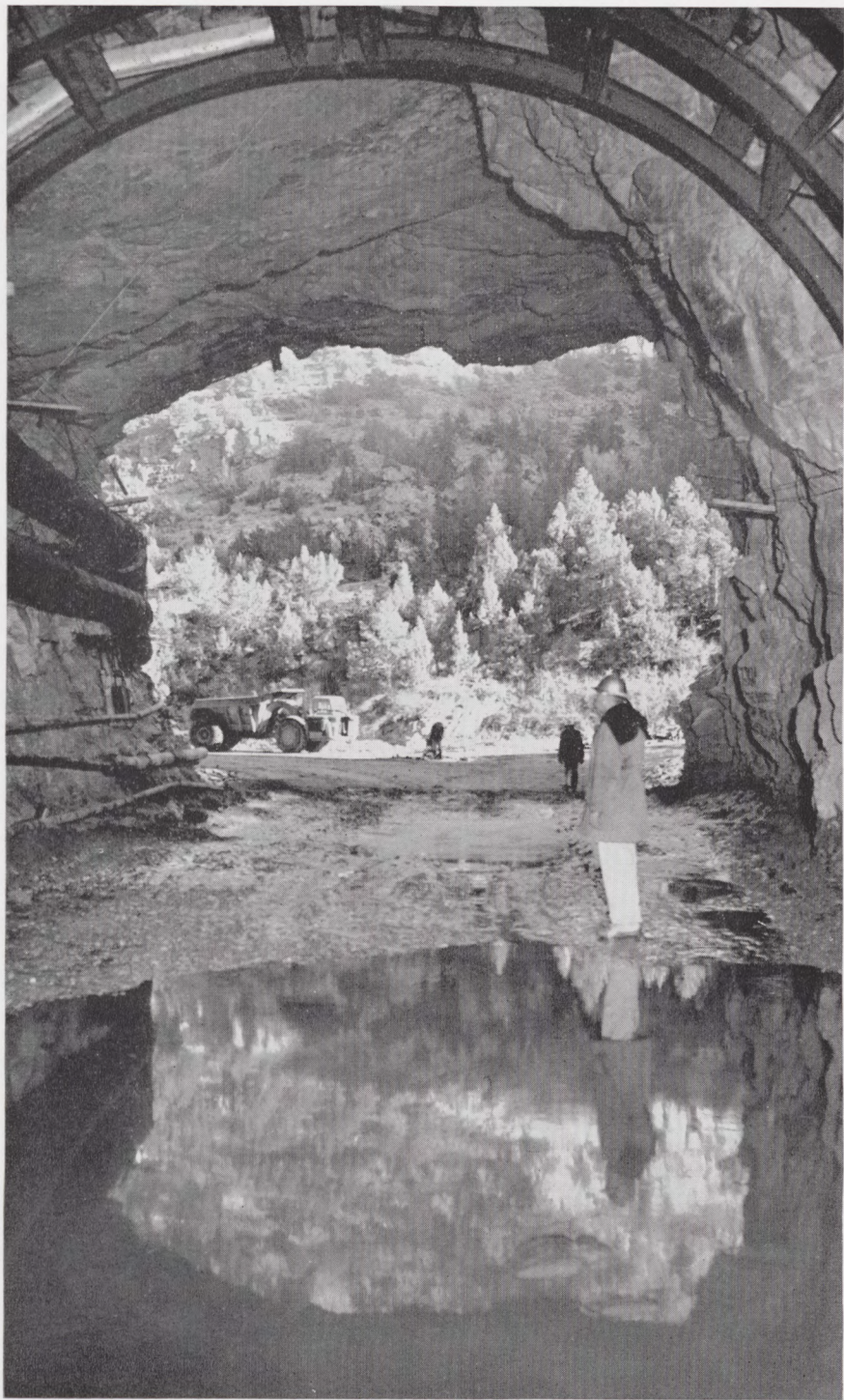
Construction Activities

During 1958 excellent progress was made on the work covered by the contracts awarded in 1957 for the construction of highways, streets, utilities and residences for the Flaming Gorge community. In May, 1958 the project construction engineer moved his headquarters from Vernal to the new damsite community called Dutch John, Utah. Office space has been located in a temporary warehouse until the Administration Building can be completed. Fifteen to twenty permanent residences have been built. The remainder of the Bureau of Reclamation personnel at Dutch John are housed in trailers or temporary houses. On June 18, 1958 the contract for the construction of Flaming Gorge Dam and power plant was awarded by the Bureau of Reclamation. The prime contractor moved on to the job immediately. A field office was established in that portion of the Dutch John community assigned to the contractor and his key personnel were transferred to the site during July.

The preparation of the first eight miles of the previously constructed temporary access road for bituminous surface treatment and the location of the access road between Dutch John and the right abutment of the dam and power plant were the first items of construction undertaken. Work on the diversion tunnel has commenced.

The contractor has awarded his subcontracts for constructing residences, dormitories, mess halls, water distribution and sewage disposal facilities in his portion of the townsite. A temporary hospital has been established with a resident physician in attendance.

The construction schedule anticipates completion of the diversion tunnel, spillway tunnel and control cable tunnel by mid-summer 1959. Closure of the coffer dam and the diversion of the Green River through the diversion tunnel will be accomplished by September, 1959.



FLAMING GORGE U. S. Bureau of Reclamation Photo

Inlet portal of the diversion tunnel of Flaming Gorge. Tunnel will be excavated to 26 feet in diameter and then lined with concrete to 23 feet in diameter. The length of the tunnel will be about 1,100 feet.

At the time of the hearings before Congressional Committees in 1954, it was estimated that Flaming Gorge dam would cost about \$85,000,000. This estimate was for a concrete gravity type dam. Since that time the Bureau of Reclamation has designed a more satisfactory thin arch concrete dam and has determined from detailed diamond drilling at the site that such a dam would have superior qualities over a gravity dam. This change in basic dam design will result in a reduction of about \$20,000,000 from the original cost estimate.

Contracts that have been awarded for the construction of the Flaming Gorge Storage Unit now total approximately \$33,000,000.

3. Navajo Storage Unit

The Navajo Dam will be located in northwestern New Mexico on the San Juan River 34 miles east of Farmington and 3½ miles downstream from the confluence of the Los Pinos and San Juan Rivers. The dam will be a rolled earth fill embankment structure. Revised studies indicate that the reservoir will have 1,700,000 acre-feet total capacity and an active capacity of 1,028,000 acre-feet. Accumulations of sediment in this reservoir will amount to approximately 330,000 acre-feet in 100 years with much of the sediment being deposited in the inactive space.

The major purpose of this reservoir will be to regulate the flows of the San Juan River for the potential Navajo Indian Irrigation Project near Farmington and the San Juan-Chama Project in the Rio Grande Basin and perhaps for the small authorized Hammond Project. Part of the water to be made available may also be used for industrial and municipal purposes in northwestern New Mexico. Recreational facilities will be provided and are expected to contribute materially to the economy of the area.

Construction Activities

Work under a contract awarded in October, 1957 for the construction of residences, streets, utilities, and power facilities for a temporary Government camp at Navajo Dam was completed in June, 1958. Contracts have been negotiated for furnishing electric power, gas and telephone service to the camp site. Several temporary houses have been constructed. The Bureau of Reclamation has decided that it will be cheaper to house its personnel and office in Farmington with only the field personnel at the dam site. Extensive explorations have been made in the barrow area to locate 30,000,000 cubic yards of earth materials satisfactory for the dam.

As the result of successful negotiations between the State of New Mexico and the Federal Government a 13.6 mile access road to the Navajo Dam Camp area has been completed. Plans and specifications for Navajo Dam were issued in May, 1958. The construction contract



Spillway Excavation

NAVAJO DAM SITE

U. S. Bureau of Reclamation Photo

Placing first part of embankment material in foundation — Spillway excavation indicated — River flows from right to left under cliff in foreground.

was awarded on June 26, 1958. The contractor's key personnel began arriving on the job in July and initial construction activities were initiated before the end of the month.

Excavation of the spillway inlet channel and drilling and blasting operations in the spillway section are advancing rapidly. Haul roads to various parts of the project are nearly complete. A sprinkler irrigation system has been erected and placed in operation at the dam foundation area preparatory to stripping and excavation of the foundation. It has been found that suitable material from these operations can be used in the coffer dam.

Various buildings such as contractor's office, mess halls, barracks, paint shop, warehouse and repair shop are nearly completed.

Total amount of contracts awarded by the Bureau of Reclamation on this project now total in excess of \$23,000,000.

4. Curecanti Storage Unit

The Curecanti Storage Unit will be located on the Gunnison River in Western Colorado, upstream from the Black Canyon National Monument and downstream from the town of Gunnison. In order to prevent damage to property near the town, the authorizing legislation provides that the upstream dam at Blue Mesa shall be constructed to a height to store not less than 940,000 acre-feet of water, or to create a reservoir of such greater capacity as can be obtained by a high water line located at 7,520 feet above sea level. Construction cannot be commenced until the Secretary of the Interior has certified to the Congress and the President that the Curecanti Storage Unit is economically justifiable.

Investigation Activities

The Bureau of Reclamation, after investigating many possible combinations of potential dams in the reach of the river to be developed, has decided upon a plan involving the construction of three dams at locations known as Blue Mesa, Morrow Point and Crystal. A feasibility report on this project is scheduled for completion by February 1959. This report will include data and recommendations only upon the dams to be constructed at Blue Mesa, and Morrow Point to be followed in about a year by a supplemental report on Crystal Dam.

It is believed that this procedure is within the authorization language of Public Law 485. Additional topographic information has been obtained at the Blue Mesa damsite to accommodate a change in the location of the axis of the dam. Foundation drilling of both the Blue Mesa and Morrow Point sites has been completed. Laboratory testing of embankment materials and concrete aggregate sources has been finished.

The Corps of Engineers is making investigations to determine the flood control benefits of the project.

It is anticipated that a substantial portion of the money to be appropriated for advanced planning for fiscal 1960 will be used for pre-construction activities. If the feasibility report is cleared by the responsible agencies in Washington, D. C. in sufficient time, the appropriation of money for the initiation of construction of the Curecanti Storage Unit will be requested in hearings before Congressional Appropriations Committees.

D. INITIALLY AUTHORIZED PARTICIPATING PROJECTS

Of the eleven participating projects authorized by Public Law 485, five are in Colorado, one is in New Mexico, two are in Utah, and three are located in Wyoming. Participating projects will consume water of the Upper Colorado River System for irrigation, municipal and industrial purposes, and will participate in the use of revenues in the Basin Fund to help repay the costs of irrigation features beyond the ability of the water users to repay.

It has been impossible for the Bureau of Reclamation to undertake work simultaneously on all eleven participating projects because of the large amount of investigational work needed to firm the development plans and to make cost estimates and repayment studies. Therefore, the Bureau has sought the advice of officials of each State, and, on their recommendations, has selected specific projects on which to concentrate work in order that construction can be started on these projects as soon as possible.

The President's budget request to the Second Session of the 85th Congress did not include recommendations for appropriation of construction funds for any of the participating irrigation projects although the Paonia Project in Colorado and the Vernal Unit of the Central Utah Project had been ready for construction since mid 1957. As noted elsewhere in this report, before its adjournment, Congress enacted an appropriation bill that included \$1,000,000 for the initiation of the construction of each of these two projects. As a result, both are currently under construction.

A brief description of each of the authorized participating projects and the present status of its construction or investigations follows:

1. Authorized Colorado Participating Projects

a. Paonia Project

This project is located near Paonia and Hotchkiss in westcentral Colorado on the North Fork of the Gunnison River. The Paonia Reser-

voir will be constructed to a capacity of 21,000 acre-feet. The Fire Mountain Canal will be completed, enlarged, and extended to distribute the project water. By these means, the irrigation water supply will be improved for an additional 13,070 acres of irrigated land and a full water supply provided for about 2,230 acres of new land. Fish and wildlife values in the area will be enhanced, and flood damages will be decreased.

Construction Activities

As a result of the Second Session of the 85th Congress having appropriated \$1,000,000 the Bureau of Reclamation on January 7, 1959 awarded a construction contract for \$3,167,176 for the construction of the Paonia Dam and relocation of the State highway. The engineers estimate for the work under this contract was \$4,143,712. The contractor expects to move men and equipment to the site and to proceed with actual construction as soon as weather will permit in the spring of 1959.

b. Florida Project

The Florida Project is located in southwestern Colorado, southeast of Durango in the Florida River Valley and on Florida Mesa. Its principal features include the construction of Lemon Dam on the Florida River with a reservoir capacity of 23,300 acre-feet, enlargement of the Florida Farmers Ditch, and the construction of a new diversion dam. The laterals will be constructed to 6,300 acres of project lands. Drainage facilities will also be built. Flood control and fish and wildlife values will be improved. The project includes 6,300 acres of new land and 12,650 acres of presently irrigated land needing a supplemental water supply.

Investigation Activities

Field surveys for project features and the detailed land classification are completed. Agricultural surveys and water supply analyses are well advanced. Designs and estimates have been started. Core drilling at an alternate site for Lemon Dam has disclosed that this site will be more favorable than the one formerly under consideration. The definite plan report is scheduled for completion about September, 1959.

c. Smith Fork Project

The Smith Fork Project is located in Delta County, along the Smith Fork of the Gunnison River near Crawford, Colorado. Its principal features will include the construction of Crawford Dam and Reservoir on Iron Creek, capacity 13,650 acre-feet, a diversion from Smith Fork Dam on Smith Fork with head works on a sluiceway, a Smith Fork Feed-

er Canal 2-3/4 miles from the diversion dam and Crawford Reservoir, and 6.6 miles of canals to project lands. The acreage to be irrigated contains 1,320 acres of new land in the vicinity of Crawford, Colorado, and 6,920 acres of land presently irrigated but needing a supplemental supply of water.

The Crawford Conservancy District has been organized under State Law for the purpose of contracting with the Federal Government for repayment of the project.

The definite plan report has been completed by the Regional Office of the Bureau of Reclamation and submitted to the Department of the Interior in Washington for review. If this report is cleared by the appropriate agencies of the Executive Branch of the Federal Government in sufficient time, requests will be made to the Appropriations Committees of Congress for money to initiate construction in fiscal year 1960.

d. Pine River Project Extension

As originally conceived this project would involve an extension to the existing Pine River Project in southwestern Colorado and northwestern New Mexico on Pine River about 20 miles east of Durango, Colorado. This extension would provide water from the existing Vallecito Reservoir for the irrigation of about 15,150 acres of irrigated land, of which about 1,940 acres are within the Pine River Indian Irrigation Project. The project would involve an enlargement and extension of eight major canals and ditches diverting from Pine River, a new diversion dam, and several small distribution laterals. Of the acreage originally anticipated to be irrigated, 14,520 acres of new land are in Colorado and 630 acres in New Mexico.

Investigation Activities

The results of the Bureau of Reclamation's definite plan report show that the Pine River Project Extension as originally planned would be infeasible. Of the 15,150 acres to be irrigated about 8,730 acres are in small scattered tracts that are now irrigated or could be irrigated with a continuation of the expansion program now being executed by local irrigation companies. Of the remaining 6,420 acres, which would involve an extension of the existing King Consolidated Ditch, only about 3,100 acres could meet the Bureau's revised standards for arable land. This remaining acreage is too widely scattered for a feasible project.

The Bureau's office has been asked to supply additional information before the definite plan report is reviewed.

e. Silt Project

An improved water supply for more than 5,400 acres of partially irrigated land, and a full supply for about 1,900 acres of new land will

be provided by construction of the Silt Project between Rifle and Elk Creeks in west-central Colorado. Construction features will include the Rifle Gap Reservoir of 10,000 acre-feet capacity, a pumping plant, diversion dam and feeder canal, rehabilitation of existing works and construction of laterals and drains.

Investigation Activities

Detailed land classification and drainage surveys are almost completed. Questions of design for the dam at Rifle Gap are delaying other phases of the investigations and requiring further geologic studies and explorations. A number of drainage and design problems are being studied.

The Conservancy District to contract with the Federal Government for repayment of the project has been organized. The definite plan report is scheduled for completion about October, 1959.

2. Authorized New Mexico Participating Projects

a. Hammond Project

The Hammond Project is located in northwestern New Mexico along the south bank of the San Juan River and opposite the towns of Blanco, Bloomfield, and Farmington. The project will provide irrigation water for 3,900 acres, of which 3,180 acres are not irrigated. The remaining 720 acres are now irrigated by pumping water from the San Juan River. The pumps will be abandoned when project water becomes available.

The project works will consist of the Hammond Diversion Dam on the San Juan River, the main gravity canal, a hydraulic-turbine driven pumping plant, three main laterals, distribution laterals, and a drainage system.

The definite plan report was completed in September, 1958 and is now waiting final approval in Washington. A Conservancy District has been organized to contract with the United States for repayment of the project. If the definite plan report receives final approval of the interested agencies of the executive branch of the Federal Government in sufficient time, Congressional Appropriation Committees will be requested to provide funds for initiating construction during fiscal 1960.

3. Authorized Utah Participating Projects

a. Central Utah Project (Initial Phase)

The Central Utah Project (initial phase) would intercept streams draining the southern slope of the Uinta Mountains in the Colorado River Basin and would convey the water by gravity flow through the

Wasatch Mountains to the Bonneville Basin for power generation, irrigation, municipal and industrial use, and other purposes in central Utah. Water conservation for irrigation, municipal use, and other purposes would also be accomplished in Utah's Uinta Basin, a part of the Colorado River Basin. Supplemental water would be furnished for 131,840 acres and a full supply for 28,540 acres not presently irrigated. Municipal and industrial water averaging 48,800 acre-feet annually would be provided and power averaging 373,000,000 kilowatt-hours annually would be generated at project plants with installed capacities totaling 61,000 kilowatts.

The potential Strawberry Aqueduct would intercept flows of Rock Creek and other Uinta Mountain streams west of Rock Creek and convey the water to the existing Strawberry Reservoir which would be enlarged by the construction of Soldier Creek Dam below the present dam. The reservoir water would be released through an enlargement of the present tunnel to the headwaters of Spanish Fork River in the Bonneville Basin. In descending Spanish Fork Canyon, the water would flow through a series of power plants before being consumptively used in the central Utah area. Through various exchanges and by the construction of the required facilities, the water would be made available to an area extending from Salt Lake City south 75 miles to Nephi.

New project works that would develop water for use in the Uinta Basin would include Hanna Reservoir on the North Fork of Duchesne River, Starvation Reservoir on Strawberry River with a feeder canal from the Duchesne River, Upalco Reservoir offstream from Lake Fork River, Stanaker Reservoir with a feeder canal from Ashley Creek, and Tyzack Reservoir on Brush Creek.

Investigation Activities

The definite plan report on the overall project is scheduled for completion about 1963. A definite plan report was completed on the Vernal Unit in 1957 and funds for the start of construction were appropriated by Congress for fiscal year 1959. The Bureau of Reclamation has been giving priority to studies upon which to decide between various alternative plans and to select the scale of development, the areas to be served and the project facilities. Topographic and location surveys and land classification work are well advanced. Water supply studies will require considerable additional effort. Also a final selection of areas to be served and capacities to be provided in project works must be determined. The Bureau of Reclamation has been working closely with the Utah State Engineer's Office and with the Utah Water and Power Board to resolve the major water right problems involving water exchanges, existing water rights and filings. If the Bureau determines from studies now being made that certain units of the Central Utah

Project can be covered by separate definite plan reports the completion of these reports will be scheduled separately.

Construction Activities

The Second Session of the 85th Congress appropriated \$1,000,000 for the initiation of construction of the Vernal Unit of the Central Utah Project. During the past year land acquisition and road surveys have been made. It is anticipated that a contract will be awarded before the end of the 1959 fiscal year for the construction of Stanaker Dam and Reservoir, access roads and certain other related facilities.

b. Emery County Project

The Emery County Project would provide supplemental water for 20,450 acres of land and a full supply for 3,630 acres in Emery County in east-central Utah near the towns of Huntington, Castle Dale, and Orangeville. Principal construction features would include the Joes Valley Dam and Reservoir which would impound 57,000 acre-feet of water on Cottonwood Creek, the Swasey Diversion Dam located ten miles downstream from Joes Valley, and the 17-mile Cottonwood-Huntington Canal heading at the Swasey Diversion Dam. Canals, laterals and drains would be constructed as required.

Investigation Activities

Detailed land classification surveys are essentially complete. It has been ascertained that a large acreage is in class 5 and 6w due to deficiencies in drainage. More field work and study is required to resolve drainage problems and to determine areas that can be economically drained. Other phases of the investigations are not scheduled until 1959.

The Definite Plan Report is scheduled to be completed in 1961.

4. Authorized Wyoming Participating Projects

a. La Barge Project

The La Barge Project is in the Green River Basin in Lincoln and Sublette Counties. The project lands are situated between South Piney Creek and La Barge Creek along the west side of the Green River in a narrow strip about 30 miles long with an average width of 1-1/2 miles. The irrigation of 7,970 acres of arable dry lands is contemplated.

As presently planned, this project would involve a direct flow diversion from the Green River. Water would be carried in the 39-mile long Green River Canal to serve the project area. The canal heading would be about 6 miles east of Big Piney, Wyoming, and would be placed low enough in the west bank of the river to eliminate the need for a diversion

dam as previously planned. Distribution laterals and drains will be constructed as needed.

Investigation Activities

Investigations for new cost estimates and a revised financial appraisal are to be started in 1959. The definite plan report is scheduled for completion in fiscal year 1961. This small project could be constructed in two or three years.

b. Lyman Project

Supplemental irrigation water amounting to an average of 32,500 acre-feet annually would be provided for 40,600 acres of land along Blacks Fork of the Green River near Lyman, Wyoming. A dam would be constructed at the Bridger site on Willow Creek, creating a reservoir with a total capacity of 43,000 acre-feet. Surplus flows of Blacks Fork and its tributary, West Fork of Smiths Fork, would be conveyed to the reservoir by separate feeder canals. About 7-1/2 miles of the Willow Creek channel below the reservoir would be enlarged, and three canals would be constructed to divert flows from the enlarged channel. Existing canal systems would be improved and extended as necessary, in addition to construction of new drains.

Investigation Activities

A field office of the Bureau of Reclamation has been established at Lyman, Wyoming. Initial consideration is being given to plan formulation studies and to land classification and drainage. The Definite Plan report should be completed in fiscal year 1961.

c. Seedskadee Project

The Seedskadee Project would provide for the irrigation of approximately 60,720 acres of dry arable land along both sides of the Green River in an area extending from 14 to 50 miles northwest of Green River, Wyoming.

Present plans are to use Fontenelle Dam and Reservoir on Green River both for storage and as a means of diverting water from the river in lieu of the direct canal diversion contemplated in previous plans. Development of a wildlife refuge downstream from Fontenelle Dam is under consideration as an adjunct to the project under Section 8 of Public Law 485.

The Definite Plan Report was completed by the Bureau of Reclamation at the field level in November, 1958, and has been forwarded to the Washington office for review. If this report is cleared by the interested department of the Federal Government in sufficient time, the Appropriations Committees of Congress will be requested to make construction funds available for fiscal 1960.

E. PROJECTS HAVING PRIORITY FOR PLANNING UNDER PUBLIC LAW 485, 84TH CONGRESS, SECOND SESSION

In carrying out further investigations of projects under Federal Reclamation Laws in the Upper Colorado River Basin, the Secretary of the Interior is directed to give priority to completion of planning reports on twenty-five projects. Brief descriptions of these projects are to be found in the Commission's Eighth Annual Report.

The Bureau of Reclamation, so far as limited funds and personnel will permit, is continuing its studies on these projects. Considerable progress in investigations has been accomplished during the past year. Two projects, the Navajo Indian Irrigation Project and the San Juan-Chama Project, had supplemental feasibility reports completed during 1957. Authorizing legislation introduced in the 2d Session of the 85th Congress was not enacted into law.

Other projects in the priority-for-planning category are in various stages of detailed planning for feasibility reports or preliminary investigations for reconnaissance reports.

A list of these projects given priority-for-planning status by P. L. 485, the Colorado River Storage Project Act, follows:

1. Potential Participating Projects Under Investigation for Feasibility Reports

Colorado

a. Savery-Pot Hook Project

The State of Wyoming has approved the plan for a combined development in Colorado and Wyoming that was presented in the Bureau of Reclamation's proposed feasibility report of July, 1954. After a revision of the cost estimates and repayment analyses, the final report was submitted to interested parties in April, 1958. This report is being further revised to include additional information.

b. Fruitland Mesa Project

Field surveys, land classification, geologic surveys and water supply studies have been completed and work on other phases of the investigations has been accelerated. The feasibility report is scheduled to be completed before the end of fiscal year 1959.

c. Bostwick Park Project

Land classifications, field surveys, and geologic explorations have been finished. Possibilities for power generation and for supplying municipal water to the City of Montrose, Colorado are being given serious consideration. The feasibility report will be completed as soon as possible after the feasibility report for Fruitland Mesa Project is finished and personnel can be made available.

d. Dolores Project

Since completion of the May, 1954 status report, topographic surveys of the McPhee Reservoir site and the project lands have been completed. Detailed work classification surveys are almost completed. A completed feasibility report can be expected during fiscal year 1960.

e. Dallas Creek Project

The Bureau of Reclamation started detailed investigation during fiscal year 1959 but have been limited to preliminary studies and inspections as a basis for formulating a general plan. A feasibility report is scheduled to be ready in fiscal year 1963.

f. Animas-La Plata Project

Since completion of the status report in November, 1954, investigations have been concentrated on topographic and location surveys of potential project lands and feature sites and on preliminary plan studies. Land classification is proceeding. Funds have been contributed by local people and the State of Colorado to aid in the investigations. The feasibility report is scheduled for completion in fiscal year 1962.

g. San Miguel Project

With higher priorities assigned to the Dolores and Animas-La Plata Projects, no work has been accomplished on the San Miguel Project since the March 1953 Status Report. Excluding the dam site and reservoir topography, geologic explorations at the Saltado Dam site and a semi-detailed land classification, most aspects of the investigation by the Bureau of Reclamation have been completed in reconnaissance scope only. Investigations were resumed in fiscal 1959 with potential developments in the Saucer Valley area included as part of the project. A feasibility report is scheduled for completion in fiscal year 1963.

h. West Divide Project

Topography on a portion of the potential project land area was obtained by the State of Colorado in 1957. Detailed land classification surveys were commenced in 1958. Preliminary studies are being made on alternatives and modifications in plans to determine if present margi-

nal economic justification can be improved. A feasibility report is scheduled for fiscal year 1963.

i. Juniper Project

This project is not classified in P.L. 485 as either a Storage Unit or participating project. Its status will be determined by the type of development ultimately planned.

The irrigation possibilities of this project were appraised in the February, 1957 reconnaissance report on the Yampa-White Project. During fiscal years 1959, 1960 and 1961, a reconnaissance report will be made of the hydro-power possibilities of the Yampa River upstream from Dinosaur National Monument and studies will be made of an integrated irrigation and power development. After these studies are completed the best plan for the project and the extent of the project can be ascertained.

New Mexico

a. Navajo Indian Irrigation Project

b. San Juan-Chama Project

Under the policy of the State of New Mexico, these two projects are to be developed concurrently. Supplemental feasibility reports for both were completed during 1957. Legislation was introduced in the Second Session of the 85th Congress that would have authorized the construction of both projects, had it been enacted into law. The Senate Bill was approved by that body, but the House Bill failed to receive hearings by the Irrigation and Reclamation Subcommittee of the Committee on Interior and Insular Affairs.

The **Navajo Indian Irrigation Project** will be in northwestern New Mexico, along the south side of the San Juan River in the Farmington-Shiprock area. The project will irrigate 110,630 acres of new land on the present or extended Navajo Indian Reservation. Although this project is directly dependent upon the Navajo Storage Unit (currently under construction) of the Colorado River Storage Project, Public Law 485 states that irrigation costs that will be beyond the capability of the Indian irrigators to repay shall be nonreimbursable, and irrigation costs that are within the capability of the lands to repay shall be deferred so long as the lands remain in Indian ownership.

The potential **San Juan-Chama Project** is located in south central Colorado and north central New Mexico in the San Juan River, Rio Grande and Canadian River Basins. This project will divert waters from the headwaters of the San Juan River into the Rio Grande Basin for the purpose of providing supplemental water for existing irrigation projects and for municipal and industrial uses in the Albuquerque, New Mexico

metropolitan area. Although water for the diversion will be collected from tributaries of the San Juan River in both Colorado and New Mexico, all water will be used in New Mexico in the Rio Grande Basin. By exchange, the project will also increase the use of water in New Mexico in the Canadian River Basin. It is planned to provide for an initial diversion of 110,000 acre-feet of Colorado River Basin water per year. This project will also improve conditions for recreation, fish and wildlife in the Rio Grande Basin.

Authorizing legislation for both the Navajo Indian Irrigation and San Juan-Chama Projects will again be submitted to the First Session of the 86th Congress for approval.

UTAH

a. Gooseberry Project

The Bureau of Reclamation completed a feasibility report for this project in January 1953. The plan of that report contemplated a diversion of 11,700 acre-feet from the Price River Basin. The people of Carbon County in Price River Basin opposed the plan, and, as a result it has not been recommended to Congress for authorization.

Comparative data on a revised plan for a smaller diversion was compiled in 1957 for the use of the State of Utah in resolving the controversy between Carbon and Sanpete Counties. In addition, the Bureau has been making reconnaissance investigations for exchange storage in the Price River drainage. It is believed that if sufficient storage can be made available, the controversy can be settled and the project be submitted to Congress for authorization.

Wyoming

a. Savery-Pot Hook Project

(See discussion under Colorado)

b. Sublette Project (Buckskin Division)

Field surveys and land classifications are well advanced. Other phases of investigation are only of a preliminary nature. A feasibility report is expected to be completed in 1962.

2. Other Potential Participating Projects in P.L. 485 That Have Priority-For-Planning Reports and On Which Feasibility Investigations Will Be Either Resumed Or Initiated In the Future

Colorado

- | | |
|----------------------------------|--------------------------|
| a. Parshall Project ¹ | h. Eagle Divide Project |
| b. Bluestone Project | i. East River Project |
| c. Troublesome Project | j. Ohio Creek Project |
| d. Rabbit Ear Project | k. Fruit Growers Dam |
| e. Battlement Mesa Project | Extension Project |
| f. Tomichi Creek Project | l. Yellow Jacket Project |
| g. Grand Mesa Project | |

F. SPECIAL STUDIES

Section 15 of the Colorado River Storage Project Act (70 Stat. 105) stipulates that "the Secretary of the Interior is directed to continue studies and to make a report to the Congress and to the States of the Colorado River Basin on the quality of water of the Colorado River." Early in calendar year 1958 the U. S. Geological Survey established the Colorado River Hydrologic Study Office in Salt Lake City, Utah. This office is staffed by experts in the fields of groundwater, surface water, general hydrology, and quality-of-water. Studies being conducted in these categories have been limited to the Upper Colorado River Basin.

1. The Bureau of Reclamation started detailed investigations on the Parshall Project and then deferred them when it became apparent that the City of Denver would exercise the right to enlarge its Williams Creek Reservoir. A smaller Parshall Project than that originally contemplated may be investigated in the future.

IX. Findings of Fact

No findings of fact pursuant to Article VIII of the Upper Colorado River Basin Compact have been made by the Upper Colorado River Commission. No part of this Annual Report, or the information contained herein, is to be construed as findings of fact by the Commission.

X. Acknowledgments

At hearings before the Subcommittee on Public Works of the Appropriations Committee of the House of Representatives of the U. S. Congress, the Governors of Colorado, New Mexico, Utah and Wyoming in cooperation with the Commission again presented effective testimony on behalf of appropriations of funds for investigation, planning and construction of the Storage Units and participating projects of the Colorado River Storage Project. Our four Governors are to be commended for their united actions on fundamental issues involved in the development of the water and land resources of the Upper Colorado River Basin and for their interest in and support of the Upper Colorado River Commission.

The Commission especially wishes to give recognition to the difficult and able work of the members of the U. S. Congress from our four States and to acknowledge with appreciation the assistance it has received from agencies of the Executive Branch of the Federal Government, the Department of the Interior, Bureau of Reclamation, U. S. Geological Survey, Bureau of Indian Affairs, and the Department of Agriculture.

Officers and personnel of many state agencies having their primary interests in various phases of water resources have also aided materially with cooperative efforts and information.

Appendices

APPENDIX A

Report of Auditor

REPORT OF EXAMINATION
UPPER COLORADO RIVER COMMISSION
GRAND JUNCTION, COLORADO
JUNE 30, 1958

Appendix A (continued)

DALBY & McNULTY
Certified Public Accountants
First National Bank Building
Grand Junction, Colorado

August 21, 1958

Upper Colorado River Commission
Grand Junction, Colorado

We have examined the balance sheets of the General Fund and the Property and Equipment Fund of the Upper Colorado River Commission as of June 30, 1958, and the related statement of revenue and expense for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying balance sheets and revenue and expense statement present fairly the financial position of the Upper Colorado River Commission at June 30, 1958, and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Certified Public Accountants

Appendix A (continued)

BALANCE SHEET — GENERAL FUND
Upper Colorado River Commission
June 30, 1958

ASSETS		
Cash		
Office cash fund	\$ 25.00	
Demand deposit—General Fund	30,242.45	
Time deposit with United States Bank of Grand Junction—term one year, sub- ject to withdrawal on and after Janu- ary 3, 1959, interest at 3% a year —Note C	60,000.00	
	<u>\$90,267.45</u>	
Demand deposit—Contingent Fund— Note B (contra)	12,589.89	\$102,857.34
Other Assets		
Accrued interest receivable—derived from investment of cash in time deposit— Note C	\$ 900.00	
Returnable deposit—United Air Lines	425.00	1,325.00
Prepaid Insurance		
Unexpired portion of insurance premiums		78.79
		<u>\$104,261.13</u>

LIABILITIES, RESERVES, AND FUND BALANCE

Liabilities		
Accounts payable—Note A	\$ 1,308.51	
F.I.C.A. tax payable	22.46	\$ 1,330.97
Reserves		
For assessments received in advance:		
State of New Mexico	\$ 8,437.50	
State of Wyoming	10,500.00	\$18,937.50
For Contingent Fund—Note B:		
Cash contribution from Upper Colorado River Grass Roots, Inc.	\$12,607.92	
Less disbursements—cost of printing checks and legal fees	18.03	12,589.89
		31,527.39
Unappropriated Fund Balance		
Balance at July 1, 1957	\$42,704.00	
Excess of revenues over expenditures for the fiscal year ended June 30, 1958	28,698.77	71,402.77
		<u>\$104,261.13</u>

Note—The accompanying notes to financial statements are an integral part of this statement.

Appendix A (continued)

BALANCE SHEET — PROPERTY AND EQUIPMENT FUND
Upper Colorado River Commission
June 30, 1958

Assets			
Property and equipment—at cost:			
Furniture and fixtures			\$ 9,064.13
Automobile			3,311.89
Engineering equipment			1,533.65
Motion picture film—at nominal value			2.00
Upper Colorado basin relief model			5,937.77
			<u>\$19,849.44</u>
Fund Balance			
Investment in property and equipment			
July 1, 1957		\$18,963.56	
Transaction for fiscal year ended June			
30, 1958:			
Additions	\$1,000.63		
Retirements	<u>114.75</u>	<u>885.88</u>	
Investment in property and equipment			
at June 30, 1958			<u>\$19,849.44</u>
			<u>\$19,849.44</u>

Note—The accompanying notes to financial statements are an integral part of this statement.

Appendix A (continued)

STATEMENT OF REVENUE AND EXPENSE

Upper Colorado River Commission
For the Fiscal Year Ended June 30, 1958

	Budget Amount (as revised May 15, 1958)	Actual Amount	Actual Amount Over-Under*
Revenue:			
Assessments	\$75,000.00	\$74,999.50	\$.50*
Miscellaneous revenues		51.77	51.77
Interest on time deposit		900.00	900.00
Total Revenue	<u>\$75,000.00</u>	<u>\$75,951.27</u>	<u>\$ 951.27</u>
Expense:			
Personal services:			
Administrative salaries	\$19,000.00	\$17,528.28	\$ 1,471.72*
Engineering salary	20,000.00	3,833.32	16,166.68*
Clerical salaries	3,500.00	1,380.68	2,119.32*
	<u>\$42,500.00</u>	<u>\$22,742.28</u>	<u>\$19,757.72*</u>
Capital outlay—furniture and fixtures	\$ 700.00	\$ 640.63	\$ 59.37*
Office supplies and postage— Grand Junction, Colorado			
Office	2,570.00	1,932.71	637.29*
Education and information	6,000.00	3,806.77	2,193.23*
Travel	8,000.00	6,557.25	1,442.75*
Current expenses:			
Social security	\$ 500.00	\$ 324.12	\$ 175.88*
Rent and janitor service	4,200.00	3,746.20	453.80*
Assistant treasurer	300.00	300.00	0
Accounting, legal service and reporting	1,800.00	927.00	873.00*
Telephone and telegraph	2,000.00	1,774.63	225.37*
Insurance and bond premiums	850.00	587.21	262.79*
Printing	2,000.00	1,736.67	263.33*
Engineering services, aerial photos, maps, etc.	1,580.00	42.00	1,538.00*
Miscellaneous	2,000.00	2,135.03	135.03
	<u>\$15,230.00</u>	<u>\$11,572.86</u>	<u>\$ 3,657.14*</u>
Total Expenses	<u>\$75,000.00</u>	<u>\$47,252.50</u>	<u>\$27,747.50</u>
Excess of Revenue Over Actual Expense		<u>\$28,698.77</u>	<u>\$28,698.77</u>

Note—The accompanying notes to financial statements are an integral part of this statement.

Appendix A (continued)

NOTES TO FINANCIAL STATEMENTS

Upper Colorado River Commission

June 30, 1958

Note A—At June 30, 1958, unrecorded liability of the Commission to its full-time employees for accrued annual leave pay amounted to \$707.08. According to Commission policy (effective January 1, 1957) each employee is expected to take annual leave of 16 days each calendar year (not necessarily consecutively) during which period of time regular salary payments are continued. The unused portions of annual leave are not carried forward from year to year.

Note B—During its annual meeting on September 25, 1957, the Commission accepted a contribution which consisted of all of the assets of Upper Colorado River Grass Roots, Inc. These assets, consisting mostly of cash, were placed in a separate contingent fund to be used to promote the development of the Upper Colorado River Basin. At the same meeting, the Commission formed a special committee on Education and Information. This committee is composed of the four State Commissioners, or persons delegated by them, to promote the development of the Upper Colorado River Basin and to supervise use of the funds received from the Upper Colorado River Grass Roots, Inc.

Note C—Interest on the time deposit with United States Bank of Grand Junction is earned if the deposit remains intact for one year. Interest on this deposit will not be paid by the bank if the money is withdrawn before the end of the one year period nor will interest be paid for periods of time in excess of one year.

Appendix A (continued)

SUPPLEMENTARY DATA
CASH RECEIPTS AND DISBURSEMENTS

Upper Colorado River Commission
For the Fiscal Year Ended June 30, 1958

Balance of cash and demand deposit at July 1, 1957			\$ 51,619.35
Cash receipts:			
Assessments	\$66,562.00		
Assessments for fiscal year ended June 30, 1959, received prior to June 30, 1958:			
State of Mexico	\$ 8,437.50		
State of Wyoming	<u>10,500.00</u>	18,937.50	
Miscellaneous revenues		51.77	
Return premium on insurance		7.65	
Contribution to contingent fund	<u>12,607.92</u>		98,166.84
			<u>\$149,786.19</u>
Cash disbursements:			
Personal services	\$22,742.28		
Travel	6,240.17		
Current expense	11,239.83		
Capital outlay	640.63		
Information	3,628.78		
Office supplies	1,834.71		
Expense of fiscal year ended June 30, 1957, not paid until after July 1, 1957		584.42	
Contingent fund disbursements	<u>18.03</u>		46,928.85
Balance of cash and demand deposits at June 30, 1958			<u><u>\$102,857.34</u></u>

Appendix A (continued)

INSURANCE COVERAGE

Upper Colorado River Commission

June 30, 1958

	Type of Coverage	Amount of Coverage
Treasurer	Fidelity bond	\$ 40,000.00
Assistant treasurer	Fidelity bond	\$ 40,000.00
Automobile	Comprehensive	Actual cash value
	Liability - each person	\$ 50,000.00
	Liability - each accident	\$100,000.00
	Property damage - each accident	\$ 5,000.00
	Collision and upset	\$ 100.00 deductible
Employees	Workmen's compensation	Various
Contents—		
Grand Junction office	Fire and comprehensive	\$ 3,000.00
Contents—		
Salt Lake City office	Fire and comprehensive	\$ 4,500.00

APPENDIX B

BUDGET

Fiscal Year Ending June 30, 1960

Personal Services

Administrative Salaries	\$ 19,800	
Engineering Salaries	25,000	
Clerk-Stenographer	<u>3,300</u>	\$ 48,100

Current Expense

Social Security	1,000	
Rent and Janitor Service	3,700	
Assistant Treasurer	300	
Accounting, Legal Services, reporting	3,550	
Telephone and Telegraph	2,700	
Insurance and Bond Premiums	850	
Printing	2,600	
Engineering Services, aerial photos, maps, etc.	3,000	
Miscellaneous	<u>2,000</u>	19,700

CAPITAL OUTLAY	4,400
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EDUCATION & INFORMATION	8,500
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TRAVEL	12,800
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OFFICE SUPPLIES AND POSTAGE	<u>3,500</u>
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TOTAL ESTIMATED EXPENSE

Fiscal Year July 1, 1959 through June 30, 1960	<u><u>\$ 97,000</u></u>
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APPENDIX C
CONSTRUCTION CONTRACT AWARDS
for
Colorado River Storage Project and Participating Projects

Feature, Schedule or Description of the Work	Spec. No.	Name of Contractor	Low Bid	Engineer's Estimate	Date of Award	Scheduled Completion Date
Glen Canyon Dam and Reservoir						
Earthwork and culverts, Access Highway, Station 158+67.7 to Station 400+00 (High- way along east side of the Colorado River)	DC-4730	Strong Co. Springville, Utah	\$ 1,156,244	\$ 1,014,633	9-21-56	7- 1-57
Exploratory Drilling and Water Testing at Glen Canyon Dam Site	400C-63	Cannon Diamond Drilling Co., Compton, Calif.	148,185	172,820	8-14-56	12-27-56
Glen Canyon Dam Right Diversion Tunnel	DC-4747	Mountain States Const. Co., Denver, Colorado	2,452,340	3,845,100	10- 1-56	12-26-57
Earthwork and Culverts, Access Highway, Station 400+00 to Station 1497+50 and Waterholes Canyon Bridge	DC-4756	W. W. Clyde & Co. Springville, Utah	1,011,819	832,663	10-20-56	7- 3-57
Completion of Gravel Surfacing, Arizona- Utah State Line to Glen Canyon Dam Site and Wahweap Creek Road	400C-68	Ford-Fie'ding, Inc. Provo, Utah	36,801	73,220	11- 8-56	2- 7-57
Colorado River Bridge, Glen Canyon Dam	DC-4800	Kiewit-Judson Pacific Murphy, 4322 Eastshore Drive, Emoryville, Calif.	4,139,277	2,944,750	1-21-57	1/ 2-17-59 6-17-59
1/Entire bridge, exclusive of painting below concrete bridge deck						
Glen Canyon Dam and Powerplant, Prime Contract	DC-4825	Merritt-Chapman & Scott Corp., New York, N. Y.	\$107,955,122	\$135,608,170	4-29-57	3- 6-64

Water Tank and Reservoir	DC-4865	Pittsburg-Des Moines Steel Co., Santa Clara, California	189,190	274,000	5-13-57	4- 3-58
Surfacing, Guardrail, Access Highway and Airstrip	DC-4887	Alexander Const. Co. Minneapolis, Minn.	1,517,412	1,911,956	5-28-57	11-27-57
Surfacing West Road and Vista Point	400C-83	W. W. Clyde & Co. Springville, Utah	58,453	55,936	6-13-57	10-12-57
Temporary Parking Area on Left Bank	400C-98	W. W. Clyde & Co. Springville, Utah	55,705	43,800	11-15-57	4-15-58
Streets, Water Distribution, and Sewage Systems	DC-4896	W. W. Clyde & Co. Springville, Utah	1,331,470	1,640,617	7-25-57	9- 1-58
Sewage Treatment Plant	DC-4912	W. W. Clyde & Co. Springville, Utah	221,445	206,197	8- 8-57	3- 5-58
Laboratory, Municipal Building, and Warehouse	DC-4924	Security Construction Co. Salt Lake City, Utah	358,708	429,362	8-22-57	3-12-58
Water Supply System	DC-4933	Southern Engineering and Construction Co., Long Beach, Calif.	1,059,157	869,547	9-10-57	11-27-58
Two-hundred Permanent Residences	DC-4989	Page City Construction Long Beach, Calif.	3,157,580	4,093,000	12-10-57	
Lighting installation for Glen Canyon Airport at Page, Arizona	DC-5066	A&B Lighting Co. 521 West 4th No. Salt Lake City, Utah	27,498	25,600	7-23-58	11-25-58
Furnishing & installing Control Cable, River Pumps to Filtration Plant Page, Arizona	DC-5090	A&B Lighting Co. 521 West 4th No. Salt Lake City, Utah	24,209	23,460	9-24-58	12-31-58
Administration Bldg. & Garage, Fire Station & Police Bldg. for Page, Arizona	DC-5115	Sierra Const. Corp. 2137 So. Industrial Road, Las Vegas, Nev.	190,342 144,204 334,546	209,046 134,946 343,992	12- 3-58	10- 6-59 6-28-59

Appendix C (continued)

CONSTRUCTION CONTRACT AWARDS

for

Colorado River Storage Project and Participating Projects

Feature, Schedule or Description of the Work	Spec. No.	Name of Contractor	Low Bid	Engineer's Estimate	Date of Award	Scheduled Completion Date
Flaming Gorge Dam and Reservoir						
Earthwork, Structures, Bridges, and Surfacing Temporary Access Road to Flaming Gorge Dam, Station 0+00 to Station 402+00	DC-4779	Wangsgaard Const. Co., Logan, Utah	143,912	171,342	1- 4-57	7-15-57
Streets, Utilities, and Residences for Flaming Gorge Community	DC-4897	Witt Construction Co. Provo, Utah	\$2,678,031	\$2,522,293	7-25-57	2-25-59
Earthwork, Structures, and Surfacing of Access Road	DC-4900	Wangsgaard Construction Co., Logan, Utah	504,642	457,439	6-27-57	6-25-58
Temporary Office and Warehouse Buildings	400C-89	Bethers and Stoker Salt Lake City, Utah	47,028	51,610	8-22-57	1-23-58
Prefabricated Metal Garages	400C-91	Dean R. Mayberry Ogden, Utah	59,793	73,275	9-18-57	1-28-58
Flaming Gorge Dam and Powerplant	DC-5045	Arch Dam Constructors Joint Venture 1024 Omaha Nat'l. Bank Bldg. Omaha, Nebraska	29,602,497	25,889,667	6-18-58	7- 1-63
Administration Bldg., Garage, and Fire Station and Laboratory for Flaming Gorge Community Facilities	DC-5069	Witt Construction Co. P. O. Box 19 Provo, Utah	161,052	153,811	8-19-58	5-28-59 8- 6-59 4-18-59

Navajo Dam and Reservoir

Streets, Utilities, and 15 Residences	DC-4914	Oehring Construction Co. Omaha, Nebraska	260,190	282,265	10-24-57	6-28-58
Navajo Dam and Access Road	DC-5056	Morrison-Knudsen Co., Inc., Henry J. Kaiser Co., F&S Construction Co. 411 West 5th St. L. A. 13, California	22,822,624	28,373,670	6-25-58	3-19-63
Laboratory Bldg., Navajo Dam	400C-103	Foutz & Bursum Constr. Co. P. O. Box 307 Farmington, New Mexico	19,700	18,390	8- 7-58	11- 9-58
Service Bldg. and Garage, Gov. Community, Navajo Dam	400C-116	Oehring Construction Co. 1005 E. 26th St. Farmington, New Mexico	22,197	26,340	10-20-58	4-23-59
Interior Finish for Residences and Wash House at Gov. Community, Navajo Dam	400-C-113	Allied Painting & Decorating 3950 Ulster St. Denver, Colorado	13,980	13,300	8- 8-58	10-27-58

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Paonia Participating Project

Paonia Dam and Relocation of State Highway	DC-5117	Bud King Construction Co. 1203 Wyoming St. Missoula, Montana	3,167,176	4,143,712	1- 7-59	10- 6-61
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APPENDIX D

(Note: The following report was taken from Senate Document No. 8, 86th Congress, 1st Session. It was prepared by the Secretary of the Interior and submitted to both Houses of Congress to show the financial status of the Colorado River Storage Project as of June 30, 1958.)

Second Annual Report on the Colorado River Storage Project and Participating Projects

INTRODUCTION

Legislation authorizing construction of the Colorado River storage project and participating projects was enacted into law (70 Stat. 105) on April 11, 1956. The act initiated an extensive program for the development of water resources in the Upper Colorado River Basin. Authorized for construction were 4 initial units of the Colorado River storage project on the Colorado River or its larger tributaries, primarily for river regulation and power production, and 11 participating projects for irrigation and other related purposes. Construction of the Curecanti unit, one of the four authorized units, is not to be undertaken until the Secretary of the Interior has certified to the Congress and to the President that, in his judgment, the benefits of such unit will exceed its costs. Completion of this special report is scheduled for the early part of calendar year 1959.

Section 6 of the act stipulates that on January 1 of each year the Secretary of the Interior shall report to Congress for the previous fiscal year:

1. Status of revenues from, and
2. Cost of constructing, operating, and maintaining the Colorado River storage project and participating projects (hereinafter referred to as the project).

The report is to be prepared so as to reflect accurately the—

3. Federal investment allocated at that time to power, to irrigation, and to other purposes;
4. Progress of return and repayment thereon; and
5. Estimated rate of progress, year by year, in accomplishing full repayment.

The project is still in the initial stages of construction and no income-producing facilities were in operational status during the year. For these reasons this report deals primarily with the construction prog-

ress to June 30, 1958, which is the forepart of item 2 above. Limited comments are furnished with respect to the remaining items required to be reported upon.

1. Status of Revenues

There were no revenues from water rental, water sales or from sales of electric energy during the fiscal year. Revenues to date have been limited to nonoperating income derived from grazing leases which at June 30, 1958, aggregated \$3,566 as follows:

Particulars:	Amount
Current year	\$2,123
Prior year	1,443
Total	3,566

2. Cost of Constructing, Operating, and Maintaining the Project

The cost of constructing the project to June 30, 1958, is reflected on the following attached financial exhibits:

Exhibit A.—Comparative balance sheets at June 30, 1958, and June 30, 1957;

Exhibit B.—Statement of source and application of funds and other credits as of June 30, 1958.

Exhibit A sets forth comparatively the financial condition of the project at June 30, 1958, and June 30, 1957. The cumulative funds and other credits available to the project to June 30, 1958, and how such funds and credits were used or applied are set forth on exhibit B by storage units, advance planning activity, and transmission division.

During the second fiscal year of the project, which ended June 30, 1958, activities were confined principally to construction on 3 of the 4 storage units; acquisition and construction of service facilities; continuation of advance planning on the Curecanti storage unit, and the 11 participating projects authorized for construction by the act and preconstruction work on the transmission division. Costs incurred for these activities constitute the principal items of cost of constructing the project to June 30, 1958, and are summarized as follows:

Activity:	Cost to date
Construction work in progress	\$41,862,636
Service facilities	9,167,240
Investigation (advance planning)	2,262,082
Total	\$53,291,958

Details with respect to the foregoing, identified as to storage unit, participating project, advance planning activity or transmission division are shown respectively on schedules No. 1, 2, and 3 attached.

Highlights of certain of the major construction and advance planning activities are set forth in the following paragraphs:

Glen Canyon Storage Unit

At June 30, 1958, work on the \$108 million prime contract for construction of the dam was on schedule with 17 percent of the work completed in 17 percent of the contract time. The access highways to the dam site were completed. Construction of the steel arch highway bridge spanning the canyon of the Colorado and connecting the new highways was on schedule. The bridge is expected to be in use ahead of the contract completion date of February 1959.

Excavation of the two diversion tunnels was completed and the concrete lining work was started. Diversion of the Colorado River is planned by the contractor for low water in February 1959.

In the town of Page, Arizona, temporary facilities were provided by contractors to serve a work force of approximately 1,500 employees in June 1958. A trailer camp, dormitories, mess halls, and a temporary shopping center are located in the contractors' portion of the town. Work on permanent features for the town continues with construction of houses, streets, water and sewer systems, laboratory, warehouses, municipal building, and other structures.

Flaming Gorge Storage Unit

The contract for the construction of the dam was awarded on June 18, 1958, to Arch Dam Constructors (Morrison-Knudsen, Peter Kiewit, and the Coker Construction Co., Omaha, Nebr.) for \$29,602,497. The contractor has begun work on housing for construction workers, on an access road from Dutch John to the dam site, and on excavation of the diversion tunnel.

By June 30, 1958, construction of an access road from Linwood, Utah, to Dutch John had been completed with the exception of the blacktop surfacing.

Construction of streets, utilities, and residences at Dutch John, located 2 miles from the dam site, was nearing completion.

Navajo Storage Unit

The contract for the construction of Navajo Dam was awarded on June 26, 1958, to a combination of construction firms made up of

Morrison-Knudsen, Henry J. Kaiser, and F & S Contracting Co. for \$22,822,624. The contractors moved onto the job immediately and started work on excavation in the spillway area and the opening of borrow areas.

By June 30, 1958, facilities at Navajo Camp, the field headquarters for the construction of Navajo Dam, had been completed.

An access road to Navajo Camp and to the dam site has been completed. The road was constructed by the State of New Mexico utilizing, in part, funds advanced by the Bureau of Reclamation.

Transmission Division

During fiscal year 1958, preliminary steps have been taken in the planning of a suitable transmission system for the Colorado River storage project.

Reconnaissance surveys have been made to select a route for the Glen Canyon-Springville section of the Glen Canyon-Flaming Gorge interconnecting transmission line.

Network analyzer studies have been initiated to determine operating voltages, size and type of conductors, location of lines, and operating characteristics of the potential system.

Advance Planning Activities

Foundation drilling at the dam site and the testing of sources of earth embankment and concrete aggregate materials constituted the major activity during the year relative to the Curecanti unit.

By June 30, 1958, definite plan reports had been completed for the Paonia project in Colorado and for the Vernal unit of the central Utah project in Utah. Definite plan reports were essentially complete for the Hammond project in New Mexico and the Seedskaadee project in Wyoming.

Advance planning studies continued during the year on all other authorized participating projects with the major emphasis on field studies coincident with preparation of definite plan reports.

3. Allocation of Federal Investment

Section 6 of Public Law 485 states that upon completion of each unit, participating project, or separable feature thereof, the Secretary shall allocate the total costs of constructing said unit, project or feature to the various purposes authorized in the act or authorized under reclamation law. Therefore in accordance with such provision no formal allocations to the several purposes to be served by the project have been made of the cost to June 30, 1958, as reflected in construction work in

progress accounts. However, tentative allocations have been made of the total estimated cost to complete the entire project and such allocations by units and participating projects may be summarized as follows:

(Dollars in thousands)

Storage units or participating projects	Authorized purposes				Total project cost
	Power	Municipal and industrial water	Irrigation	Other	
Storage project:					
Glen Canyon unit	\$ 303,473		\$ 48,761	\$ 2,923	\$ 355,157
Flaming Gorge unit	55,398		14,496	1,309	71,203
Navajo unit			42,101	1,105	43,206
Curecanti unit	85,495		2,636	584	88,715
Transmission division	166,534			100	166,634
Subtotal	610,900		107,994	6,021	724,915
Participating projects:					
State of Colorado:					
Pine River extension			192	53	245
Paonia			8,226	267	8,493
Smith Fork			4,122	298	4,420
Silt			3,531	17	3,548
Florida			7,234	199	7,433
State of New Mexico:					
Hammond			3,174	106	3,280
State of Utah:					
Central Utah:					
Vernal		\$ 657	6,123	201	6,981
Other units	52,110	46,256	130,839	5,189	234,394
Emery County			9,705	208	9,913
State of Wyoming:					
Seedskadee			35,449	2,436	37,885
Lyman			11,376	60	11,436
La Barge			1,751	65	1,816
Subtotal	52,110	46,913	221,722	9,099	329,844
Total	\$ 663,010	\$ 46,913	\$ 329,716	\$ 15,120	\$1,054,759

Allocation summary

	Amount	Percent
Reimbursable allocations:		
Power	\$ 663,010	62.9
Municipal and industrial water	46,913	4.4
Irrigation	329,716	31.3
	1,039,639	98.6
Nonreimbursable allocations:		
Flood control	2,636	.2
Recreation	4,472	.4
Fish and wildlife	2,664	.3
Other nonreimbursable costs:		
Investigations	2,825	.3
Contributions	2,523	.2
	15,120	1.4
Total	\$1,054,759	100.0

4. Progress of Return and Repayment of Federal Investment

As indicated heretofore no unit or separable feature of the project has been completed; therefore no progress has been made on actual repayment of the Federal investment as a result of operations.

5. Estimated Rate of Project Repayment, Year by Year

Except for miscellaneous nonoperating revenues, repayment of reimbursable project cost will not start until June 1963, when the first unit at Flaming Gorge is expected to go on the line. As stated under item 3, above, no storage unit, participating project, or separable feature thereof had been completed to June 30, 1958, and firm cost allocations to power, to irrigation, and to other purposes have not been made. Accordingly, no estimated rate of progress of project repayment, year by year, of the investment to be so allocated is included in this annual report.

COLORADO RIVER STORAGE PROJECT AND PARTICIPATING PROJECTS

Exhibit A.—Comparative balance sheets

	June 30—		Increase (decrease)
	1958	1957	
Assets			
Construction work in progress (schedule No. 1).....	\$41,862,636	\$ 8,394,711	\$33,467,925
Service facilities (schedule No. 2):			
Original cost	9,402,519	1,282,034	8,120,485
Less: Depreciation	235,279	76,614	158,665
Total	9,167,240	1,205,420	7,961,820
Investigation costs (schedule No. 3).....	2,262,082	1,282,719	979,363
Current assets:			
Cash and fund balance with U.S. Treasury:			
Operating funds ¹	6,656,814	5,320,870	1,335,944
Deposit funds ²	2,381,902	289,747	2,092,155
Total	9,038,716	5,610,617	3,428,099
Accounts receivable:			
Government agencies	16,034	20,300	(4,266)
Other	32,070	293,181	(261,111)
Total	48,104	313,481	(265,377)
Materials and supplies	44,574	24,400	20,174
Prepayments and advances ³	113,031	72,091	40,940
Total	9,244,425	6,020,589	3,223,836
Other assets:			
Undistributed and deferred charges ⁴	809,792	18,425	791,367
Other work in progress		150	(150)
Total	63,346,175	16,922,014	46,424,161

See footnotes at end of table.

Exhibit A—Comparative balance sheets (continued)

	June 30—		Increase (decrease)
	1958	1957	
Liabilities			
Net investment:			
United States:			
Congressional appropriations	48,742,000	13,600,000	35,142,000
Transfers of property and services	1,619,448	1,508,090	111,358
Interest during construction capitalized	493,093	75,273	417,820
	50,854,541	15,183,363	35,671,178
Less: Funds returned to U. S. Treasury, \$3,566 and nonreimbursable expenses \$40,734 ⁵	44,300		44,300
Total	50,810,241	15,183,363	35,626,878
Non-Federal: Contributions	1,730,191	843,772	886,419
Accumulated net income: Net nonoperating income	3,565		3,565
Total	52,543,998	16,027,135	36,516,863
Current liabilities:			
Accrued liabilities ²	2,381,602	289,706	2,091,896
Accounts payable:			
Government agencies	127,951	67,392	60,559
Other	3,439,924	535,336	2,903,588
Total	5,949,477	893,434	5,055,043
Other deferred credits ⁶	4,852,700	1,445	4,851,255
Total	\$63,346,175	\$16,922,014	\$46,424,161
¹ Operating funds:			
Obligated			\$5,455,120
Unobligated			1,201,694
Total			6,656,814
² Deposit funds:			
Retained percentages of contractors' earnings			\$2,381,602
Fees for business permits pending approval			300
Total			2,381,902
³ Prepayments and advances—Advances to other Bureau of Reclamation activities performing services for the project and which are reflected on the records of such entities as follows:			
Fund balances with U.S. Treasury			\$ 468,585
Accounts receivable:			
Project		\$64,483	
Other		30,442	
			94,925
Total			563,610
Less: Accounts payable—Other			450,579
Total			113,031

⁴Undistributed and deferred charges: Consists primarily of undistributed general expense and investment in transmission lines, telephone lines, and natural gas facilities. Such costs will be applied to construction work in progress and other applicable accounts over a period of time in order to accomplish an equitable distribution thereof.

⁵Nonreimbursable expenses: Cost (\$40,734) of quality of water studies required by sec. 15, Public Law 485, 84th Cong.

⁶Other deferred credits: Includes contractor's earnings of \$4,852,159. The earnings accrued after notice of exhaustion of funds had been issued to contractor and payment was deferred pending fiscal year 1959 appropriations.

Exhibit B—Statement of Source and Application of funds and other Credits, June 30, 1958

	Total	Storage units			Advance planning	Trans- mission division
		Glen Canyon	Flaming Gorge	Navajo		
SOURCE OF FUNDS AND OTHER CREDITS						
Congressional appro- priations:						
1957	\$13,000,000	\$ 9,277,000	\$ 1,300,000	\$ 800,000	\$ 1,575,000	\$ 48,000
1958	35,142,000	27,300,000	4,800,000	1,800,000	1,142,000	100,000
Total direct appro- priations	48,142,000	35,577,000	6,100,000	2,600,000	2,717,000	148,000
Transfer appropri- ations, Bureau of Public Roads	600,000	600,000	.....	.....	.....	.....
Total congressional appropriations	48,742,000	37,177,000	6,100,000	2,600,000	2,717,000	148,000
Contributions in aid of construction:						
State of Arizona	1,635,000	1,635,000	.....	.....	.....	.....
State of Colorado	35,000	.....	.....	.....	35,000	.....
City of Los Angeles	60,000	60,000	.....	.....	.....	.....
Miscellaneous	191	101	26	6	58	.....
Total contributions	1,730,191	1,695,101	26	6	35,058	.....
Transfers-in of prop- erty or services with- out charge	1,619,448	1,123,879	201,959	78,791	64,772	150,047
Interest during con- struction capitalized — included in con- struction work in progress	493,093	460,475	31,218	.....	.....	1,400
Contractor's earnings in excess of funds reserved under the contract	4,852,159	4,852,159	.....	.....	.....	.....
Net nonoperating income	3,566	.....	1,462	27	2,077	.....
Total	57,440,457	45,308,614	6,334,665	2,678,824	2,818,907	299,447
APPLICATION OF FUNDS AND OTHER CREDITS						
Construction work in progress	41,862,636	38,540,666	1,875,735	1,210,777	.....	235,458
Service facilities	9,167,240	5,980,203	2,619,364	381,205	185,196	272
Investigation costs	2,262,082	.....	39,646	.....	2,222,436	.....
Nonreimbursable ex- pense: Quality of water studies	40,734	.....	.....	.....	40,734	.....
Funds returned to U.S. Treasury	3,566	.....	1,462	27	2,077	.....
Total	53,336,258	44,520,869	4,536,207	1,592,009	2,451,443	235,730
Working capital (see below)	4,104,199	787,745	1,798,458	1,086,815	367,464	63,717
Total	57,440,457	45,308,614	6,334,665	2,678,824	2,818,907	299,447
ANALYSIS OF WORKING CAPITAL						
Current and deferred assets:						
Operating fund balance with U.S. Treasury	6,655,814	3,519,113	1,490,318	1,259,438	347,017	40,928
Trust and deposit funds with U.S. Treasury	2,381,902	2,189,845	172,987	19,070	.....	.....
Accounts receivable	48,104	4,827	4,339	457	38,481	.....
Inventories (stores)	44,574	42,026	1,192	.....	1,355	.....
Prepayments and advances	113,031	.....	.....	4,660	85,582	22,787
Deferred and un- distributed charges	809,792	99,133	710,190	(84)	553	.....
Total	10,054,217	5,854,944	2,379,026	1,283,541	472,989	63,717
Current and deferred liabilities:						
Accounts payable	3,567,875	2,877,113	407,581	177,656	105,525	.....
Trust and deposit liabilities	2,381,602	2,189,545	172,987	19,070	.....	.....
Deferred and undis- tributed credits	541	541	.....	.....	.....	.....
Total	5,950,018	5,067,199	580,568	196,726	105,525	.....
Working capital	4,104,199	787,745	1,798,458	1,086,815	367,464	63,717

SCHEDULE No. 1.—Construction work in progress, June 30, 1958

Feature	Total	Storage units			Transmission division
		Glen Canyon	Flaming Gorge	Navajo	
Dams and reservoirs:					
Dam	\$25,226,769	\$23,725,674	\$938,240	\$562,855	.....
Reservoirs	887,383	191,927	47,535	647,921	.....
Bridge	2,661,198	2,661,198	.....	.....	.....
Highways and access roads	5,085,430	4,515,952	569,478	.....	.....
Other	1,184	1,184	.....	.....	.....
Subtotal	33,861,964	31,095,935	1,555,253	1,210,776	.....
Powerplants	6,828,111	6,564,842	263,269	.....	.....
Switchyards	445,410	419,415	25,995	.....	.....
Transmission lines:					
Glen Canyon-Flaming Gorge lines and interconnecting facilities	221,546	.....	.....	.....	\$221,546
Future lines and substations	12,512	.....	.....	.....	12,512
Total	234,058	.....	.....	.....	234,058
Interest during construction capitalized	493,093	460,475	31,218	.....	1,400
Total	41,862,636	38,540,667	1,875,735	1,210,776	235,458
Additions by fiscal years:					
1957	8,394,711	7,196,535	932,264	265,912	.....
1958	33,467,925	31,344,132	943,471	944,864	235,458
Total	41,862,636	38,540,667	1,875,735	1,210,776	235,458

SCHEDULE No. 2.—Service facilities, June 30, 1958

	Total	Storage units			Advance planning	Transmission division
		Glen Canyon	Flaming Gorge	Navajo		
Structures:						
Permanent housing	\$1,720,614	\$950,627	\$769,987			
Portable housing	713,506	373,348	115,770	\$224,388		
Warehouses	519,896	456,708	63,188			
Administration building	67,087	55,913	11,174			
Municipal buildings:						
Public building	100,660	100,660				
Police	33,598	33,598				
Fire station and garages	109,464	26,175	83,289			
Total	3,264,825	1,997,029	1,043,408	224,388		
Utility plant	2,518,164	1,509,893	891,237	117,034		
Streets, street improvements, and access roads	1,820,319	1,450,311	370,008			
Airstrip	281,269	281,269				
Movable equipment	1,203,782	573,269	365,258	48,131	\$216,852	\$272
All other	314,160	304,347	7,436	2,377		
Total	9,402,519	6,116,118	2,677,347	391,930	216,852	272
Less: Depreciation (transferred to construction work in progress)	235,279	135,915	57,983	10,725	30,656	
Net total	9,167,240	5,980,203	2,619,364	381,205	186,196	272
Additions by fiscal years:						
1957	1,077,281	636,307	424,583	16,391		
1958	8,089,959	5,343,896	2,194,781	364,814	186,196	272
Total	9,167,240	5,980,203	2,619,364	391,205	186,196	272

SCHEDULE No. 3—Investigation Costs, June 30, 1958

Description:	Amount
Curecanti unit	\$ 183,802
Flaming Gorge unit, exploratory well	39,645
Central Utah project	542,324
Emery County project	31,263
Florida project	158,837
Hammond project	208,587
LaBarge project	6,043
Lyman project	12,342
Paonia project	246,229
Pine River project extension	130,604
Seedskaadee project	552,395
Silt project	68,124
Smith Fork project	81,887
Total	<u>\$2,262,082</u>
Additions by fiscal years:	
1957	\$1,282,719
1958	979,363
Total	<u>\$2,262,082</u>

APPENDIX E
UPPER COLORADO RIVER COMMISSION
KEY GAGING STATIONS
Derived from reports of U.S. Geological Survey and others.

No.	Stream and Station	Drainage Area Sq. Miles	DISCHARGE DURING WATER YEAR IN 1,000 ACRE-Feet													
			Mean 1914-45	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957#	1958#
1.	Colorado River near Grand Lake, Colo.....	103.0		36.0	67.1	42.5	69.1	38.3	66.9	80.8	44.0	23.8	33.3	50.9	91.5	
2.	Arapaho Creek at Monarch Lake Outlet, Colorado.....	47.1		58.4	70.8	47.7	67.2	44.0	69.6	80.9	53.2	37.4	50.5	59.1	89.4	
3.	Fraser River near Winter Park, Colorado.....	27.6		6.8	21.9	15.2	21.8	7.4	11.5	14.9	6.4	4.3	5.0	7.1	31.6	
4.	Vasquez Creek near Winter Park, Colorado.....	27.8		4.6	20.0	13.4	10.6	6.1	9.6	17.6	4.8	2.5	3.1	7.6	15.8	
5.	St. Louis Creek near Fraser, Colorado.....	32.8		25.9	32.9	25.8	27.8	24.9	33.6	34.8	26.0	13.5	19.0	15.5	24.6	
6.	Ranch Creek near Fraser, Colorado.....	19.9		10.8	18.0	14.0	18.4	9.8	15.2	20.2	8.6	2.9	2.9	4.4	16.8	
7.	Colorado River at Hot Sulphur Springs, Colo.....	782.0	476.7	306.3	498.2	372.8	478.0	155.9	239.6	345.6	164.2	80.4	103.1	142.3	282.7	
8.	Williams River near Leal, Colorado.....	89.5		62.1	96.6	71.1	79.4	60.3	79.5	94.9	65.3	32.9	44.3	59.0	90.4	
9.	Troublesome Creek near Troublesome, Colo.....	178.0		28.4	42.8	41.1	46.2	28.1	44.8	68.0	28.7	13.5	18.5	36.5	(1)	
10.	Blue River at Dillon, Colorado.....	129.0		73.6	108.4	93.4	94.8	71.2	102.0	88.3	78.6	36.0	54.5	70.4	102.2	
11.	Snake River near Montezuma, Colorado.....	58.9		37.6						57.1	44.9	25.4	36.3	51.4	67.1	
12.	Tenmile Creek at Dillon, Colorado.....	113.0		78.3	112.2	94.0	94.4	85.1	114.1	104.8	90.5	44.0	56.6	86.2	115.6	
13.	Eagle River at Red Cliff, Colorado.....	72.2		28.1	43.3	44.4	35.7	30.6	39.6	42.5	28.8	14.8	16.7	26.0	45.2	31.7
14.	Eagle River below Gypsum, Colorado.....	957.0			547.8	475.7	460.2	396.3	464.2	580.7	402.9	221.1	292.3	391.6	622.9	430.2
15.	Colorado River at Glenwood Springs, Colo.....	4,560.0	2,080.4	1,556.0	2,261.0	1,939.0	2,048.0	1,476.0	1,848.0	2,441.0	1,589.0	885.9	1,026.0	1,469.0	2,409.0	1,723.0
16.	Roaring Fork at Aspen, Colorado.....	109.0		56.1	103.3	85.5	75.6	50.3	59.2	81.3	59.4	32.6	43.5	43.8	131.0	84.4

Stream and No. Station	Drainage Area Sq. Miles	DISCHARGE DURING WATER YEAR IN 1,000 ACRE-FEET													
		Mean 1914-45	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957#	1958#
17. Crystal River near Redstone, Colorado	225.0		236.0	279.1	271.7	262.4	245.6	256.2	356.2	211.4	142.5	213.2	202.6	406.0	246.9
18. Roaring Fork at Glen- wood Springs, Colo.	1,460.0	1,028.0	798.3	1,155.0	1,087.0	958.6	798.0	872.7	1,239.0	800.1	477.9	660.8	717.4	1,521.0	897.4
19. Colorado River near Cameo, Colorado	8,060.0	3,505.0	2,576.0	3,747.0	3,325.0	3,341.0	2,557.0	2,911.0	4,130.0	2,573.0	1,552.0	1,976.0	2,416.0	4,213.0	2,902.0
20. Plateau Creek near Cameo, Colorado	604.0	186.3	111.7	163.0	182.4	160.6	117.2	71.5	183.4	103.0	72.3	93.0	69.8	210.5	201.6
21. Taylor River at Almont, Colorado	440.0		191.3	216.7	317.1	242.7	224.4	204.0	304.4	245.3	166.6	177.4	224.4	330.3	294.6
22. East River at Almont, Colorado	295.0		194.0	270.7	279.8	244.4	219.8	234.8	353.8	200.8	126.3	175.8	203.6	414.8	256.2
23. Gunnison River near Gunnison, Colorado	1,010.0		377.3	544.0	673.1	539.0	469.5	460.1	740.3	480.8	283.8	362.6	452.1	895.6	605.6
24. Tomichi Creek at Gunnison, Colorado	1,020.0		72.3	147.5	167.6	187.4	81.4	89.5	197.1	124.6	50.3	58.6	83.1	256.9	167.8
25. Gunnison River below Gunnison Tunnel, Colo.	3,980.0		571.9	960.0	1,297.0	1,118.0	607.0	569.1	1,407.0	668.8	217.8	401.4	574.7	1,814.0	
26. North Fork Gunnison River near Somerset, Colorado	521.0		249.5	341.3	393.6	339.1	335.5	256.1	474.7	248.0	142.3	239.8	245.6	593.8	367.2
27. Uncompahgre River at Colona, Colorado	437.0		152.8	211.9	226.2	230.8	126.2	93.6	219.5	144.1	87.6	119.0	118.0	275.8	264.6
28. Gunnison River near Grand Junction, Colo.	8,020.0	2,054.9	1,278.0	1,849.0	2,445.0	2,119.0	1,387.0	1,127.0	2,625.0	1,331.0	663.5	1,032.0	1,113.0	3,208.0	2,383.0
29. Colorado River near Colorado-Utah State Line....	17,900.0								6,847.0	3,773.0	2,086.0	2,903.0	3,345.0	7,525.0	5,425.0
30. Dolores River at Dolores, Colorado	556.0		215.6	315.6	388.8	378.2	233.0	138.5	492.8	195.1	155.6	203.0	197.2	504.3	383.6
31. San Miguel River near Placerville, Colo.	308.0		147.9	189.9	233.0	199.8	122.8	95.9	217.3	138.8	103.0	127.0	115.1	243.3	265.9
32. Dolores River near Cisco, Utah									1,085.0	290.8	208.5	360.0	269.7	1,085.0	
33. Colorado River near Cisco, Utah	24,100.0	6,186.0	4,062.0	6,051.0	6,554.0	6,287.0	4,236.0	3,921.0	7,707.0	4,037.0	2,329.0	3,241.0	3,604.0	8,486.0	6,354.0

APPENDIX E (continued)
 UPPER COLORADO RIVER COMMISSION
 KEY GAGING STATIONS
 Derived from reports of U.S. Geological Survey and others.

Stream and No. Station	Drainage Area Sq. Miles	DISCHARGE DURING WATER YEAR IN 1,000 ACRE-FEET													
		Mean 1914-45	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957#	1958#
34. Green River at Warren Bridge near Daniel, Wyo.....	468.0		344.7	427.3	340.9	354.0	463.7	488.5	396.4	358.7	394.1	292.9	482.1	442.0	312.1
35. Pine Creek above Fremont Lake, Wyoming.....	75.8											102.2	155.2	142.4	110.8
36. Boulder Creek below Boulder Lake, Wyo.	130.0		135.8	187.9	132.0	133.1	175.8	194.9	162.8	117.9	147.9	116.7	160.3	169.0	
37. North Piney Creek near Mason, Wyoming	58.0		48.3	55.1	39.5	35.8	60.8	75.2	49.8	38.8	40.4	28.5	56.8	53.2	40.6
38. Fontenelle Creek near Herschler Ranch near Fontenelle, Wyoming	152.0								69.6	40.3	39.8	37.4	66.4	53.6	53.8
39. Big Sandy Creek at Leckie Ranch near Big Sandy, Wyo.	94.0		60.8	79.5	55.7	58.2	90.7	76.6	73.6	48.0	54.7	46.8	64.8	78.4	47.7
40. Green River near Green River, Wyoming	10,000.0								1,574.0	1,087.0	1,179.0	836.0	1,631.0	1,483.0	1,106.0
41. Blacks Fork near Millburne, Wyoming	156.0	113.2	102.7	130.9	104.3	104.9	117.1	111.6	131.9	114.8	71.5	86.3	122.2	151.6	117.2
42. East Fork of Smith Fork near Robertson, Wyo.	53.0	32.5	29.6	36.4	26.9	38.7	31.4	31.4	60.0	30.2	18.4	21.4	29.9	39.6	31.7
43. West Fork of Smith Fork near Robertson, Wyo.	37.2	16.3	13.9	18.5	12.2	14.8	16.8	16.6	19.2	14.2	6.4	9.3	15.2	17.9	12.1
44. Hams Fork near Frontier, Wyoming	298.0		124.1	132.6	116.8	99.2	196.4	167.9	147.2	74.0	61.6	69.2	121.6	120.2	105.0
45. Blacks Fork near Green River, Wyoming	3,670.0				270.1	221.9	441.7	307.8	460.1	117.4	67.1	88.1	217.0	248.8	184.6
46. Green River near Linwood, Utah	14,300.0	1,501.6	1,425.0	2,235.0	1,447.0	1,358.0	2,458.0	2,262.0	2,016.0	1,205.0	1,227.0	932.5	1,853.0	1,826.0	1,317.0
47. Henrys Fork near Lonetree, Wyo.	56.0	32.4	20.2	34.3	25.0	31.7	29.6	28.2	42.9	28.4	14.9	19.4	21.3	31.2	28.2

No.	Stream and Station	Drainage Area Sq. Miles	DISCHARGE DURING WATER YEAR IN 1,000 ACRE-Feet													
			Mean 1914-45	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957#	1958#
48.	Middle Fork Beaver Creek near Lonetree, Wyoming	28.0					18.8	15.0	12.7	23.9	14.2	8.6	11.1	10.9	22.1	
49.	East Fork Beaver Creek near Lonetree, Wyoming	8.2					5.8	6.4	4.5	5.8	6.7	4.2	4.4	4.6	4.7	
50.	West Fork Beaver Creek near Lonetree, Wyo.	23.0					12.9	10.9	10.7	17.4	12.6	6.8	8.0	8.1	17.0	
51.	Burnt Fork near Burntfork, Wyoming	52.8	25.1	14.2	27.6	21.8	28.1	20.8	18.6	30.0	19.8	12.4	15.2	15.3	25.5	19.6
52.	Henrys Fork at Linwood, Utah	531.0	66.8	43.8	87.5	52.0	64.4	56.5	45.9	109.2	58.1	15.6	21.1	30.9	67.2	41.4
53.	Sheep Creek Upper Canal near Manila, Utah							3.7	3.4	4.2	3.0	2.8	4.0	4.0	6.6	
54.	Sheep Creek Lower Canal near Manila, Utah							10.8	12.0	11.3	8.8	8.8	12.4	11.6	15.4	
55.	Sheep Creek near Manila, Utah	45.9		4.1	19.5	16.9	16.1	6.8	2.9	20.4	7.0	1.6	2.0	2.2	11.2	
56.	Sheep Creek at mouth near Manila, Utah	111.0			28.3	21.1	25.0	16.6	10.8	30.7	14.8	8.4	8.3	7.9	23.3	
57.	Carter Creek near Manila, Utah	19.0					9.1	6.6	5.4	11.1	5.2	3.0	(2)	(2)		
58.	Carter Creek at mouth near Manila, Utah	110.0			65.0	46.1	58.2	47.9	32.1	68.2	33.6	22.3	18.2	(3)		
59.	Green River near Greendale, Utah								2,336.0	2,226.0	1,288.0	1,251.0	1,002.0	1,895.0	1,938.0	1,383.0
60.	Yampa River at Steamboat Springs, Colo.	604.0	345.1	274.8	382.3	343.8	390.0	287.6	346.0	447.1	285.3	156.2	241.6	309.1	535.8	
61.	Elk River at Clark, Colorado	206.0		216.4	261.1	213.5	291.6	248.3	233.1	276.4	178.1	135.1	186.8	237.6	316.2	
62.	Yampa River near Maybell, Colo.	3,410.0	1,189.5	855.6	1,310.0	1,183.0	1,322.0	952.0	1,016.0	1,447.0	829.2	522.2	772.6	1,033.0	1,781.0	1,268.0
63.	Little Snake River near Slater, Colo.	285.0		152.0	178.4				153.1	226.6	113.0	75.7	114.6	173.4	229.6	188.2
64.	Slater Fork near Slater, Colorado	161.0		44.8	67.4	47.9	76.3	67.9	39.1	79.6	42.0	30.0	40.2	50.5	77.7	

APPENDIX E (continued)
UPPER COLORADO RIVER COMMISSION
KEY GAGING STATIONS
 Derived from reports of U.S. Geological Survey and others.

No.	Stream and Station	Drainage Area Sq. Miles	DISCHARGE DURING WATER YEAR IN 1,000 ACRE-FeET													
			Mean 1914-45	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957#	1958#
65.	Savery Creek near Savery, Wyoming	330.0		57.6		55.2	105.0	92.3	55.8	150.2	59.0	39.4	42.5	58.1	95.3	85.0
66.	Little Snake River near Dixon, Wyoming	988.0	423.5	288.3	383.6	297.7	461.2	399.0	291.2	577.6	258.8	157.2	215.7	303.4	457.8	397.7
67.	Little Snake River near Lily, Colorado	3,730.0	472.4	323.8	467.0	284.8	536.4	442.0	294.6	728.5	268.7	178.3	233.2	410.9	507.8	425.0
68.	Green River near Jensen, Utah				4,057.0	3,050.0	3,408.0	4,097.0	3,673.0	4,522.0	2,492.0	2,055.0	2,074.0	3,404.0	4,377.0	3,156.0
69.	Brush Creek near Vernal, Utah	82.0		14.7	41.2	25.1	34.0	36.3	19.7	35.4	19.7	16.4	14.4	16.4	27.9	23.9
70.	Brush Creek near Jensen, Utah	255.0	36.0	5.7	30.1	12.0	18.9	22.8	7.6	27.7	7.6	5.1	4.8	4.9	12.4	10.0
71.	Ashley Creek near Vernal, Utah	101.0	78.0	47.3	92.2	67.8	80.4	87.4	59.6	102.5	58.1	53.4	49.5	58.3	71.2	66.7
72.	Ashley Creek at Sign of the Maine near Vernal, Utah	241.0		49.1	134.0	81.1	104.6	118.3	75.8	132.2	65.1	58.6	52.4	69.7	93.0	92.2
73.	Ashley Creek near Jensen, Utah	386.0			80.6	38.8	58.0	78.8	31.5	93.2	27.7	16.0	15.6	18.4	31.7	42.0
74.	Duchesne River near Tabiona, Utah	352.0		143.6	178.2	125.1	182.0	201.5	184.5	252.5	140.3	77.7	92.2	129.3	140.7	139.7
75.	Strawberry River at Duchesne, Utah	1,040.0		78.2	97.4	65.3	134.2	130.2	101.5	292.8	89.9	64.6	72.2	88.5	108.1	120.1
76.	Duchesne River at Myton, Utah	2,750.0	439.5	255.3	382.8	234.9	456.2	431.4	349.2	797.2	272.0	148.3	185.4	251.9	296.1	326.0
77.	Uinta River near Neola, Utah	181.0		91.1	153.9	98.3	152.9	137.6	114.6	183.1	105.4	95.1	96.6	111.8	124.1	140.6
78.	Whiterocks River near Whiterocks, Utah	115.0	94.1	55.2	111.1	69.4	93.8	93.2	73.0	120.4	63.4	57.9	60.3	67.2	80.2	92.2

No.	Stream and Station	Drainage Area Sq. Miles	DISCHARGE DURING WATER YEAR IN 1,000 ACRE-FEET													
			Mean 1914-45	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957#	1958#
79.	Duchesne River near Randlett, Utah	3,920.0	653.3	316.3	570.0	330.7	603.3	581.2	434.8	1,041.0	354.9	191.4	247.6	313.5	406.5	465.6
80.	White River at Buford, Colorado	254.0								274.8	208.6	160.0	174.7	211.6	316.8	263.3
81.	South Fork White River at Buford, Colorado	170.0								259.2	188.6	130.4	153.8	166.2	242.3	204.7
82.	White River near Meeker, Colorado	752.0	461.7	363.6	553.8	459.3	522.8	429.2	440.2	606.0	455.4	301.1	344.5	394.1	668.5	538.7
83.	White River near Watson, Utah	4,020.0	582.0	394.3	559.1	528.0	537.4	446.8	467.8	694.4	475.9	340.6	388.0	419.2	728.1	594.7
84.	Green River near Ouray, Utah					4,032.0	4,826.0	5,461.0	4,718.0	6,425.0	3,399.0	2,665.0	2,818.0	(4)	5,593.0	4,338.0
85.	Willow Creek near Ouray, Utah	967.0				16.3	28.6	26.8	12.8	35.3	13.6	12.6	10.7	(3)		
86.	Minnie Maud Creek near Myton, Utah	30.0							1.7	11.2	0.9	1.1	1.3	(5)	(5)	
87.	Price River near Heiner, Utah	455.0	92.6	53.9	64.8	62.7	85.6	80.8	72.6	225.3	79.9	63.4	59.0	61.5	66.2	126.2
88.	Price River at Woodside, Utah	1,500.0			51.1	35.8	84.1	67.7	60.1	247.8	58.8	52.4	44.4	24.6	74.4	132.0
89.	Green River at Green River, Utah	40,600.0	4,658.4	3,469.0	5,484.0	4,148.0	4,897.0	5,511.0	4,722.0	6,838.0	3,395.0	2,618.0	2,839.0	4,056.0	5,501.0	4,466.0
90.	Cottonwood Creek near Orangeville, Utah	200.0		54.7	68.5	51.3	83.2	51.0	57.8	152.7	62.1	41.3	43.2	48.8	98.6	96.2
91.	San Rafael River near Green River, Utah	1,690.0		66.6	111.8	67.0	130.8	55.2	68.3	314.8	80.9	40.8	31.8	34.2	155.0	
91.	Dirty Devil River near Hite, Utah													37.1	96.5	
93.	Colorado River at Hite, Utah	76,600.0				10,980.0	11,130.0	9,738.0	8,784.0	14,780.0	7,767.0	5,015.0	6,238.0	7,694.0	14,290.0	11,190.0
94.	Escalante River near Escalante, Utah	315.0		7.9	7.5	9.2	16.6	7.4	3.3	8.9	4.4	2.2	2.4	(3)		
95.	Escalante River at mouth near Escalante, Utah	2,010.0							60.4	73.0	60.8	49.6	64.5			

APPENDIX E (continued)
UPPER COLORADO RIVER COMMISSION
KEY GAGING STATIONS
 Derived from reports of U.S. Geological Survey and others.

No.	Stream and Station	Drainage Area Sq. Miles	DISCHARGE DURING WATER YEAR IN 1,000 ACRE-FEET													
			Mean 1914-45	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957#	1958#
96.	San Juan River at Pagosa Springs, Colo.	298.0		120.5	205.4	353.3	370.4	182.1	131.5	415.1	183.7	150.7	153.3	180.3	432.1	299.6
97.	Rio Blanco River near Pagosa Springs, Colo.	58.0		34.1	56.7	61.0	73.3	41.0	33.2	89.1	44.4	40.0	37.8	45.1	116.9	81.9
98.	Navajo River at Edith, Colorado	165.0	131.8	54.3	77.5	103.2	121.9	66.0	52.2	156.4	65.2	62.5	56.3	63.4	162.4	142.3
99.	San Juan River at Rosa, New Mexico	1,990.0	956.6	342.2	545.9	925.8	1,064.0	477.3	327.9	1,235.0	459.7	433.4	434.5	464.9	1,153.0	1,109.0
100.	Los Pinos River near Bayfield, Colorado	270.0		166.2	211.4	410.6	368.1	196.2	145.5	322.5	175.9	176.7	192.2	199.6	332.8	359.9
101.	Los Pinos River at Ignacio, Colorado	448.0	256.4	42.1	95.5	297.7	282.4	53.1	26.7	259.2	44.7	43.9	57.8	44.8	288.8	280.6
* 102.	Los Pinos River at LaBoca, Colorado	510.0								282.2	62.2	64.1	80.4	70.0	323.3	327.3
* 103.	Spring Creek at LaBoca, Colorado	58.0								22.2	21.5	24.3	22.4	21.2	19.2	23.6
104.	Martinez Ditch near Archuleta, New Mex.													2.0	(6)	
105.	San Juan River near Archuleta, New Mexico	3,240.0												558.0	1,501.0	1,455.0
106.	Citizens Ditch (Bloomfield Canal) near Turley, New Mex. diverting water around Blanco gage									70.4	72.2	79.1	74.2	66.0	69.5	
107.	San Juan River at Bloomfield, New Mex.	5,410.0												(7)	1,552.0	1,529.0
108.	Animas River at Durango, Colo.	692.0	654.7	421.8	625.8	769.0	774.9	410.2	324.4	813.0	391.9	364.0	409.7	378.6	798.8	

Stream and No. Station	Drainage Area Sq. Miles	DISCHARGE DURING WATER YEAR IN 1,000 ACRE-Feet													
		Mean 1914-45	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957#	1958#
109. Florida River near Durango, Colo.	96.0		39.1	66.8	102.4	104.1	42.6	30.1	98.9	37.3	43.8	42.4	35.9	102.6	
110. Animas River near Cedar Hill, New Mex.	1,090.0	806.7	438.6	668.5	865.5	945.1	464.9	372.9	985.4	442.3	426.8	464.0	431.1	979.5	954.4
111. Animas River at Farmington, New Mexico	1,360.0	753.8	382.3	608.3	829.0	861.0	395.0	294.6	935.2	373.6	376.5	412.5	365.1	969.6	913.0
112. San Juan River at Farmington, New Mexico	7,240.0	2,111.4	790.4	1,299.0	2,133.0	2,239.0	942.2	651.0	2,401.0	841.7	896.9	915.7	874.4	2,438.0	2,363.0
113. LaPlata River at Hesperus, Colo.	37.0		15.8	26.4	36.8	47.0	20.4	17.9	53.4	22.3	18.6	20.3	20.0	53.6	
114. LaPlata River at Colorado-New Mex. State Line	331.0	30.9	9.7	11.7	22.4	35.0	13.0	8.0	45.3	11.4	6.7	9.4	8.4	41.8	
115. LaPlata River near Farmington, New Mexico	583.0		3.6	5.0	14.6	25.3	5.9	2.4	41.9	3.6	2.4	4.3	0.4	27.9	46.0
116. San Juan River at Shiprock, New Mexico	12,900.0		811.7	1,382.0	2,211.0	2,321.0	959.9	668.3	2,482.0	873.4	943.4	956.4	860.1	2,500.0	2,363.0
117. Mancos River near Towaoc, Colorado	550.0	52.0							60.7	11.8	10.0	14.2	8.3	62.2	52.6
118. McElmo Creek near Colorado-Utah State Line	350.0								24.9	20.0	20.8	26.5	20.2	45.3	48.8
119. San Juan River near Bluff, Utah	23,000.0	2,275.6	864.6	1,488.0	2,319.0	2,523.0	902.3	668.3	2,542.0	934.7	984.9	988.5	861.6	2,597.0	2,551.0
120. Colorado River at Lees Ferry, Ariz.	107,900.0	13,763.3	8,722.0	13,490.0	13,670.0	14,340.0	11,040.0	9,817.0	17,960.0	8,787.0	6,101.0	7,290.0	8,740.0	17,320.0	14,220.0
121. Paria River at Lees Ferry, Ariz.	1,570.0	25.3	22.9	23.2	19.1	19.6	13.5	13.9	18.9	17.9	15.7	17.7	9.9	16.6	39.2
** 122. Colorado River at Lee Ferry, Ariz.	109,470.0	13,788.6	8,744.0	13,510.0	13,690.0	14,360.0	11,060.0	9,831.0	17,980.0	8,805.0	6,116.0	7,307.0	8,750.0	17,340.0	14,260.0

Provisional Record subject to revision.

* Add Spring Creek (No. 103) to Los Pinos River at La Boca (No. 102) to obtain flow of Los Pinos River at Colorado-New Mexico State Line.

** Lee Ferry, one mile downstream from the mouth of the Paria River, is the 1922 "Compact Point." The discharge at this point is taken as the sum of Nos. 120 and 121.

(1) Discontinued September 30, 1956.

(2) Discontinued September 30, 1954.

(3) Discontinued September 30, 1955.

(4) Discontinued September 30, 1955 and Re-established September 30, 1956.

(5) Discontinued September 30, 1955 and Re-established September 30, 1957.

(6) Discontinued June 30, 1957.

(7) Previously provisionally estimated at 558.0.

APPENDIX F TRANSMOUNTAIN DIVERSIONS IN COLORADO

DIVERSION	LOCATION	ACRE-FEET PER YEAR									
		1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
Alva B. Adams Tunnel (East Portal)	Shadow Mountain Reservoir	17,480	26,270	56,310	56,020	180,000	302,100	256,600	210,700	195,200	208,380
Berthoud Pass Ditch	Fraser River Tributaries.....	327	490	716	730	594	217	458	396	568	429
Eureka Ditch	Tonahutu Creek	91	77	124	103	26	27	125	52	124	64
Grand River Ditch	Colorado River Tributaries.....	17,190	16,160	24,970	21,380	19,750	12,740	16,150	20,470	16,060	13,770
Moffat Tunnel (East Portal)		24,660	29,560	33,800	31,230	35,070	19,540	37,020	53,430	48,180	13,650
Independence Pass Tunnel (Twin Lakes Tunnel)	Roaring Fork Tributaries.....	38,190	34,880	44,920	51,360	40,300	27,470	35,050	36,440	32,740	24,030
Williams Fork Tunnel (Jones Pass)	Williams River	1,890	9,090	11,140	6,810	7,420	5,480	10,300	8,880	4,540	0
Boreas Pass Ditch	Blue River	0	69	176	13	273	136	268	260	475	250
Hoosier Pass Tunnel	Blue River				2,380	4,840	3,550	6,450	9,290	7,110	6,460
Columbine Ditch	Tenmile Creek Tributaries.....	0	1,270	1,740	1,020	1,040	844	1,160	1,390	1,110	0
Fremont Pass Ditch	Tenmile Creek	0	0	0	0	0	0	0	0	0	0
Ewing Ditch	Eagle River	1,340	783	1,420	1,820	1,140	498	415	1,100	1,360	1,340
Wurtz Ditch	Eagle River	2,690	1,990	2,940	2,950	2,010	905	1,350	2,590	2,640	2,040
Busk-Ivanhoe Tunnel	Fryingpan River	4,300	3,410	5,130	6,340	5,080	3,200	5,270	4,400	5,510	2,650
Larkspur Ditch	Tomichi Creek	394	24	121	422	217	0	16	35	0	199
Tabor Ditch	Gunnison River	0	255	396	308	182	174	31	167	788	794
Fuchs Ditch	N. Fork Los Pinos River.....	90	361	175	536	381	1,110	696	941	1,265	522
Raber-Lohr Ditch	Los Pinos River	422	976	735	1,730	1,340	3,650	3,490	2,630	2,680	1,813
Treasure Pass Ditch	San Juan River	0	69	160	198	96	60	90	128	0	0
Squaw Pass Ditch	San Juan River	0	208	159	240	192	211	71	177	0	172
Piedra Pass Ditch	San Juan River	0	0	67	0	42	0	0	84	0	244
Total		109,054	125,942	185,199	185,590	299,993	381,912	375,020	353,560	320,350	276,807

APPENDIX F (continued)
TRANSMOUNTAIN DIVERSIONS IN UTAH

DIVERSION	LOCATION	ACRE-FEET PER YEAR								
		1950	1951	1952	1953	1954	1955	1956	1957	1958
(A) Colorado Basin to Great Basin										
Ephraim Tunnel	near Ephraim	3,070	3,180	3,920	3,720	2,480	2,950	3,520	2,460	
Reeder Ditch	near Spring City	265	116	138	44	75	272	474	493	
Twin Creek Tunnel	near Mt. Pleasant	163	205	462	103	144	221	121	377	
Horseshoe Tunnel	near Ephraim	698	703	1,000	539	362	409	492	699	
Cedar Creek Tunnel	near Spring City	314	338	718	223	191	329	237	496	
Spring City Tunnel	near Spring City	1,370	1,630	1,660	1,960	1,430	1,880	1,890	2,330	
Fairview Ditch	near Fairview	1,490	1,820	2,060	1,700	1,000	1,280	1,540	2,410	
Candland Ditch	near Mt. Pleasant	133	224	583	134	164	81	155	151	
Black Canyon Ditch	near Spring City	205	260	500	180	217	231	254	428	
Larsen Tunnel	near Ephraim	750	910	2,280	923	705	785	913	993	
Madsen Ditch	near Ephraim	7	69	13	20	4	4	104	20	
John August Ditch	near Ephraim	186	299	206	235	224	246	183	279	
Coal Fork Ditch	near Mt. Pleasant	158	209	630	205	167	210	206	426	
Hobble Creek Ditch	near Heber	651	1,334	551	1,260	995	1,160	1,260	717	605
Strawberry River and Willow Creek Ditches	Strawberry River, Willow Creek	2,730	2,500	2,480	1,990	1,290	2,610	2,350	2,380	2,670
Sub-Total.....		12,192	13,797	17,201	13,236	9,448	12,669	13,699	14,659	
Strawberry Tunnel	Strawberry River	69,140	68,170	45,780	80,970	78,910	71,450	74,060	57,960	67,040
Duchesne Tunnel near Kamas, Utah	North Fork Duchesne River					28,220	32,060	31,890	29,790	22,740
Total.....		81,332	81,967	62,981	94,205	116,578	116,179	119,649	102,409	
(B) Great Basin to Colorado Basin										
Tropic and East Fork Canal	near Tropic	3,910	2,400	4,980	1,880	2,180	2,050	934	2,490	

APPENDIX F (continued)

TRANSMOUNTAIN DIVERSIONS NOT MEASURED
UPPER COLORADO RIVER BASIN

COLORADO:

Tarbell ditch diverts water from a tributary of Cochetopa Creek to the Rio Grande basin.

WYOMING:

Continental Divide ditch diverts water from Little Sandy Creek to the Platte River basin. The appropriation permit is for 13.76 cubic feet per second, but no discharge record is available.

NEW MEXICO AND ARIZONA:

There are no transmountain diversions from the Colorado River basin above Lee Ferry.

APPENDIX G

COLORADO RIVER COMPACT SIGNED AT SANTA FE, NEW MEXICO, November 24, 1922

The States of Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming, having resolved to enter into a compact under the act of the Congress of the United States of America approved August 19, 1921, (42 Stat. L., p. 171), and the acts of the legislatures of the said States, have through their governors appointed as their commissioners: W. S. Norviel for the State of Arizona, W. F. McClure for the State of California, Delph E. Carpenter for the State of Colorado, J. G. Scrugham for the State of Nevada, Stephen B. Davis, Jr. for the State of New Mexico, R. E. Caldwell for the State of Utah, Frank C. Emerson for the State of Wyoming, who, after negotiations participated in by Herbert Hoover, appointed by the President as the representative of the United States of America, have agreed upon the following articles.

Article I

The major purposes of this compact are to provide for the equitable division and apportionment of the use of the waters of the Colorado River system; to establish the relative importance of different beneficial uses of water; to promote interstate comity; to remove causes of present and future controversies and to secure the expeditious agricultural and industrial development of the Colorado River Basin, the storage of its waters, and the protection of life and property from floods. To these ends the Colorado River Basin is divided into two basins, and an apportionment of the use of part of the water of the Colorado River system is made to each of them with the provision that further equitable apportionment may be made.

Article II

As used in this compact:

(a) The term "Colorado River system" means that portion of the Colorado River and its tributaries within the United States of America.

(b) The term "Colorado River Basin" means all of the drainage area of the Colorado River system and all other territory within the United States of America to which the waters of the Colorado River system shall be beneficially applied.

(c) The term "States of the upper division" means the States of Colorado, New Mexico, Utah, and Wyoming.

(d) The term "States of the lower division" means the States of Arizona, California, and Nevada.

(e) The term "Lee Ferry" means a point in the main stream of the Colorado River 1 mile below the mouth of the Paria River.

(f) The term "Upper Basin" means those parts of the States of Arizona, Colorado, New Mexico, Utah, and Wyoming within and from which waters naturally drain into the Colorado River system above Lee Ferry, and also all parts of said States located without the drainage area of the Colorado River system which are now or shall hereafter be beneficially served by waters diverted from the system above Lee Ferry.

(g) The term "Lower Basin" means those parts of the States of Arizona, California, Nevada, New Mexico, and Utah within and from which waters naturally drain into the Colorado River system below Lee Ferry, and also all parts of said States located without the drainage area of the Colorado River system which are now or shall hereafter be beneficially served by waters diverted from the system below Lee Ferry.

(h) The term "domestic use" shall include the use of water for household, stock, municipal, mining, milling, industrial, and other like purposes, but shall exclude the generation of electrical power.

Article III

(a) There is hereby apportioned from the Colorado River system in perpetuity to the upper basin and to the lower basin, respectively, the exclusive beneficial consumptive use of 7,500,000 acre-feet of water per annum, which shall include all water necessary for the supply of any rights which may now exist.

(b) In addition to the apportionment in paragraph (a), the lower basin is hereby given the right to increase its beneficial consumptive use of such waters by 1,000,000 acre-feet per annum.

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

(d) The States of the upper division will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75,000,000 acre-feet for any period of 10 consecutive years reckoned in continuing progressive series beginning with the 1st day of October next succeeding the ratification of this compact.

(e) The States of the upper division shall not withhold water, and the States of the lower division shall not require the delivery of water, which can not reasonably be applied to domestic and agricultural uses.

(f) Further equitable apportionment of the beneficial uses of the waters of the Colorado River system unapportioned by paragraphs (a), (b), and (c) may be made in the manner provided in paragraph (g) at any time after October 1, 1963, if and when either basin shall have reached its total beneficial consumptive use as set out in paragraphs (a) and (b).

(g) In the event of a desire for further apportionment as provided in paragraph (f) any two signatory States, acting through their governors, may give joint notice of such desire to the governors of the other signatory States and to the President of the United States of America, and it shall be the duty of the governors of the signatory States and of the President of the United States of America forthwith to appoint representatives, whose duty it shall be to divide and apportion equitably between the upper basin and lower basin the beneficial use of the unapportioned water of the Colorado River system as mentioned in paragraph (f), subject to the legislative ratification of the signatory States and the Congress of the United States of America.

Article IV

(a) Inasmuch as the Colorado River has ceased to be navigable for commerce and the reservation of its waters for navigation would seriously limit the development of its basin, the use of its waters for purposes of navigation shall be subservient to the uses of such waters for domestic, agricultural, and power purposes. If the Congress shall not consent to this paragraph, the other provisions of this compact shall nevertheless remain binding.

(b) Subject to the provisions of this compact, water of the Colorado River system may be impounded and used for the generation of electrical power, but such impounding and use shall be subservient to the use and consumption of such water for agricultural and domestic purposes and shall not interfere with or prevent use for such dominant purposes.

(c) The provisions of this article shall not apply to or interfere with the regulation and control by any State within its boundaries of the appropriation, use, and distribution of water.

Article V

The chief official of each signatory State charged with the administration of water rights, together with the Director of the United States Reclamation Service and the Director of the United States Geological Survey, shall cooperate, *ex officio*—

(a) To promote the systematic determination and coordination of the facts as to flow, appropriation, consumption, and use of water in the Colorado River Basin, and the interchange of available information in such matters.

(b) To secure the ascertainment and publication of the annual flow of the Colorado River at Lee Ferry.

(c) To perform such other duties as may be assigned by mutual consent of the signatories from time to time.

Article VI

Should any claim or controversy arise between any two or more of the signatory States: (a) With respect to the waters of the Colorado River system not covered by the terms of this compact; (b) over the meaning or performance of any of the terms of this compact; (c) as to the allocation of the burdens incident to the performance of any article of this compact or the delivery of waters as herein provided; (d) as to the construction or operation of works within the Colorado River Basin to be situated in two or more States, or to be constructed in one State for the benefit of another State; or (e) as to the diversion of water in one State for the benefit of another State, the governors of the States affected upon the request of one of them, shall forthwith appoint commissioners with power to consider and adjust such claim or controversy, subject to ratification by the legislatures of the States so affected.

Nothing herein contained shall prevent the adjustment of any such claim or controversy by any present method or by direct future legislative action of the interested States.

Article VII

Nothing in this compact shall be construed as affecting the obligations of the United States of America to Indian tribes.

Article VIII

Present perfected rights to the beneficial use of waters of the Colorado River system are unimpaired by this compact. Whenever storage capacity of 5,000,000 acre-feet shall have been provided on the Main Colorado River within or for the benefit of the lower basin, then claims of such rights, if any, by appropriators or users of water in the lower basin against appropriators or users of water in the upper basin shall attach to and be satisfied from water that may be stored not in conflict with Article III.

All other rights to beneficial use of waters of the Colorado River system shall be satisfied solely from the water apportioned to that basin in which they are situated.

Article IX

Nothing in this compact shall be construed to limit or prevent any State from instituting or maintaining any action or proceeding, legal or equitable, for the protection of any right under this compact or the enforcement of any of its provisions.

Article X

This compact may be terminated at any time by the unanimous agreement of the signatory States. In the event of such termination, all rights established under it shall continue unimpaired.

Article XI

This compact shall become binding and obligatory when it shall have been approved by the legislatures of each of the signatory States and by the Congress of the United States. Notice of approval by the legislatures shall be given by the governor of each signatory State to the governors of the other signatory States and to the President of the United States, and the President of the United States is requested to give notice to the governors of the signatory States of approval by the Congress of the United States.

In witness whereof the commissioners have signed this compact in a single original, which shall be deposited in the archives of the Department of State of the United States of America and of which a duly certified copy shall be forwarded to the governor of each of the signatory States.

Done at the city of Santa Fe, New Mexico, this twenty-fourth day of November, A. D. one thousand nine hundred and twenty-two.

W. S. Norviel
W. F. McClure
Delph E. Carpenter
J. G. Scrugham
Stephen B. Davis, Jr.
R. E. Caldwell
Frank C. Emerson

Approved:

Herbert Hoover

APPENDIX H

TREATY BETWEEN THE UNITED STATES AND MEXICO

The Government of the United States of America and the Government of the United Mexican States: animated by the sincere spirit of cordiality and friendly cooperation which happily governs the relations between them; taking into account the fact that Articles VI and VII of the Treaty of Peace, Friendship and Limits between the United States of America and the United Mexican States signed at Guadalupe Hidalgo on February 2, 1848, and Article IV of the boundary treaty between the two countries signed at the City of Mexico December 30, 1853 regulate the use of the waters of the Rio Grande (Rio Bravo) and the Colorado River for purposes of navigation only; considering that the utilization of these waters for other purposes is desirable in the interests of both countries, and desiring, moreover, to fix and delimit the rights of the two countries with respect to the waters of the Colorado and Tijuana Rivers, and of the Rio Grande (Rio Bravo) from Fort Quitman, Texas, United States of America, to the Gulf of Mexico, in order to obtain the most complete and satisfactory utilization thereof, have resolved to conclude a treaty and for this purpose have named as their plenipotentiaries:

The President of the United States of America:

Cordell Hull, Secretary of State of the United States of America, George S. Messersmith, Ambassador Extraordinary and Plenipotentiary of the United States of America in Mexico, and Lawrence M. Lawson, United States Commissioner, International Boundary Commission, United States and Mexico; and

The President of the United Mexican States:

Francisco Castillo Najera, Ambassador Extraordinary and Plenipotentiary of the United Mexican States in Washington, and Rafael Fernandez MacGregor, Mexican Commissioner, International Boundary Commission, United States and Mexico; who, having communicated to each other their respective Full Powers and having found them in good and due form, have agreed upon the following:

I — PRELIMINARY PROVISIONS

Article 1

For the purposes of this Treaty it shall be understood that:

- (a) "The United States" means the United States of America.
- (b) "Mexico" means the United Mexican States.
- (c) "The Commission" means the International Boundary and

Water Commission, United States and Mexico, as described in Article 2 of this Treaty.

- (d) "To divert" means the deliberate act of taking water from any channel in order to convey it elsewhere for storage, or to utilize it for domestic, agricultural, stock-raising or industrial purposes whether this be done by means of dams across the channel, partition weirs, lateral intakes, pumps or any other methods.
- (e) "Point of diversion" means the place where the act of diverting the water is effected.
- (f) "Conservation capacity of storage reservoirs" means that part of their total capacity devoted to holding and conserving the water for disposal thereof as and when required, that is, capacity additional to that provided for silt retention and flood control.
- (g) "Flood discharges and spills" means the voluntary or involuntary discharge of water for flood control as distinguished from releases for other purposes.
- (h) "Return flow" means that portion of diverted water that eventually finds its way back to the source from which it was diverted.
- (i) "Release" means the deliberate discharge of stored water for conveyance elsewhere or for direct utilization.
- (j) "Consumptive use" means the use of water by evaporation, plant transpiration or other manner whereby the water is consumed and does not return to its source of supply. In general it is measured by the amount of water diverted less the part thereof which returns to the stream.
- (k) "Lowest major international dam or reservoir" means the major international dam or reservoir situated farthest downstream.
- (l) "Highest major international dam or reservoir" means the major international dam or reservoir situated farthest upstream.

Article 2

The International Boundary Commission established pursuant to the provisions of the Convention between the United States and Mexico signed in Washington March 1, 1889 to facilitate the carrying out of the principles contained in the Treaty of November 12, 1884 and to avoid difficulties occasioned by reason of the changes which take place in the beds of the Rio Grande (Rio Bravo) and the Colorado River shall hereafter be known as the International Boundary and Water Commission, United States and Mexico, which shall continue to function for the entire period during which the present Treaty shall continue in force. Accordingly, the term of the Convention of March 1, 1889 shall be considered to be indefinitely extended, and the Convention of November 21,

1900 between the United States and Mexico regarding that Convention shall be considered completely terminated.

The application of the present Treaty, the regulation and exercise of the rights and obligations which the two Governments assume thereunder, and the settlement of all disputes to which its observance and execution may give rise are hereby entrusted to the International Boundary and Water Commission, which shall function in conformity with the powers and limitations set forth in this Treaty.

The Commission shall in all respects have the status of an international body, and shall consist of a United States section and a Mexican Section. The head of each Section shall be an Engineer Commissioner. Wherever there are provisions in this Treaty for joint action or joint agreement by the two Governments, or for the furnishing of reports, studies or plans to the two Governments, or similar provisions, it shall be understood that the particular matter in question shall be handled by or through the Department of State of the United States and the Ministry of Foreign Relations of Mexico.

The Commission or either or its two Sections may employ such assistants and engineering and legal advisers as it may deem necessary. Each Government shall accord diplomatic status to the Commissioner, designated by the other Government. The Commissioner, two principal engineers, a legal adviser, and a secretary, designated by each Government as members of its Section of the Commission, shall be entitled in the territory of the other country to the privileges and immunities appertaining to diplomatic officers. The Commission and its personnel may freely carry out their observations, studies and field work in the territory of either country.

The jurisdiction of the Commission shall extend to the limitrophe parts of the Rio Grande (Rio Bravo) and the Colorado River, to the land boundary between the two countries, and to works located upon their common boundary, each Section of the Commission retaining jurisdiction over that part of the works located within the limits of its own country. Neither Section shall assume jurisdiction or control over works located within the limits of the country of the other without the express consent of the Government of the later. The works constructed, acquired or used in fulfillment of the provisions of this Treaty and located wholly within the territorial limits of either country, although these works may be international in character, shall remain, except as herein otherwise specifically provided, under the exclusive jurisdiction and control of the Section of the Commission in whose country the works may be situated.

The duties and powers vested in the Commission by this Treaty shall be in addition to those vested in the International Boundary Commission by the Convention of March 1, 1889 and other pertinent treaties and

agreements in force between the two countries except as the provisions of any of them may be modified by the present Treaty.

Each Government shall bear the expenses incurred in the maintenance of its Section of the Commission. The joint expenses, which may be incurred as agreed upon by the Commission, shall be borne equally by the two Governments.

Article 3

In matters in which the Commission may be called upon to make provision for the joint use of international waters, the following order of preferences shall serve as a guide:

1. Domestic and municipal uses.
2. Agriculture and stock-raising.
3. Electric power.
4. Other industrial uses.
5. Navigation.
6. Fishing and hunting.
7. Any other beneficial uses which may be determined by the Commission.

All of the foregoing uses shall be subject to any sanitary measures or works which may be mutually agreed upon by the two Governments, which hereby agree to give preferential attention to the solution of all border sanitation problems.

II — RIO GRANDE (RIO BRAVO)

Article 4

The waters of the Rio Grande (Rio Bravo) between Fort Quitman, Texas and the Gulf of Mexico are hereby allotted to the two countries in the following manner:

A. To Mexico:

- (a) All of the waters reaching the main channel of the Rio Grande (Rio Bravo) from the San Juan and Alamo Rivers, including the return flow from the lands irrigated from the latter two rivers.
- (b) One-half of the flow in the main channel of the Rio Grande (Rio Bravo) below the lowest major international storage dam, so far as said flow is not specifically allotted under this Treaty to either of the two countries.
- (c) Two-thirds of the flow reaching the main channel of the Rio Grande (Rio Bravo) from the Conchos, San Diego, San Rodrigo, Escondido and Salado Rivers and the Las Vacas Arroyo, subject to the provisions of subparagraph (c) of Paragraph B of this Article.

- (d) One-half of all other flows not otherwise allotted by this Article occurring in the main channel of the Rio Grande (Rio Bravo), including the contributions from all the unmeasured tributaries, which are those not named in this Article, between Fort Quitman and the lowest major international storage dam.

B. To the United States:

- (a) All of the waters reaching the main channel of the Rio Grande (Rio Bravo) from the Pecos and Devils Rivers, Goodenough Spring, and Alamito, Terlingua, San Felipe and Pinto Creeks.
- (b) One-half of the flow in the main channel of the Rio Grande (Rio Bravo) below the lowest major international storage dam, so far as said flow is not specifically allotted under this Treaty to either of the two countries.
- (c) One-third of the flow reaching the main channel of the Rio Grande (Rio Bravo) from the Conchos, San Diego, San Rodrigo, Escondido and Salado Rivers and the Las Vacas Arroyo, provided that this third shall not be less, as an average amount in cycles of five consecutive years, than 350,000 acre-feet (431,721,000 cubic meters) annually. The United States shall not acquire any right by the use of the waters of the tributaries named in this subparagraph, in excess of the said 350,000 acre-feet (431,721,000 cubic meters) annually, except the right to use one-third of the flow reaching the Rio Grande (Rio Bravo) from said tributaries, although such one-third may be in excess of that amount.
- (d) One-half of all other flows not otherwise allotted by this Article occurring in the main channel of the Rio Grande (Rio Bravo), including the contributions from all the unmeasured tributaries, which are those not named in this Article, between Fort Quitman and the lowest major international storage dam.

In the event of extraordinary drought or serious accident to the hydraulic systems on the measured Mexican tributaries, making it difficult for Mexico to make available the run-off of 350,000 acre-feet (431,721,000 cubic meters) annually, allotted in subparagraph (c) of Paragraph B of this Article to the United States as the minimum contribution from the aforesaid Mexican tributaries, any deficiencies existing at the end of the aforesaid five-year cycle shall be made up in the following five-year cycle with water from the said measured tributaries.

Whenever the conservation capacities assigned to the United States in at least two of the major international reservoirs, including the highest major reservoir, are filled with waters belonging to the United States, a cycle of five years shall be considered as terminated and all debits fully paid, whereupon a new five-year cycle shall commence.

Article 5

The two Governments agree to construct jointly, through their respective Sections of the Commission, the following works in the main channel of the Rio Grande (Rio Bravo):

I. The dams required for the conservation, storage and regulation of the greatest quantity of the annual flow of the river in a way to ensure the continuance of existing uses and the development of the greatest number of feasible projects, within the limits imposed by the water allotments specified.

II. The dams and other joint works required for the diversion of the flow of the Rio Grande (Rio Bravo).

One of the storage dams shall be constructed in the section between Santa Helena Canyon and the mouth of the Pecos River; one in the section between Eagle Pass and Laredo, Texas (Piedras Negras and Nuevo Laredo in Mexico); and a third in the section between Laredo and Roma, Texas (Nuevo Laredo and San Pedro de Roma in Mexico). One or more of the stipulated dams may be omitted, and others than those enumerated may be built, in either case as may be determined by the commission, subject to the approval of the two Governments.

In planning the construction of such dams the Commission shall determine:

- (a) The most feasible sites;
- (b) The maximum feasible reservoir capacity at each site;
- (c) The conservation capacity required by each country at each site, taking into consideration the amount and regimen of its allotment of water and its contemplated uses;
- (d) The capacity required for retention of silt;
- (e) The capacity required for flood control.

The conservation and silt capacities of each reservoir shall be assigned to each country in the same proportion as the capacities required by each country in such reservoir for conservation purposes. Each country shall have an undivided interest in the flood control capacity of each reservoir.

The construction of the international storage dams shall start within two years following the approval of the respective plans by the two Governments. The works shall begin with the construction of the lowest major international storage dam, but works in the upper reaches of the river may be constructed simultaneously. The lowest major international storage dam shall be completed within a period of eight years from the date of the entry into force of this Treaty.

The construction of the dams and other joint works required for the diversion of the flows of the river shall be initiated on the dates recommended by the Commission and approved by the two Governments.

The cost of construction, operation and maintenance of each of the international storage dams shall be prorated between the two Governments in proportion to the capacity allotted to each country for conservation purposes in the reservoir at such dam.

The cost of construction, operation and maintenance of each of the dams and other joint works required for the diversion of the flows of the river shall be prorated between the two Governments in proportion to the benefits which the respective countries receive therefrom, as determined by the Commission and approved by the two governments.

Article 6

The Commission shall study, investigate, and prepare plans for flood control works, where and when necessary, other than those referred to in Article 5 of this Treaty, on the Rio Grande (Rio Bravo) from Fort Quitman, Texas to the Gulf of Mexico. These works may include levees along the river, floodways and grade-control structures, and works for the canalization, rectification and artificial channeling of reaches of the river. The Commission shall report to the two Governments the works which should be built, the estimated cost thereof, the part of the works to be constructed by each Government, and the part of the works to be operated and maintained by each Section of the Commission. Each Government agrees to construct, through its Section of the Commission, such works as may be recommended by the Commission and approved by the two Governments. Each Government shall pay the costs of the works constructed by it and the costs of operation and maintenance of the part of the works assigned to it for such purpose.

Article 7

The commission shall study, investigate and prepare plans for plants for generating hydro-electric energy which it may be feasible to construct at the international storage dams on the Rio Grande (Rio Bravo). The Commission shall report to the two Governments in a Minute the works which should be built, the estimated cost thereof, and the part of the works to be constructed by each Government. Each Government agrees to construct, through its Section of the Commission, such works as may be recommended by the Commission and approved by the two Governments. Both Governments, through their respective Sections of the Commission, shall operate and maintain jointly such hydro-electric plants. Each Government shall pay half the cost of the construction, operation and maintenance of such plants, and the energy generated shall be assigned to each country in like proportion.

Article 8

The two governments recognize that both countries have a common interest in the conservation and storage of waters in the international reservoirs and in the maximum use of these structures for the purpose of obtaining the most beneficial, regular and constant use of the waters belonging to them. Accordingly, within the year following the placing in operation of the first of the major international storage dams which is constructed, the Commission shall submit to each Government for its approval, regulations for the storage, conveyance and delivery of the waters of the Rio Grande (Rio Bravo) from Fort Quitman, Texas to the Gulf of Mexico. Such regulations may be modified, amended or supplemented when necessary by the Commission, subject to the approval of the two Governments. The following general rules shall severally govern until modified or amended by agreement of the Commission, with the approval of the two Governments:

- (a) Storage in all major international reservoirs above the lowest shall be maintained at the maximum possible water level, consistent with flood control, irrigation use and power requirements.
- (b) Inflows to each reservoir shall be credited to each country in accordance with the ownership of such inflows.
- (c) In any reservoir the ownership of water belonging to the country whose conservation capacity therein is filled, and in excess of that needed to keep it filled, shall pass to the other country to the extent that such country may have unfilled conservation capacity, except that one country may at its option temporarily use the conservation capacity of the other country not currently being used in any of the upper reservoirs; provided that in the event of flood discharge or spill occurring while one country is using the conservation capacity of the other, all of such flood discharge or spill shall be charged to the country using the other's capacity, and all inflow shall be credited to the other country until the flood discharge or spill ceases or until the capacity of the other country becomes filled with its own water.
- (d) Reservoir losses shall be charged in proportion to the ownership of water in storage. Releases from any reservoir shall be charged to the country requesting them, except that releases for the generation of electrical energy, or other common purpose, shall be charged in proportion to the ownership of water in storage.
- (e) Flood discharges and spills from the upper reservoirs shall be divided in the same proportion as the ownership of the inflows occurring at the time of such flood discharges and spills, except

as provided in subparagraph (c) of this Article. Flood discharges and spills from the lowest reservoir shall be divided equally, except that one country, with the consent of the Commission, may use such part of the share of the other country as is not used by the latter country.

- (f) Either of the two countries may avail itself, whenever it so desires, of any water belonging to it and stored in the international reservoirs, provided that the water so taken is for direct beneficial use or for storage in other reservoirs. For this purpose the Commissioner of the respective country shall give appropriate notice to the Commission, which shall prescribe the proper measures for the opportune furnishing of the water.

Article 9

- (a) The channel of the Rio Grande (Rio Bravo) may be used by either of the two countries to convey water belonging to it.
- (b) Either of the two countries may, at any point on the main channel of the river from Fort Quitman, Texas to the Gulf of Mexico, divert and use the water belonging to it and may for this purpose construct any necessary works. However, no such diversion or use, not existing on the date this Treaty enters into force, shall be permitted in either country, nor shall works be constructed for such purpose, until the Section of the Commission in whose country the diversion or use is proposed has made a finding that the water necessary for such diversion or use is available from the share of that country, unless the Commission has agreed to a greater diversion or use as provided by paragraph (d) of this Article. The proposed use and the plans for the diversion works to be constructed in connection therewith shall be previously made known to the Commission for its information.
- (c) Consumptive uses from the main stream and from the unmeasured tributaries below Fort Quitman shall be charged against the share of the country making them.
- (d) The Commission shall have the power to authorize either country to divert and use water not belonging entirely to such country, when the water belonging to the other country can be diverted and used without injury to the latter and can be replaced at some other point on the river.
- (e) The Commission shall have the power to authorize temporary diversion and use by one country of water belonging to the other, when the latter does not need it or is unable to use it,

provided that such authorization or the use of such water shall not establish any right to continue to divert it.

- (f) In case of the occurrence of an extraordinary drought in one country with an abundant supply of water in the other country, water stored in the international storage reservoirs and belonging to the country enjoying such abundant water supply may be withdrawn, with the consent of the Commission, for the use of the country undergoing the drought.
- (g) Each country shall have the right to divert from the main channel of the river any amount of water, including the water belonging to the other country, for the purpose of generating hydro-electric power, provided that such diversion causes no injury to the other country and does not interfere with the international generation of power and that the quantities not returning directly to the river are charged against the share of the country making the diversion. The feasibility of such diversions not existing on the date this Treaty enters into force shall be determined by the Commission, which shall also determine the amount of water consumed, such water to be charged against the country making the diversion.
- (h) In case either of the two countries shall construct works for diverting into the main channel of the Rio Grande (Rio Bravo) or its tributaries waters that do not at the time this Treaty enters into force contribute to the flow of the Rio Grande (Rio Bravo) such waters shall belong to the country making such diversion.
- (i) Main stream channel losses shall be charged in proportion to the ownership of water being conveyed in the channel at the times and places of the losses.
- (j) The Commission shall keep a record of the waters belonging to each country and of those that may be available at a given moment, taking into account the measurement of the allotments, the regulation of the waters in storage, the consumptive uses, the withdrawals, the diversions, and the losses. For this purpose the Commission shall construct, operate and maintain on the main channel of the Rio Grande (Rio Bravo), and each Section shall construct, operate and maintain on the measured tributaries in its own country, all the gaging stations and mechanical apparatus necessary for the purpose of making computations and of obtaining the necessary data for such record. The information with respect to the diversions and consumptive uses on the unmeasured tributaries shall be furnished to the Commission by the appropriate Section. The cost of construction of any new gaging stations located on the main channel of the Rio Grande

(Rio Bravo) shall be borne equally by the two Governments. The operation and maintenance of all gaging stations or the cost of such operation and maintenance shall be apportioned between the two Sections in accordance with determinations to be made by the Commission.

III — COLORADO RIVER

Article 10

Of the waters of the Colorado River, from any and all sources, there are allotted to Mexico:

- (a) A guaranteed annual quantity of 1,500,000 acre-feet (1,850,234,000 cubic meters) to be delivered in accordance with the provisions of Article 15 of this Treaty.
- (b) Any other quantities arriving at the Mexican points of diversion, with the understanding that in any year in which, as determined by the United States Section, there exists a surplus of waters of the Colorado River in excess of the amount necessary to supply uses in the United States and the guaranteed quantity of 1,500,000 acre-feet (1,850,234,000 cubic meters) annually to Mexico, the United States undertakes to deliver to Mexico, in the manner set out in Article 15 of this Treaty, additional waters of the Colorado River system to provide a total quantity not to exceed 1,700,000 acre-feet (2,096,931,000 cubic meters) a year. Mexico shall acquire no right beyond that provided by this subparagraph by the use of the waters of the Colorado River system, for any purpose whatsoever, in excess of 1,500,000 acre feet (1,850,234,000 cubic meters) annually.

In the event of extraordinary drought or serious accident to the irrigation system in the United States, thereby making it difficult for the United States to deliver the guaranteed quantity of 1,500,000 acre-feet (1,850,234,000 cubic meters) a year, the water allotted to Mexico under subparagraph (a) of this Article will be reduced in the same proportion as consumptive uses in the United States are reduced.

Article 11

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

- (b) Of the waters of the Colorado River allotted to Mexico by subparagraph (a) of Article 10 of this Treaty, the United States shall deliver, wherever such waters may arrive in the limitrophe section of the river, 1,000,000 acre-feet (1,233,489,000 cubic meters) annually from the time the Davis dam and reservoir are placed in operation until January 1, 1980 and thereafter 1,125,000 acre-feet (1,387,675,000 cubic meters) annually, except that, should the main diversion structure referred to in subparagraph (a) of Article 12 of this Treaty be located entirely in Mexico and should Mexico so request, the United States shall deliver a quantity of water not exceeding 25,000 acre-feet (30,837,000 cubic meters) annually, unless a larger quantity may be mutually agreed upon, at a point, to be likewise mutually agreed upon, on the international land boundary near San Luis, Sonora, in which event the quantities of 1,000,000 acre-feet (1,233,489,000 cubic meters) and 1,125,000 acre-feet (1,387,675,000 cubic meters) provided hereinabove as deliverable in the limitrophe section of the river shall be reduced by the quantities to be delivered in the year concerned near San Luis, Sonora.
- (c) During the period from the time the Davis dam and reservoir are placed in operation until January 1, 1980, the United States shall also deliver to Mexico annually, of the water allotted to it, 500,000 acre-feet (616,745,000 cubic meters), and thereafter the United States shall deliver annually 375,000 acre-feet (462,558,000 cubic meters), at the international boundary line, by means of the All-American Canal and a canal connecting the lower end of the Pilot Knob Wasteway with the Alamo Canal or with any other Mexican canal which may be substituted for the Alamo Canal. In either event the deliveries shall be made at an operating water surface elevation not higher than that of the Alamo Canal at the point where it crossed the international boundary line in the year 1943.
- (d) All the deliveries of water specified above shall be made subject to the provisions of Article 15 of this Treaty.

Article 12

The two Governments agree to construct the following works:

- (a) Mexico shall construct at its expense, within a period of five years from the date of the entry into force of this Treaty, a main diversion structure below the point where the northernmost part of the international land boundary line intersects the Colorado River. If such diversion structure is located in the

limitrophe section of the river, its location, design and construction shall be subject to the approval of the Commission. The Commission shall thereafter maintain and operate the structure at the expense of Mexico. Regardless of where such diversion structure is located, there shall simultaneously be constructed such levees, interior drainage facilities and other works, or improvements to existing works, as in the opinion of the Commission shall be necessary to protect lands within the United States against damage from such floods and seepage as might result from the construction, operation and maintenance of this diversion structure. These protective works shall be constructed, operated and maintained at the expense of Mexico by the respective Sections of the Commission, or under their supervision, each within the territory of its own country.

- (b) The United States, within a period of five years from the date of the entry into force of this Treaty, shall construct in its own territory and at its expense, and thereafter operate and maintain at its expense, the Davis storage dam and reservoir, a part of the capacity of which shall be used to make possible the regulation at the boundary of the waters to be delivered to Mexico in accordance with the provisions of Article 15 of this Treaty.
- (c) The United States shall construct or acquire in its own territory the works that may be necessary to convey a part of the waters of the Colorado River allotted to Mexico to the Mexican diversion points on the international land boundary line referred to in this Treaty. Among these works shall be included: the canal and other works necessary to convey water from the lower end of the Pilot Knob Wasteway to the international boundary, and, should Mexico request it, a canal to connect the main diversion structure referred to in sub-paragraph (a) of this Article, if this diversion structure should be built in the limitrophe section of the river, with the Mexican system of canals at a point to be agreed upon by the Commission on the international land boundary near San Luis, Sonora. Such works shall be constructed or acquired and operated and maintained by the United States Section at the expense of Mexico. Mexico shall also pay the costs of any sites or rights of way required for such works.
- (d) The Commission shall construct, operate and maintain in the limitrophe section of the Colorado River, and each Section shall construct, operate and maintain in the territory of its own country on the Colorado River below Imperial Dam and on all other carrying facilities used for the delivery of water to Mexico, all

necessary gaging stations and other measuring devices for the purpose of keeping a complete record of the waters delivered to Mexico and of the flows of the river. All data obtained as to such deliveries and flows shall be periodically compiled and exchanged between the two Sections.

Article 13

The Commission shall study, investigate and prepare plans for flood control on the Lower Colorado River between Imperial Dam and the Gulf of California, in both the United States and Mexico, and shall, in a Minute, report to the two Governments the works which should be built, the estimated cost thereof, and the part of the works to be constructed by each Government. The two Governments agree to construct, through their respective Sections of the Commission, such works as may be recommended by the Commission and approved by the two Governments, each Government to pay the costs of the works constructed by it. The Commission shall likewise recommend the parts of the works to be operated and maintained jointly by the Commission and the parts to be operated and maintained by each Section. The two Governments agree to pay in equal shares the cost of joint operation and maintenance, and each Government agrees to pay the cost of operation and maintenance of the works assigned to it for such purpose.

Article 14

In consideration of the use of the All-American Canal for the delivery to Mexico, in the manner provided in Articles 11 and 15 of this Treaty, of a part of its allotment of the waters of the Colorado River, Mexico shall pay to the United States:

- (a) A proportion of the costs actually incurred in the construction of Imperial Dam and the Imperial Dam-Pilot Knob section of the All-American Canal, this proportion and the method and terms of repayment to be determined by the two Governments, which, for this purpose, shall take into consideration the proportionate uses of these facilities by the two countries, these determinations to be made as soon as Davis dam and reservoir are placed in operation.
- (b) Annually, a proportionate part of the total costs of maintenance and operation of such facilities, these costs to be prorated between the two countries in proportion to the amount of water delivered annually through such facilities for use in each of the two countries.

In the event that revenues from the sale of hydro-electric power which may be generated at Pilot Knob become available

for the amortization of part or all of the costs of the facilities named in subparagraph (a) of this Article, the part that Mexico should pay of the costs of said facilities shall be reduced or repaid in the same proportion as the balance of the total costs are reduced or repaid. It is understood that any such revenue shall not become available until the cost of any works which may be constructed for the generation of hydro-electric power at said location has been fully amortized from the revenues derived therefrom.

Article 15

- A. The water allotted in subparagraph (a) Article 10 of this Treaty shall be delivered to Mexico at the points of delivery specified in Article 11, in accordance with the following two annual schedules of delivery by months, which the Mexican Section shall formulate and present to the Commission before the beginning of each calendar year:

Schedule I

Schedule I shall cover the delivery, in the limitrophe section of the Colorado River, of 1,000,000 acre-feet (1,233,489,000 cubic meters) of water each year from the date Davis dam and reservoir are placed in operation until January 1, 1980 and the delivery of 1,125,000 acre-feet (1,387,675,000 cubic meters) of water each year thereafter. This schedule shall be formulated subject to the following limitations:

With reference to the 1,000,000 acre-foot (1,233,489,000 cubic meter) quantity:

- (a) During the months of January, February, October, November and December the prescribed rate of delivery shall be not less than 600 cubic feet (17.0 cubic meters) nor more than 3,500 cubic feet (99.1 cubic meters) per second.
- (b) During the remaining months of the year the prescribed rate of delivery shall be not less than 1,000 cubic feet (28.3 cubic meters) nor more than 3,500 cubic feet (99.1 cubic meters) per second.

With reference to the 1,125,000 acre-foot (1,387,675,000 cubic meter) quantity:

- (a) During the months of January, February, October, November and December the prescribed rate of delivery shall be not less than 675 cubic feet (19.1 cubic meters) nor more than 4,000 cubic feet (113.3 cubic meters) per second.

- (b) During the remaining months of the year the prescribed rate of delivery shall be not less than 1,125 cubic feet (31.9 cubic meters) nor more than 4,000 cubic feet (113.3 cubic meters) per second.

Should deliveries of water be made at a point on the land boundary near San Luis, Sonora, as provided for in Article 11, such deliveries shall be made under a sub-schedule to be formulated and furnished by the Mexican Section. The Quantities and monthly rates of deliveries under such sub-schedule shall be in proportion to those specified for Schedule I, unless otherwise agreed upon by the Commission.

Schedule II

Schedule II shall cover the delivery at the boundary line by means of the All-American Canal of 500,000 acre-feet (616,745,000 cubic meters) of water each year from the date Davis dam and reservoir are placed in operation until January 1, 1980 and the delivery of 375,000 acre-feet (462,558,000 cubic meters) of water each year thereafter. This schedule shall be formulated subject to the following limitations:

With reference to the 500,000 acre-foot (616,745,000 cubic meter) quantity:

- (a) During the months of January, February, October, November and December the prescribed rate of delivery shall be not less than 300 cubic feet (8.5 cubic meters) nor more than 2,000 cubic feet (56.6 cubic meters) per second.
- (b) During the remaining months of the year the prescribed rate of delivery shall be not less than 500 cubic feet (14.2 cubic meters) nor more than 2,000 cubic feet (56.6 cubic meters) per second.

With reference to the 375,000 acre-foot (462,558,000 cubic meter) quantity:

- (a) During the months of January, February, October, November and December the prescribed rate of delivery shall be not less than 225 cubic feet (6.4 cubic meters) nor more than 1,500 cubic feet (42.5 cubic meters) per second.
- (b) During the remaining months of the year the prescribed rate of delivery shall be not less than 375 cubic feet (10.6 cubic meters) nor more than 1,500 cubic feet (42.5 cubic meters) per second.

- B. The United States shall be under no obligation to deliver, through the All-American Canal, more than 500,000 acre-feet (616,745,000 cubic meters) annually from the date Davis dam and reservoir are placed in operation until January 1, 1980 or

more than 375,000 acre-feet (462,558,000 cubic meters) annually thereafter. If, by mutual agreement, any part of the quantities of water specified in this paragraph are delivered to Mexico at points on the land boundary otherwise than through the All-American Canal, the above quantities of water and the rates of deliveries set out under Schedule II of this Article shall be correspondingly diminished.

- C. The United States shall have the option of delivering, at the point on the land boundary mentioned in sub-paragraph (c) of Article 11, any part or all of the water to be delivered at that point under Schedule II of this Article during the months of January, February, October, November and December of each year, from any source whatsoever, with the understanding that the total specified annual quantities to be delivered through the All-American Canal shall not be reduced because of the exercise of this option, unless such reduction be requested by the Mexican Section, provided that the exercise of this option shall not have the effect of increasing the total amount of scheduled water to be delivered to Mexico.
- D. In any year in which there shall exist in the river water in excess of that necessary to satisfy the requirements in the United States and the guaranteed quantity of 1,500,000 acre-feet (1,850,234,000 cubic meters) allotted to Mexico, the United States hereby declares its intention to cooperate with Mexico in attempting to supply additional quantities of water through the All-American Canal as such additional quantities are desired by Mexico, if such use of the Canal and facilities will not be detrimental to the United States, provided that the delivery of any additional quantities through the All-American Canal shall not have the effect of increasing the total scheduled deliveries to Mexico. Mexico hereby declares its intention to cooperate with the United States by attempting to curtail deliveries of water through the All-American Canal in years of limited supply, if such curtailment can be accomplished without detriment to Mexico and is necessary to allow full use of all available water supplies, provided that such curtailment shall not have the effect of reducing the total scheduled deliveries of water to Mexico.
- E. In any year in which there shall exist in the river water in excess of that necessary to satisfy the requirements in the United States and the guaranteed quantity of 1,500,000 acre-feet (1,850,234,000 cubic meters) allotted to Mexico, the United States Section shall so inform the Mexican Section in order that the latter may schedule such surplus water to complete a quan-

tity up to a maximum of 1,700,000 acre-feet (2,096,931,000 cubic meters). In this circumstance the total quantities to be delivered under Schedules I and II shall be increased in proportion to their respective total quantities and the two schedules thus increased shall be subject to the same limitations as those established for each under paragraph A of this Article.

- F. Subject to the limitations as to rates of deliveries and total quantities set out in Schedules I and II, Mexico shall have the right, upon thirty days notice in advance to the United States Section, to increase or decrease each monthly quantity prescribed by those schedules by not more than 20% of the monthly quantity.
- G. The total quantity of water to be delivered under Schedule I of paragraph A of this Article may be increased in any year if the amount to be delivered under Schedule II is correspondingly reduced and if the limitations as to rates of delivery under each schedule are correspondingly increased and reduced.

IV — TIJUANA RIVER

Article 16

In order to improve existing uses and to assure any feasible further development, the Commission shall study and investigate, and shall submit to the two Governments for their approval:

- (1) Recommendations for the equitable distribution between the two countries of the waters of the Tijuana River system;
- (2) Plans for storage and flood control to promote and develop domestic, irrigation and other feasible uses of the waters of this system;
- (3) An estimate of the cost of the proposed works and the manner in which the construction of such works or the cost thereof should be divided between the two Governments;
- (4) Recommendations regarding the parts of the works to be operated and maintained by the Commission and the parts to be operated and maintained by each Section.

The two Governments through their respective Sections of the Commission shall construct such of the proposed works as are approved by both Governments, shall divide the work to be done or the cost thereof, and shall distribute between the two countries the waters of the Tijuana River system in the proportions approved by the two Governments. The two Governments agree to pay in equal shares the costs of joint operation and maintenance of the works involved, and each Gov-

ernment agrees to pay the cost of operation and maintenance of the works assigned to it for such purpose.

V — GENERAL PROVISIONS

Article 17

The use of the channels of the international rivers for the discharge of flood or other excess waters shall be free and not subject to limitation by either country, and neither country shall have any claim against the other in respect of any damage caused by such use. Each Government agrees to furnish the other Government, as far in advance as practicable, any information it may have in regard to such extraordinary discharges of water from reservoirs and flood flows on its own territory as may produce floods on the territory of the other.

Each Government declares its intention to operate its storage dams in such manner, consistent with the normal operations of its hydraulic systems, as to avoid, as far as feasible, material damage in the territory of the other.

Article 18

Public use of the water surface of lakes formed by international dams shall, when not harmful to the services rendered by such dams, be free and common to both countries, subject to the police regulations of each country in its territory, to such general regulations as may appropriately be prescribed and enforced by the Commission with the approval of the two Governments for the purpose of the application of the provisions of this Treaty, and to such regulations as may appropriately be prescribed and enforced for the same purpose by each Section of the Commission with respect to the areas and borders of such parts of those lakes as lie within its territory. Neither Government shall use for military purposes such water surface situated within the territory of the other country except by express agreement between the two Governments.

Article 19

The two Governments shall conclude such special agreements as may be necessary to regulate the generation, development and disposition of electric power at international plants, including the necessary provisions for the export of electric current.

Article 20

The two Governments shall, through their respective Sections of the Commission, carry out the construction of works allotted to them. For this purpose, the respective Sections of the Commission may make

use of any competent public or private agencies in accordance with the laws of the respective countries. With respect to such works as either Section of the Commission may have to execute on the territory of the other, it shall, in the execution of such works, observe the laws of the place where such works are located or carried out, with the exceptions hereinafter stated.

All materials, implements, equipment and repair parts intended for the construction, operation and maintenance of such works shall be exempt from import and export customs duties. The whole of the personnel employed either directly or indirectly on the construction, operation or maintenance of the works may pass freely from one country to the other for the purpose of going to and from the place of location of the works, without any immigration restrictions, passports or labor requirements. Each Government shall furnish, through its own Section of the Commission, convenient means of identification to the personnel employed by it on the aforesaid works and verification certificates covering all materials, implements, equipment and repair parts intended for the works.

Each Government shall assume responsibility for and shall adjust exclusively in accordance with its own laws all claims arising within its territory in connection with the construction, operation or maintenance of the whole or of any part of the works herein agreed upon, or of any works which may, in the execution of this Treaty, be agreed upon in the future.

Article 21

The construction of the international dams and the formation of artificial lakes shall produce no change in the fluvial international boundary, which shall continue to be governed by existing treaties and conventions in force between the two countries.

The Commission shall, with the approval of the two Governments, establish in the artificial lakes, by buoys or by other suitable markers, a practicable and convenient line to provide for the exercise of the jurisdiction and control vested by this Treaty in the Commission and its respective Sections. Such line shall also mark the boundary for the application of the customs and police regulations of each country.

Article 22

The provisions of the Convention between the United States and Mexico for the rectification of the Rio Grande (Rio Bravo) in the El Paso-Juarez Valley signed on February 1, 1933, shall govern, so far as delimitation of the boundary, distribution of jurisdiction and sovereignty, and relations with private owners are concerned, in any places where works

for the artificial channeling, canalization or rectification of the Rio Grande (Rio Bravo) and the Colorado River are carried out.

Article 23

The two Governments recognize the public interest attached to the works required for the execution and performance of this Treaty and agree to acquire, in accordance with their respective domestic laws, any private property that may be required for the construction of the said works, including the main structures and their appurtenances and the construction materials therefor, and for the operation and maintenance thereof, at the cost of the country within which the property is situated, except as may be otherwise specifically provided in this Treaty.

Each Section of the Commission shall determine the extent and location of any private property to be acquired within its own country and shall make the necessary requests upon its Government for the acquisition of such property.

The Commission shall determine the cases in which it shall become necessary to locate works for the conveyance of water or electrical energy and for the servicing of any such works, for the benefit of either of the two countries, in the territory of the other country, in order that such works can be built pursuant to agreement between the two Governments. Such works shall be subject to the jurisdiction and supervision of the Section of the Commission within whose country they are located.

Construction of the works built in pursuance of the provisions of this Treaty shall not confer upon either of the two countries any rights either of property or of jurisdiction over any part whatsoever of the territory of the other. These works shall be part of the territory and be the property of the country wherein they are situated. However, in the case of any incidents occurring on works constructed across the limitrophe part of a river and with supports on both banks, the jurisdiction of each country shall be limited by the center line of such works, which shall be marked by the Commission, without thereby changing the international boundary.

Each Government shall retain, through its own Section of the Commission and within the limits and to the extent necessary to effectuate the provisions of this Treaty, direct ownership, control and jurisdiction within its own territory and in accordance with its own laws, over all real property—including that within the channel of any river—rights of way and rights *in rem*, that it may be necessary to enter upon and occupy for the construction, operation or maintenance of all the works constructed, acquired or used pursuant to this Treaty. Furthermore, each Government shall similarly acquire and retain in its own possession the titles, control and jurisdiction over such works.

Article 24

The International Boundary and Water Commission shall have, in addition to the powers and duties otherwise specifically provided in this Treaty, the following powers and duties:

- (a) To initiate and carry on investigations and develop plans for the works which are to be constructed or established in accordance with the provisions of this and other treaties or agreements in force between the two Governments dealing with boundaries and international waters; to determine, as to such works, their location, size, kind and characteristic specifications; to estimate the costs of such work; and to recommend the division of such costs between the two Governments, the arrangements for the furnishing of the necessary funds, and the dates for the beginning of the works, to the extent that the matters mentioned in this subparagraph are not otherwise covered by specific provisions of this or any other Treaty.
- (b) To construct the works agreed upon or to supervise their construction and to operate and maintain such works or to supervise their operation and maintenance, in accordance with the respective domestic laws of each country. Each Section shall have, to the extent necessary to give effect to the provisions of this Treaty, jurisdiction over the works constructed exclusively in the territory of its country whenever such works shall be connected with or shall directly affect the execution of the provisions of this Treaty.
- (c) In general to exercise and discharge the specific powers and duties entrusted to the Commission by this and other treaties and agreements in force between the two countries, and to carry into execution and prevent the violation of the provisions of those treaties and agreements. The authorities of each country shall aid and support the exercise and discharge of these powers and duties, and each Commissioner shall invoke when necessary the jurisdiction of the courts or other appropriate agencies of his country to aid in the execution and enforcement of these powers and duties.
- (d) To settle all differences that may arise between the two Governments with respect to the interpretation or application of this Treaty, subject to the approval of the two Governments. In any case in which the Commissioners do not reach an agreement, they shall so inform their respective governments reporting their respective opinions and the grounds therefor and the points upon which they differ, for discussion and adjustment of the difference through diplomatic channels and for application

where proper of the general or special agreements which the two Governments have concluded for the settlement of controversies.

- (e) To furnish the information requested of the Commissioners jointly by the two Governments on matters within their jurisdiction. In the event that the request is made by one Government alone, the Commissioner of the other Government must have the express authorization of his Government in order to comply with such request.
- (f) The Commission shall construct, operate and maintain upon the limitrophe parts of the international streams, and each Section shall severally construct, operate and maintain upon the parts of the international streams and their tributaries within the boundaries of its own country, such stream gaging stations as may be needed to provide the hydrographic data necessary or convenient for the proper functioning of this Treaty. The data so obtained shall be compiled and periodically exchanged between the two Sections.
- (g) The Commission shall submit annually a joint report to the two Governments on the matters in its charge. The Commission shall also submit to the two Governments joint reports on general or any particular matters at such other times as it may deem necessary or as may be requested by the two Governments.

Article 25

Except as otherwise specifically provided in this Treaty, Articles III and VII of the Convention of March 1, 1889 shall govern the proceedings of the Commission in carrying out the provisions of this Treaty. Supplementary thereto the Commission shall establish a body of rules and regulations to govern its procedure, consistent with the provisions of this Treaty and of Articles III and VII of the Convention of March 1, 1889 and subject to the approval of both Governments.

Decisions of the Commission shall be recorded in the form of Minutes done in duplicate in the English and Spanish languages, signed by each Commissioner and attested by the Secretaries, and copies thereof forwarded to each Government within three days after being signed. Except where the specific approval of the two Governments is required by any provision of this Treaty, if one of the Governments fails to communicate to the Commission its approval or disapproval of a decision of the Commission within thirty days reckoned from the date of the Minute in which it shall have been pronounced, the Minute in question

and the decisions which it contains shall be considered to be approved by that Government. The Commissioners, within the limits of their respective jurisdictions, shall execute the decisions of the Commission that are approved by both Governments.

If either Government disapproves a decision of the Commission the two Governments shall take cognizance of the matter, and if an agreement regarding such matter is reached between the two Governments, the agreement shall be communicated to the Commissioners, who shall take such further proceedings as may be necessary to carry out such agreement.

VI — TRANSITORY PROVISIONS

Article 26

During a period of eight years from the date of the entry into force of this Treaty, or until the beginning of operation of the lowest major international reservoir on the Rio Grande (Rio Bravo), should it be placed in operation prior to the expiration of said period, Mexico will cooperate with the United States to relieve, in times of drought, any lack of water needed to irrigate the lands now under irrigation in the Lower Rio Grande Valley in the United States, and for this purpose Mexico will release water from El Azucar reservoir on the San Juan River and allow that water to run through its system of canals back into the San Juan River in order that the United States may divert such water from the Rio Grande (Rio Bravo). Such releases shall be made on condition that they do not affect the Mexican irrigation system, provided that Mexico shall, in any event, except in cases of extraordinary drought or serious accident to its hydraulic works, release and make available to the United States for its use the quantities requested, under the following conditions: that during the said eight years there shall be made available a total of 160,000 acre-feet (197,358,000 cubic meters) and up to 40,000 acre-feet (49,340,000 cubic meters) in any one year; that the water shall be made available as requested at rates not exceeding 750 cubic feet (21.2 cubic meters) per second; that when the rates of flow requested and made available have been more than 500 cubic feet (14.2 cubic meters) per second the period of release shall not extend beyond fifteen consecutive days; and that at least thirty days must elapse between any two periods of release during which rates of flow in excess of 500 cubic feet (14.2 cubic meters) per second have been requested and made available. In addition to the guaranteed flow, Mexico shall release from El Azucar reservoir and conduct through its canal system and the San Juan River, for use in the United States during periods of drought and after satisfying the needs of Mexican users, any excess water that does not in the opinion of the Mexican Section have to be stored and that may

be needed for the irrigation of lands which were under irrigation during the year 1943 in the Lower Rio Grande Valley in the United States.

Article 27

The provisions of Article 10, 11, and 15 of this Treaty shall not be applied during a period of five years from the date of the entry into force of this Treaty, or until the Davis dam and the major Mexican diversion structure on the Colorado River are placed in operation, should these works be placed in operation prior to the expiration of said period. In the meantime Mexico may construct and operate at its expense a temporary diversion structure in the bed of the Colorado River in territory of the United States for the purpose of diverting water into the Alamo Canal, provided that the plans for such structure and the construction and operation thereof shall be subject to the approval of the United States Section. During this period of time the United States will make available in the river at such diversion structure river flow not currently required in the United States, and the United States will cooperate with Mexico to the end that the latter may satisfy its irrigation requirements within the limits of those requirements for lands irrigated in Mexico from the Colorado River during the year 1943.

VII — FINAL PROVISIONS

Article 28

This Treaty shall be ratified and the ratifications thereof shall be exchanged in Washington. It shall enter into force on the day of the exchange of ratifications and shall continue in force until terminated by another Treaty concluded for that purpose between the two Governments.

In witness whereof the respective Plenipotentiaries have signed this Treaty and have hereunto affixed their seals.

Done in duplicate in the English and Spanish languages, in Washington on this third day of February, 1944.

FOR THE
GOVERNMENT OF THE UNITED STATES OF AMERICA:

CORDELL HULL (SEAL)

GEORGE S. MESSERSMITH (SEAL)

LAWRENCE M. LAWSON (SEAL)

FOR THE
GOVERNMENT OF THE UNITED MEXICAN STATES:

F. CASTILLO NAJERA (SEAL)

RAFAEL FERNANDEZ MAC GREGOR (SEAL)

PROTOCOL

The Government of the United States of America and the Government of the United Mexican States agree and understand that:

Wherever, by virtue of the provisions of the Treaty between the United States of America and the United Mexican States, signed in Washington on February 3, 1944, relating to the utilization of the waters of the Colorado and Tijuana Rivers and of the Rio Grande from Fort Quitman, Texas, to the Gulf of Mexico, specific functions are imposed on, or exclusive jurisdiction is vested in, either of the Sections of the International Boundary and Water Commission, which involve the construction or use of works for storage or conveyance of water, flood control, stream gaging, or for any other purpose, which are situated wholly within the territory of the country of that Section, and which are to be used only partly for the performance of treaty provisions, such jurisdiction shall be exercised, and such functions, including the construction, operation and maintenance of the said works, shall be performed and carried out by the Federal agencies of that country which now or hereafter may be authorized by domestic law to construct, or to operate and maintain, such works. Such functions or jurisdictions shall be exercised in conformity with the provisions of the Treaty and in cooperation with the respective Section of the Commission, to the end that all international obligations and functions may be coordinated and fulfilled.

The works to be constructed or used on or along the boundary, and those to be constructed or used exclusively for the discharge of treaty stipulations, shall be under the jurisdiction of the Commission or of the respective Section, in accordance with the provisions of the Treaty. In carrying out the construction of such works the Sections of the Commission may utilize the services of public or private organizations in accordance with the laws of their respective countries.

This Protocol, which shall be regarded as an integral part of the aforementioned Treaty signed in Washington on February 3, 1944, shall be ratified and the ratifications thereof shall be exchanged in Washington. This Protocol shall be effective beginning with the day of the entry into force of the Treaty and shall continue effective so long as the Treaty remains in force.

In witness whereof the respective Plenipotentiaries have signed this Protocol and have hereunto affixed their seals.

Done in duplicate, in the English and Spanish languages, in Washington, this fourteenth day of November, 1944.

FOR THE
GOVERNMENT OF THE UNITED STATES OF AMERICA:

E. R. STETTINIUS, JR. (SEAL)
Acting Secretary of State of the
United States of America.

FOR THE
GOVERNMENT OF THE UNITED MEXICAN STATES:

F. CASTILLO NAJERA (SEAL)
Ambassador Extraordinary and Plenipotentiary
of the United Mexican States in Washington.

MEMORANDUM OF UNDERSTANDING

AS TO FUNCTIONS AND JURISDICTION OF AGENCIES OF
THE UNITED STATES IN RELATION TO THE COLORADO
AND TIJUANA RIVERS AND THE RIO GRANDE BELOW
FORT QUITMAN, TEXAS, UNDER WATER TREATY SIGNED
AT WASHINGTON, FEBRUARY 3, 1944.

February 14, 1945

This memorandum of understanding made this 14th day of February, 1945, between the Department of State and the United States Section, International Boundary and Water Commission, United States and Mexico (hereinafter referred to as the "United States Section"), represented by the Secretary of State, and the Department of the Interior, represented by the Secretary of the Interior, pursuant to the provisions of the Treaty of February 3, 1944 between the United States and Mexico relating to the Colorado and Tijuana Rivers and the Rio Grande below Fort Quitman, Texas, (hereinafter referred to as the "treaty"); the Protocol between the two Governments supplementary to the treaty (hereinafter referred to as the "protocol") dated November 14, 1944; and existing domestic law of the United States.

WITNESSETH, THAT,

a. WHEREAS, the treaty establishes certain reciprocal rights and obligations of the two nations and requires for its execution both joint and independent determinations and actions on the part of the two Governments as represented, in the case of the United States, by the Department of State and in the case of Mexico by the Ministry of Foreign Relations, or acting through their respective Sections of the International Boundary and Water Commission; and

b. WHEREAS, the use of works both of an international and domestic character will be necessarily involved in the discharge of various treaty functions; and

c. WHEREAS, the protocol provides that the said Governments agree and understand that:

Wherever, by virtue of the provisions of the Treaty between the United States of America and the United Mexican States, signed in Washington on February 3, 1944, relating to the utilization of the waters of the Colorado and Tijuana Rivers and of the Rio Grande from Fort Quitman, Texas, to the Gulf of Mexico, specific functions are imposed on, or exclusive jurisdiction is vested in, either of the Sections of the International Boundary and Water Commission, which involve the construction or use of works for storage or conveyance of water, flood control, stream gaging, or for any other purpose, which are situated wholly within the Territory of the country of that Section, and which are to be used only partly for the performance of treaty provisions, such jurisdiction shall be exercised, and such functions, including the construction, operation and maintenance of the said works, shall be performed and carried out by the Federal agencies of that country which now or hereafter may be authorized by domestic law to construct or to operate and maintain, such works. Such functions or jurisdictions shall be exercised in conformity with the provisions of the Treaty and in cooperation with the respective Section of the Commission, to the end that all international obligations and functions may be coordinated and fulfilled.

The works to be constructed or used on or along the boundary, and those to be constructed or used exclusively for the discharge of treaty stipulations, shall be under the jurisdiction of the Commission or of the respective Section, in accordance with the provisions of the Treaty. In carrying out the construction of such works the Sections of the Commission may utilize the services of public or private organizations in accordance with the laws of their respective countries.

and which protocol is by the terms thereof made an integral part of the treaty, to be effective on the day of the entry into force of the treaty and to continue effective so long as the treaty remains in force; and

d. WHEREAS, by virtue of the treaty and the protocol, the Secretary of State and the United States Section are vested with general jurisdiction over the performance of treaty functions, in so far as the rights and obligations of the United States are concerned, and are likewise vested, and from time to time in the future may be further vested, with jurisdiction over various works, constructed and to be constructed, on

or along the boundary between the United States and Mexico, and over certain matters and problems of an international character arising on or affecting the said boundary, by virtue of treaties in force between the two nations, and by virtue of Acts of Congress, and

e. WHEREAS, the Secretary of the Interior, pursuant to the Reclamation Law and other Acts of Congress pertaining to the investigation, conservation and utilization of the water resources of the United States, has been, and from time to time in the future may be authorized to construct and to operate and maintain certain facilities wholly in the United States for the storage and conveyance of water, flood control, production of hydroelectric power and for other purposes, which facilities primarily pertain to the functions of the Department of the Interior, but, some of the facilities, in consequence of the treaty, will in part also pertain to treaty functions; and

f. WHEREAS, the Bureau of Reclamation (hereinafter referred to as the "Bureau") is an agency of the Department of the Interior which aids and assists the Secretary of the Interior in the performance of his responsibilities and functions pursuant to the Reclamation Law and other Acts of Congress pertaining to the investigation, conservation and utilization of the water resources of the United States; and

g. WHEREAS, in order that all international and domestic obligations and functions prescribed by the treaty and domestic law may be co-ordinated and fulfilled in the manner contemplated by the protocol, it is mutually desirable to define and set forth the specific jurisdiction and functions to be exercised by the Department of State and the United States Section, and the Department of the Interior and its agency, the Bureau, with respect to the operation and maintenance of such existing works as may be necessary in whole or in part to the fulfillment of treaty provisions, or which may be constructed, operated and maintained pursuant thereto, and with respect to the gathering and collation of certain information and data and the making of certain findings of fact and recommendations which may become necessary or desirable in the fulfillment of treaty provisions; and to define the cooperation between the said Interior agency and the United States Section as contemplated by the protocol in the performance of functions under their respective jurisdiction;

Now, therefore, it is agreed as follows:

1. The principles enunciated in this memorandum and in the protocol and hereinabove in recital *c* set forth shall control with respect to all facilities or works which now exist and which are to be used in whole or in part in the discharge of treaty functions, or which may hereafter be constructed pursuant to the treaty in relation to the Rio Grande below Fort Quitman, Texas, and the Colorado and Tijuana Rivers, even though

such facilities or works may not be herein specifically enumerated. For the purpose of defining the respective jurisdiction and function of the Department of State, the Department of the Interior and their respective agencies represented thereby, respecting facilities which have been heretofore, or, which hereafter may be constructed or hereafter used in connection with the performance of treaty provisions:

(a) the term "works" and the term "facilities" shall be construed as embracing either or both works and facilities, and

(b) For the purpose of this memorandum, the term "works located upon their common boundary," as used in the treaty, and the term "on * * * the boundary" wherever used in the treaty or the protocol, shall have application only to works or features of works situated partly in both countries. For the purpose of this memorandum the term "along the boundary," as used in the protocol, shall have application only to works or the features of works located in such proximity to the boundary and of such a character as to control or affect the regimen or flow of the boundary sections of the Rio Grande or Colorado River, as determined by the Secretary of State after consultation with the Secretary of the Interior and, in the event they shall not be in accord as to such determination, with the approval of the President.

The provisions of this subdivision of this memorandum shall not be construed to affect:

(1) the allocation of works as to jurisdiction or function, or both, made elsewhere in this memorandum,

(2) the regulatory jurisdiction of the Commission or the United States Section arising under prior existing treaties and Acts of Congress.

(c) Nothing in this memorandum shall be construed as affecting, limiting, or modifying the functions and activities of the United States Geological Survey, or of the United States Section, respectively, with respect to stream gaging and other water resources investigations.

2. The United States Section shall consult with the Bureau with respect to the plans contemplated by subsection (2) of Article 16 of the treaty relating to the Tijuana River.

3. The Department of State and the Department of the Interior, and their respective agencies, the United States Section and the Bureau, in the exercise of their respective jurisdictions and performance of their respective functions, will cooperate with each other, among other things, as to effecting, to the extent permissible by law, assignment of personnel, transfer of funds and exchange of information to the end that there may be fulfilled the provisions of the treaty, as supplemented by the protocol, and the Reclamation Law and all other Acts of Congress pertaining to the functions of the Department of the Interior as to the investigation,

conservation and utilization of the natural resources of the United States. The Secretary of State and the Secretary of the Interior will cooperate in making studies, reports and recommendations, including those pertaining to the obtaining of such legislative authorization as may be necessary, concerning the allocation of costs of construction and operation and maintenance of existing or future works, and of water investigations, within the United States which have been heretofore, or may be in the future, constructed or performed in whole or in part under authority vested in the Secretary of the Interior and which may be utilized in whole or in part in the fulfillment of the treaty.

4. Unless and until otherwise provided in accordance with the domestic law of the United States, in conformance with the treaty and the protocol, the Bureau shall exercise or continue to exercise jurisdiction, and shall perform functions and construction, where new construction may be involved, and operation and maintenance, within the principles stated herein, as to facilities and works as follows:

(a) **Rio Grande**

(1) All facilities and works within the United States constituting the Valley Gravity Canal and Storage project as provided for in the Act of June 28, 1941 (55 Stat. 303, 338) except those portions of the Project designated by the Secretary of State, under the authority of that Act, as being international in character: *Provided*, however, that whenever the construction, operation or maintenance of any feature of such works or facilities may involve the use of, affect or interfere with the construction, operation or maintenance of any feature of the Lower Rio Grande Flood Control project under the jurisdiction of the United States Section, the plans and specifications and principles of operation as to such feature of the said Valley Gravity Canal and Storage project shall be formulated by the Bureau subject to the approval of the United States Section.

(b) **Colorado River**

(1) All facilities and works above and including Laguna Dam, and all works constituting a part of the Yuma and Gila Federal Reclamation project of the Department of the Interior.

(2) All-American Canal.

(3) Pilot Knob check and wasteway and, to whatever extent provision may be made for the generation of electric energy at Pilot Knob by the United States, the Pilot Knob power plant and appurtenances.

(4) The design of the protective works within the United States contemplated by the provisions of Article 12 (a) of the treaty as a result of the construction of the Mexican diversion

structure in the Colorado River shall be subject to the approval of the Bureau, with the understanding that the part of such works to be built in the United States may be built and operated and maintained by the Bureau, at its option, subject to supervisory control by the United States Section.

(5) The flood control works contemplated by Article 13 of the Treaty above Laguna Dam and, to the extent that may hereafter be agreed upon between the United States Section and the Bureau by a memorandum supplementary hereto, the flood control works allocated to the United States between Laguna Dam and the boundary: *Provided*, however, that nothing herein shall impair or modify the jurisdiction and functions of the Bureau under the Act of January 21, 1927 (44 Stat. 1010), as amended, relating to the Colorado River front work and levee system.

(6) The Bureau will collect and communicate to the United States Section such data and information as may be necessary for the use of the United States Section in making the determinations and findings of fact in accordance with Article 10 and Article 15 of the treaty. Such determinations and findings shall be made by the United States Section after consultation with the Bureau.

5. Unless and until otherwise provided in accordance with domestic laws of the United States, in conformance with the treaty and the protocol, the United States Section shall exercise or continue to exercise jurisdiction, and shall perform functions and construction, where new construction may be involved, and operation and maintenance, within the principles stated herein, as to facilities and works as follows:

(a) **Rio Grande**

(1) In so far as the functions of the United States Section may be involved, the engineering planning, designing, construction, and operation and maintenance of the international dams and other works provided for in the treaty: *Provided*, however, that the United States Section shall consult with the Bureau relative to locations, plans and designs for construction, and principles of operation of the principal international storage dams, and shall consult with the National Park Service relative to the location of any such dam which would involve construction in or the impounding of water on lands in the area of the Big Bend National Park.

(2) Power plants at the international storage dams: *Provided*, however, that the United States Section shall consult with the Bureau with respect to plans and designs for the construction of such plants, and principles of operation; and *Provided*, further, that the disposition in the United States of hydroelectric power

which, pursuant to the provisions of Article 7 of the treaty, is generated at the international storage dams on the Rio Grande and is made available to the United States, shall be made in accordance with such provisions therefor as the Congress of the United States shall have provided or will provide; and the Department of State will consult with the Department of the Interior in the performance of its functions regarding future agreements, regulations and other matters provided for in Article 19 of the treaty; and *Provided*, further, that the Secretary of State will cooperate with the Secretary of the Interior in connection with such legislation as hereafter may be proposed in the Congress whereby the Secretary of the Interior may be authorized to dispose of such power as may so become available to the United States for disposal therein.

(b) **Colorado River**

(1) Functions with respect to approval of the location, design, and construction and principles of operation of the main diversion structure provided for in Article 12 (a) of the treaty if it shall be built in the limitrophe section of the river: *Provided*, however, that the United States Section shall consult with the Bureau as to the location, design, and principles of operation of such structure.

(2) Works constructed or acquired pursuant to Article 12 (c) of the treaty and used exclusively for delivery of water to Mexico: *Provided*, that the United States Section will consult with the Bureau in the development of plans and in the operation and maintenance of such works and: *Provided*, further, that no agreement pursuant to Articles 11 (b) or 15-B of the Treaty which will involve the use for the purposes set out therein of any works under the jurisdiction of the Secretary of the Interior shall be made without prior arrangements having been made with him.

(3) The part of the flood control works between Imperial Dam and the Gulf of California provided for in Article 13 of the treaty, which may be assigned to the United States, except the part lying above Laguna Dam, and except as provided in subdivision (b) 5 of Article 4 hereof; *Provided*, that the United States Section will consult with the Bureau with respect to the design and construction of the part of such works which may be built in the United States.

(4) Approval of the plans for the temporary diversion structure referred to in Article 27 of the treaty, and approval of the construction and operation thereof, subject to concurrence therein by the Bureau.

(5) Subject to the provisions of subdivision (b) (4) of Article 4 hereof, the design, construction, and maintenance and operation of the protective works within the United States contemplated by the provisions of Article 12 (a) of the treaty as a result of the construction of the Mexican diversion structure in the Colorado River.

6. Where the use of any works under the jurisdiction or control of the Bureau is required for the discharge of any treaty functions, such work or works shall be operated and maintained, in cooperation with the United States Section, in such manner that all treaty functions may be coordinated and fulfilled. Where provision is made in this memorandum of understanding for consultation regarding the planning, design, construction or operation of works, or the discharge of other treaty functions, or functions under domestic law, it is understood that the Bureau and the United States Section will mutually cooperate in furnishing such advice and assistance, consistent with their normal operations and to the extent permissible by law, in furnishing such services as may be requested by one of the other.

7. In order to insure compliance with the provisions of the treaty and domestic law, to the fullest extent practicable, wherever action is proposed to be taken by one of the cooperating agencies in the exercise of its jurisdiction or function pertaining to subject matter the responsibility or function of the other which may be affected thereby, an opportunity for consultation will be afforded by the acting agency a reasonable time in advance of the taking of such action.

8. The status of the jurisdiction and functions of the United States Section and the Bureau, respectively, shall continue, as to the Rio Grande above Fort Quitman and works thereon, as such status may exist independently of and unaffected by this memorandum.

9. This memorandum of understanding shall not become effective until it has been approved by the President of the United States and until the treaty as supplemented by the protocol becomes effective by an exchange of ratifications.

IN WITNESS WHEREOF; the Secretary of State and the Secretary of the Interior have hereunto subscribed their official signature the day and year first above written.

(Signed) Joseph C. Grew,
Acting Secretary of State
(Signed) Harold L. Ickes,
Secretary of the Interior

Approved: June 18, 1945

(Signed) Harry S. Truman,
President of the United States.

APPENDIX I

UPPER COLORADO RIVER BASIN COMPACT

Entered Into By The States of

ARIZONA

COLORADO

NEW MEXICO

UTAH

WYOMING

Santa Fe, New Mexico

October 11, 1948

UPPER COLORADO RIVER BASIN COMPACT

The State of Arizona, the State of Colorado, the State of New Mexico, the State of Utah and the State of Wyoming, acting through their commissioners,

Charles A. Carson for the State of Arizona,
Clifford H. Stone for the State of Colorado,
Fred E. Wilson for the State of New Mexico,
Edward H. Watson for the State of Utah and
L. C. Bishop for the State of Wyoming,

after negotiations participated in by Harry W. Bashore, appointed by the President as the representative of the United States of America, have agreed, subject to the provisions of the Colorado River Compact, to determine the rights and obligations of each signatory State respecting the uses and deliveries of the water of the Upper Basin of the Colorado River, as follows:

Article 1

(a) The major purposes of this Compact are to provide for the equitable division and apportionment of the use of the waters of the Colorado River System, the use of which was apportioned in perpetuity to the Upper Basin by the Colorado River Compact; to establish the obligations of each State of the Upper Division with respect to the deliveries of water required to be made at Lee Ferry by the Colorado River Compact; to promote interstate comity; to remove causes of present and future controversies; to secure the expeditious agricultural and industrial development of the Upper Basin, the storage of water and to protect life and property from floods.

(b) It is recognized that the Colorado River Compact is in full force and effect and all of the provisions hereof are subject thereto.

Article II

As used in this Compact:

(a) The term "Colorado River System" means that portion of the Colorado River and its tributaries within the United States of America.

(b) The term "Colorado River Basin" means all of the drainage area of the Colorado River System and all other territory within the United States of America to which the waters of the Colorado River System shall be beneficially applied.

(c) The term "States of the Upper Division" means the States of Colorado, New Mexico, Utah and Wyoming.

(d) The term "States of the Lower Division" means the States of Arizona, California and Nevada.

(e) The term "Lee Ferry" means a point in the main stream of the Colorado River one mile below the mouth of the Paria River.

(f) The term "Upper Basin" means those parts of the States of Arizona, Colorado, New Mexico, Utah and Wyoming within and from which waters naturally drain into the Colorado River System above Lee Ferry, and also all parts of said States located without the drainage area of the Colorado River System which are now or shall hereafter be beneficially served by waters diverted from the Colorado River System above Lee Ferry.

(g) The term "Lower Basin" means those parts of the States of Arizona, California, Nevada, New Mexico and Utah within and from which waters naturally drain into the Colorado River System below Lee Ferry, and also all parts of said States located without the drainage area of the Colorado River System which are now or shall hereafter be beneficially served by waters diverted from the Colorado River System below Lee Ferry.

(h) The term "Colorado River Compact" means the agreement concerning the apportionment of the use of the waters of the Colorado River System dated November 24, 1922, executed by Commissioners for the States of Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming, approved by Herbert Hoover, representative of the United States of America, and proclaimed effective by the President of the United States of America, June 25, 1929.

(i) The term "Upper Colorado River System" means that portion of the Colorado River System above Lee Ferry.

(j) The term "Commission" means the administrative agency created by Article VIII of this Compact.

(k) The term "water year" means that period of twelve months ending September 30 of each year.

(l) The term "acre-foot" means the quantity of water required to cover an acre to the depth of one foot and is the equivalent to 43,560 cubic feet.

(m) The term "domestic use" shall include the use of water for household, stock, municipal, mining, milling, industrial and other like purposes, but shall exclude the generation of electrical power.

(n) The term "virgin flow" means the flow of any stream undepleted by the activities of man.

Article III

(a) Subject to the provisions and limitations contained in the Colorado River Compact and in this Compact, there is hereby apportioned from the Upper Colorado River System in perpetuity to the States of Arizona, Colorado, New Mexico, Utah and Wyoming, respectively, the consumptive use of water as follows:

- (1) To the State of Arizona the consumptive use of 50,000 acre-feet of water per annum.
- (2) To the States of Colorado, New Mexico, Utah and Wyoming, respectively, the consumptive use per annum of the quantities resulting from the application of the following percentages to the total quantity of consumptive use per annum apportioned in perpetuity to and available for use each year by Upper Basin under the Colorado River Compact and remaining after the deduction of the use, not to exceed 50,000 acre-feet per annum, made in the State of Arizona.

State of Colorado	51.75 per cent,
State of New Mexico	11.25 per cent,
State of Utah	23.00 per cent,
State of Wyoming	14.00 per cent.

(b) The apportionment made to the respective States by paragraph (a) of this Article is based upon, and shall be applied in conformity with, the following principles and each of them:

- (1) The apportionment is of any and all man-made depletions;
- (2) Beneficial use is the basis, the measure and the limit of the right to use;
- (3) No State shall exceed its apportioned use in any water year when the effect of such excess use, as determined by the Commission, is to deprive another signatory State of its apportioned use during that water year; provided, that this subparagraph (b) (3) shall not be construed as:

- (i) Altering the apportionment of use, or obligations to make deliveries as provided in Article XI, XII, XIII or XIV of this Compact;
 - (ii) Purporting to apportion among the signatory States such uses of water as the Upper Basin may be entitled to under paragraphs (f) and (g) of Article III of the Colorado River Compact; or
 - (iii) Countenancing average uses by any signatory State in excess of its apportionment.
- (4) The apportionment to each State includes all water necessary for the supply of any rights which now exist.
- (c) No apportionment is hereby made, or intended to be made, of such uses of water as the Upper Basin may be entitled to under paragraphs (f) and (g) of Article III of the Colorado River Compact.
- (d) The apportionment made by this Article shall not be taken as any basis for the allocation among the signatory States of any benefits resulting from the generation of power.

Article IV

In the event curtailment of use of water by the States of the Upper Division at any time shall become necessary in order that the flow at Lee Ferry shall not be depleted below that required by Article III of the Colorado River Compact, the extent of curtailment by each State of the consumptive use of water apportioned to it by Article III of this Compact shall be in such quantities and at such times as shall be determined by the Commission upon the application of the following principles:

(a) The extent and times of curtailment shall be such as to assure full compliance with Article III of the Colorado River Compact;

(b) If any State or States of the Upper Division, in the ten years immediately preceding the water year in which curtailment is necessary, shall have consumptively used more water than it was or they were, as the case may be, entitled to use under the apportionment made by Article III of this Compact, such State or States shall be required to supply at Lee Ferry a quantity of water equal to its, or the aggregate of their, overdraft or the proportionate part of such overdraft, as may be necessary to assure compliance with Article III of the Colorado River Compact, before demand is made on any other State of the Upper Division;

(c) Except as provided in subparagraph (b) of this Article, the extent of curtailment by each State of the Upper Division of the consumptive use of water apportioned to it by Article III of this Compact

shall be such as to result in the delivery at Lee Ferry of a quantity of water which bears the same relation to the total required curtailment of use by the States of the Upper Division as the consumptive use of Upper Colorado River System water which was made by each such State during the water year immediately preceding the year in which the curtailment becomes necessary bears to the total consumptive use of such water in the States of the Upper Division during the same water year; provided, that in determining such relation the uses of water under rights perfected prior to November 24, 1922, shall be excluded.

Article V

(a) All losses of water occurring from or as the result of the storage of water in reservoirs constructed prior to the signing of this Compact shall be charged to the State in which such reservoir or reservoirs are located. Water stored in reservoirs covered by this paragraph (a) shall be for the exclusive use of and shall be charged to the State in which the reservoir or reservoirs are located.

(b) All losses of water occurring from or as the result of the storage of water in reservoirs constructed after the signing of this Compact shall be charged as follows:

- (1) If the Commission finds that the reservoir is used, in whole or in part, to assist the States of the Upper Division in meeting their obligations to deliver water at Lee Ferry imposed by Article III of the Colorado River Compact, the Commission shall make findings, which in no event shall be contrary to the laws of the United States of America under which any reservoir is constructed, as to the reservoir capacity allocated for that purpose. The whole or that proportion, as the case may be, of reservoir losses as found by the Commission to be reasonably and properly chargeable to the reservoir or reservoir capacity utilized to assure deliveries at Lee Ferry shall be charged to the States of the Upper Division in the proportion which the consumptive use of water in each State of the Upper Division during the water year in which the charge is made bears to the total consumptive use of water in all States of the Upper Division during the same water year. Water stored in reservoirs or in reservoir capacity covered by this subparagraph (b) (1) shall be for the common benefit of all of the States of the Upper Division.
- (2) If the Commission finds that the reservoir is used, in whole or in part, to supply water for use in a State of the Upper Division, the Commission shall make findings, which in no event shall be contrary to the laws of the United States of America under

which any reservoir is constructed, as to the reservoir or reservoir capacity utilized to supply water for use and the State in which such water will be used. The whole or that proportion, as the case may be, of reservoir losses as found by the Commission to be reasonably and properly chargeable to the State in which such water will be used shall be borne by that State. As determined by the Commission, water stored in reservoirs covered by this subparagraph (b) (2) shall be earmarked for and charged to the State in which the water will be used.

(c) In the event the Commission finds that a reservoir site is available both to assure deliveries at Lee Ferry and to store water for consumptive use in a State of the Upper Division, the storage of water for consumptive use shall be given preference. Any reservoir or reservoir capacity hereafter used to assure deliveries at Lee Ferry shall by order of the Commission be used to store water for consumptive use in a State, provided the Commission finds that such storage is reasonably necessary to permit such State to make the use of the water apportioned to it by this Compact.

Article VI

The Commission shall determine the quantity of the consumptive use of water, which use is apportioned by Article III hereof, for the Upper Basin and for each State of the Upper Basin by the inflow-outflow method in terms of man-made depletions of the virgin flow at Lee Ferry, unless the Commission, by unanimous action, shall adopt a different method of determination.

Article VII

The consumptive use of water by the United States of America or any of its agencies, instrumentalities or wards shall be charged as a use by the State in which the use is made; provided, that such consumptive use incident to the diversion, impounding, or conveyance of water in one State for use in another shall be charged to such latter State.

Article VIII

(a) There is hereby created an interstate administrative agency to be known as the "Upper Colorado River Commission." The Commission shall be composed of one Commissioner representing each of the States of the Upper Division, namely, the States of Colorado, New Mexico, Utah and Wyoming, designated or appointed in accordance with the laws of each such State and, if designated by the President, one Commissioner representing the United States of America. The President is hereby requested to designate a Commissioner. If so designated the Commissioner

representing the United States of America shall be the presiding officer of the Commission and shall be entitled to the same powers and rights as the Commissioner of any State. Any four members of the Commission shall constitute a quorum.

(b) The salaries and personal expenses of each Commissioner shall be paid by the Government which he represents. All other expenses which are incurred by the Commission incident to the administration of this Compact, and which are not paid by the United States of America, shall be borne by the four States according to the percentage of consumptive use apportioned to each. On or before December 1 of each year, the Commission shall adopt and transmit to the Governors of the four States and to the President a budget covering an estimate of its expenses for the following year, and of the amount payable by each State. Each State shall pay the amount due by it to the Commission on or before April 1 of the year following. The payment of the expenses of the Commission and of its employees shall not be subject to the audit and accounting procedures of any of the four States; however, all receipts and disbursement of funds handled by the Commission shall be audited yearly by a qualified independent public accountant and the report of the audit shall be included in and become a part of the annual report of the Commission.

(c) The Commission shall appoint a Secretary, who shall not be a member of the Commission, or an employee of any signatory State or of the United States of America while so acting. He shall serve for such term and receive such salary and perform such duties as the Commission may direct. The Commission may employ such engineering, legal, clerical and other personnel as, in its judgment, may be necessary for the performance of its functions under this Compact. In the hiring of employees, the Commission shall not be bound by the civil service laws of any State.

(d) The Commission, so far as consistent with this Compact, shall have power to:

- (1) Adopt rules and regulations;
- (2) Locate, establish, construct, abandon, operate and maintain water gaging stations;
- (3) Make estimates to forecast water run-off on the Colorado River and any of its tributaries;
- (4) Engage in cooperative studies of water supplies of the Colorado River and its tributaries;
- (5) Collect, analyze, correlate, preserve and report on data as to the stream flows, storage, diversions and use of the waters of the Colorado River, and any of its tributaries;

- (6) Make findings as to the quantity of water of the Upper Colorado River System used each year in the Upper Colorado River Basin and in each State thereof;
 - (7) Make findings as to the quantity of water deliveries at Lee Ferry during each water year;
 - (8) Make findings as to the necessity for and the extent of the curtailment of use, required, if any, pursuant to Article IV hereof;
 - (9) Make findings as to the quantity of reservoir losses and as to the share thereof chargeable under Article V hereof to each of the States;
 - (10) Make findings of fact in the event of the occurrence of extraordinary drought or serious accident to the irrigation system in the Upper Basin, whereby deliveries by the Upper Basin of water which it may be required to deliver in order to aid in fulfilling obligations of the United States of America to the United Mexican States arising under the Treaty between the United States of America and the United Mexican States, dated February 3, 1944 (Treaty Series 994) becomes difficult, and report such findings to the Governors of the Upper Basin States, the President of the United States of America, the United States Section of the International Boundary and Water Commission, and such other Federal officials and agencies as it may deem appropriate to the end that the water allotted to Mexico under Division III of such treaty may be reduced in accordance with the terms of such Treaty;
 - (11) Acquire and hold such personal and real property as may be necessary for the performance of its duties hereunder and to dispose of the same when no longer required;
 - (12) Perform all functions required of it by this Compact and do all things necessary, proper or convenient in the performance of its duties hereunder, either independently or in cooperation with any state or federal agency;
 - (13) Make and transmit annually to the Governors of the signatory States and the President of the United States of America, with the estimated budget, a report covering the activities of the Commission for the preceding water year.
- (e) Except as otherwise provided in this Compact the concurrence of four members of the Commission shall be required in any action taken by it.
- (f) The Commission and its Secretary shall make available to the Governor of each of the signatory States any information within its pos-

session at any time, and shall always provide free access to its records by the Governors of each of the States, or their representatives, or authorized representatives of the United States of America.

(g) Findings of fact made by the Commission shall not be conclusive in any court, or before any agency or tribunal, but shall constitute prima facie evidence of the facts found.

(h) The organization meeting of the Commission shall be held within four months from the effective date of this Compact.

Article IX

(a) No State shall deny the right of the United States of America and, subject to the conditions hereinafter contained, no State shall deny the right of another signatory State, any person, or entity of any signatory State to acquire rights to the use of water, or to construct or participate in the construction and use of diversion works and storage reservoirs with appurtenant works, canals and conduits in one State for the purpose of diverting, conveying, storing, regulating and releasing water to satisfy the provisions of the Colorado River Compact relating to the obligation of the States of the Upper Division to make deliveries of water at Lee Ferry, or for the purpose of diverting, conveying, storing or regulating water in an upper signatory State for consumptive use in a lower signatory State, when such use is within the apportionment to such lower State made by this Compact. Such rights shall be subject to the rights of water users, in a State in which such reservoir or works are located, to receive and use water, the use of which is within the apportionment to such State by this Compact.

(b) Any signatory State, any person or any entity of any signatory State shall have the right to acquire such property rights as are necessary to use of water in conformity with this Compact in any other signatory State by donation, purchase or through the exercise of the power of eminent domain. Any signatory State, upon the written request of the Governor of any other signatory State, for the benefit of whose water users property is to be acquired in the State to which such written request is made, shall proceed expeditiously to acquire the desired property either by purchase at a price satisfactory to the requesting State, or, if such purchase cannot be made, then through the exercise of its power of eminent domain and shall convey such property to the requesting State or such entity as may be designated by the requesting State; provided, that all costs of acquisition and expenses of every kind and nature whatsoever incurred in obtaining the requested property shall be paid by the requesting State at the time and in the manner prescribed by the State requested to acquire the property.

(c) Should any facility be constructed in a signatory State by and for the benefit of another signatory State or States or the water users

thereof, as above provided, the construction, repair, replacement, maintenance and operation of such facility shall be subject to the laws of the State in which the facility is located, except that, in the case of a reservoir constructed in one State for the benefit of another State or States, the water administration officials of the State in which the facility is located shall permit the storage and release of any water which, as determined by findings of the Commission, falls within the apportionment of the State or States for whose benefit the facility is constructed. In the case of a regulating reservoir for the joint benefit of all States in making Lee Ferry deliveries, the water administration officials of the State in which the facility is located, in permitting the storage and release of water, shall comply with the findings and orders of the Commission.

(d) In the event property is acquired by a signatory State in another signatory State for the use and benefit of the former, the users of water made available by such facilities, as a condition precedent to the use thereof, shall pay to the political subdivisions of the State in which such works are located, each and every year during which such rights are enjoyed for such purposes, a sum of money equivalent to the average annual amount of taxes levied and assessed against the land and improvements thereon during the ten years preceding the acquisition of such land. Said payments shall be in full reimbursement for the loss of taxes in such political subdivisions of the State, and in lieu of any and all taxes on said property, improvements and rights. The signatory States recommend to the President and the Congress that, in the event the United States of America shall acquire property in one of the signatory States for the benefit of another signatory State, or its water users, provision be made for like payment in reimbursement of loss of taxes.

Article X

(a) The signatory States recognize La Plata River Compact entered into between the States of Colorado and New Mexico, dated November 27, 1922, approved by the Congress on January 29, 1925 (43 Stat. 796), and this Compact shall not affect the apportionment therein made.

(b) All consumptive use of water of La Plata River and its tributaries shall be charged under the apportionment of Article III hereof to the State in which the use is made; provided, that consumptive use incident to the diversion, impounding or conveyance of water in one State for use in the other shall be charged to the latter State.

Article XI

Subject to the provisions of this Compact, the consumptive use of the water of the Little Snake River and its tributaries is hereby apportioned between the States of Colorado and Wyoming in such quantities

as shall result from the application of the following principles and procedures:

(a) Water used under rights existing prior to the signing of this Compact.

- (1) Water diverted from any tributary of the Little Snake River or from the main stem of the Little Snake River above a point one hundred feet below the confluence of Savery Creek and the Little Snake River shall be administered without regard to rights covering the diversion of water from any down-stream points.
- (2) Water diverted from the main stem of the Little Snake River below a point one hundred feet below the confluence of Savery Creek and the Little Snake River shall be administered on the basis of an interstate priority schedule prepared by the Commission in conformity with priority dates established by the laws of the respective States.

(b) Water used under rights initiated subsequent to the signing of this Compact.

- (1) Direct flow diversion shall be so administered that, in time of shortage, the curtailment of use on each acre of land irrigated thereunder shall be as nearly equal as may be possible in both of the States.
- (2) The storage of water by projects located in either State, whether of supplemental supply or of water used to irrigate land not irrigated at the date of the signing of this Compact, shall be so administered that in times of water shortage the curtailment of storage of water available for each acre of land irrigated thereunder shall be as nearly equal as may be possible in both States.
- (c) Water uses under the apportionment made by this Article shall be in accordance with the principle that beneficial use shall be the basis, measure and limit of the right to use.
- (d) The States of Colorado and Wyoming each assent to diversions and storage of water in one State for use in the other State, subject to compliance with Article IX of this Compact.
- (e) In the event of the importation of water to the Little Snake River Basin from any other river basin, the State making the importation shall have the exclusive use of such imported water unless by written agreement, made by the representatives of the States of Colorado and Wyoming on the Commission, it is otherwise provided.
- (f) Water use projects initiated after the signing of this Compact, to the greatest extent possible, shall permit the full use within the Basin

in the most feasible manner of the waters of the Little Snake River and its tributaries, without regard to the state line; and, so far as is practicable, shall result in an equal division between the States of the use of water not used under rights existing prior to the signing of this Compact.

(g) All consumptive use of the waters of the Little Snake River and its tributaries shall be charged under the apportionment of Article III hereof to the State in which the use is made; provided, that consumptive use incident to the diversion, impounding or conveyance of water in one State for use in the other shall be charged to the latter State.

Article XII

Subject to the provisions of this Compact, the consumptive use of the waters of Henry's Fork, a tributary of Green River originating in the State of Utah and flowing into the State of Wyoming and thence into the Green River in the State of Utah; Beaver Creek, originating in the State of Utah and flowing into Henry's Fork in the State of Wyoming; Burnt Fork, a tributary of Henry's Fork, originating in the State of Utah and flowing into Henry's Fork in the State of Wyoming; Birch Creek, a tributary of Henry's Fork originating in the State of Utah and flowing into Henry's Fork in the State of Wyoming; and Sheep Creek, a tributary of Green River in the State of Utah, and their tributaries, are hereby apportioned between the States of Utah and Wyoming in such quantities as will result from the application of the following principles and procedures:

(a) Waters used under rights existing prior to the signing of this Compact.

Waters diverted from Henry's Fork, Beaver Creek, Burnt Fork, Birch Creek and their tributaries, shall be administered without regard to the state line on the basis of an interstate priority schedule to be prepared by the States affected and approved by the Commission in conformity with the actual priority of right of use, the water requirements of the land irrigated and the acreage irrigated in connection therewith.

(b) Waters used under rights from Henry's Fork, Beaver Creek, Burnt Fork, Birch Creek and their tributaries, initiated after the signing of this Compact shall be divided fifty percent to the State of Wyoming and fifty percent of the State of Utah and each State may use said waters as and where it deems advisable.

(c) The State of Wyoming assents to the exclusive use by the State of Utah of the water of Sheep Creek, except that the lands, if any, presently irrigated in the State of Wyoming from the water of Sheep Creek shall be supplied with water from Sheep Creek in order of priority and in such quantities as are in conformity with the laws of the State of Utah.

(d) In the event of the importation of water to Henry's Fork, or any of its tributaries, from any other river basin, the State making the importation shall have the exclusive use of such imported water unless by written agreement made by the representatives of the States of Utah and Wyoming on the Commission, it is otherwise provided.

(e) All consumptive use of waters of Henry's Fork, Beaver Creek, Burnt Fork, Birch Creek, Sheep Creek, and their tributaries shall be charged under the apportionment of Article III hereof to the State in which the use is made; provided, that consumptive use incident to the diversion, impounding or conveyance of water in one State for use in the other shall be charged to the latter State.

(f) The States of Utah and Wyoming each assent to the diversion and storage of water in one State for use in the other State, subject to compliance with Article IX of this Compact. It shall be the duty of the water administrative officials of the State where the water is stored to release said stored water to the other State upon demand. If either the State of Utah or the State of Wyoming shall construct a reservoir in the other State for use in its own State, the water users of the State in which said facilities are constructed may purchase at cost a portion of the capacity of said reservoir sufficient for the irrigation of their lands thereunder.

(g) In order to measure the flow of water diverted, each State shall cause suitable measuring devices to be constructed, maintained and operated at or near the point of diversion into each ditch.

(h) The State Engineers of the two States jointly shall appoint a Special Water Commissioner who shall have authority to administer the water in both States in accordance with the terms of this Article. The salary and expenses of such Special Water Commissioner shall be paid, thirty percent by the State of Utah and seventy percent by the State of Wyoming.

Article XIII

Subject to the provisions of this Compact, the rights to the consumptive use of the water of the Yampa River, a tributary entering the Green River in the State of Colorado, are hereby apportioned between the States of Colorado and Utah in accordance with the following principles:

(a) The State of Colorado will not cause the flow of the Yampa River at the Maybell Gaging Station to be depleted below an aggregate of 5,000,000 acre-feet for any period of ten consecutive years reckoned in continuing progressive series beginning with the first day of October next succeeding the ratification and approval of this Compact. In the event any diversion is made from the Yampa River or from tributaries

entering the Yampa River above the Maybell Gaging Station for the benefit of any water use project in the State of Utah, then the gross amount of all such diversions for use in the State of Utah, less any returns from such diversions to the River above Maybell, shall be added to the actual flow at the Maybell Gaging Station to determine the total flow at the Maybell Gaging Station.

(b) All consumptive use of the waters of the Yampa River and its tributaries shall be charged under the apportionment of Article III hereof to the State in which the use is made; provided, that consumptive use incident to the diversion, impounding or conveyance of water in one State for use in the other shall be charged to the latter State.

Article XIV

Subject to the provisions of this Compact, the consumptive use of the waters of the San Juan River and its tributaries is hereby apportioned between the States of Colorado and New Mexico as follows:

The State of Colorado agrees to deliver to the State of New Mexico from the San Juan River and its tributaries which rise in the State of Colorado a quantity of water which shall be sufficient, together with water originating in the San Juan Basin in the State of New Mexico, to enable the State of New Mexico, to make full use of the water apportioned to the State of New Mexico by Article III of this Compact, subject, however, to the following:

(a) A first and prior right shall be recognized as to:

- (1) All uses of water made in either State at the time of the signing of this Compact; and
- (2) All uses of water contemplated by projects authorized, at the time of the signing of this Compact, under the laws of the United States of America whether or not such projects are eventually constructed by the United States of America or by some other entity.

(b) The State of Colorado assents to diversions and storage of water in the State of Colorado for use in the State of New Mexico, subject to compliance with Article IX of this Compact.

(c) The uses of the waters of the San Juan River and any of its tributaries within either State which are dependent upon a common source of water and which are not covered by (a) hereof, shall in times of water shortages be reduced in such quantity that the resulting consumptive use in each State will bear the same proportionate relation to the consumptive use made in each State during times of average water supply as determined by the Commission; provided, that any preferential uses of water to which Indians are entitled under Article XIX shall be

excluded in determining the amount of curtailment to be made under this paragraph.

(d) The curtailment of water use by either State in order to make deliveries at Lee Ferry as required by Article IV of this Compact shall be independent of any and all conditions imposed by this Article and shall be made by each State, as and when required, without regard to any provision of this Article.

(e) All consumptive use of the waters of the San Juan River and its tributaries shall be charged under the apportionment of Article III hereof to the State in which the use is made; provided, that consumptive use incident to the diversion, impounding or conveyance of water in one State for use in the other shall be charged to the latter State.

Article XV

(a) Subject to the provisions of the Colorado River Compact and of this Compact, water of the Upper Colorado River system may be impounded and used for the generation of electrical power, but such impounding and use shall be subservient to the use and consumption of such water for agricultural and domestic purposes and shall not interfere with or prevent use for such dominant purposes.

(b) The provisions of this Compact shall not apply to or interfere with the right or power of any signatory State to regulate within its boundaries the appropriation, use and control of water, the consumptive use of which is apportioned and available to such State by this Compact.

Article XVI

The failure of any State to use the water, or any part thereof, the use of which is apportioned to it under the terms of this Compact, shall not constitute a relinquishment of the right to such use to the Lower Basin or to any other State, nor shall it constitute a forfeiture or abandonment of the right to such use.

Article XVII

The use of any water now or hereafter imported into the natural drainage basin of the Upper Colorado River System shall not be charged to any State under the apportionment of consumptive use made by this Compact.

Article XVIII

(a) The State of Arizona reserves its rights and interests under the Colorado River Compact as a State of the Lower Division and as a State of the Lower Basin.

(b) The State of New Mexico and the State of Utah reserve their respective rights and interests under the Colorado River Compact as States of the Lower Basin.

Article XIX

Nothing in this Compact shall be construed as:

(a) Affecting the obligations of the United States of America to Indian tribes;

(b) Affecting the obligations of the United States of America under the Treaty with the United Mexican States (Treaty Series 994);

(c) Affecting any rights or powers of the United States of America, its agencies or instrumentalities, in or to the waters of the Upper Colorado River System, or its capacity to acquire rights in and to the use of said waters;

(d) Subjecting any property of the United States of America, its agencies or instrumentalities, to taxation by any State or subdivision thereof, or creating any obligation on the part of the United States of America, its agencies or instrumentalities, by reason of the acquisition, construction or operation of any property or works of whatever kind, to make any payments to any State or political subdivision thereof, State agency, municipality or entity whatsoever, in reimbursement for the loss of taxes;

(e) Subjecting any property of the United States of America, its agencies or instrumentalities, to the laws of any State to an extent other than the extent to which such laws would apply without regard to this Compact.

Article XX

This Compact may be terminated at any time by the unanimous agreement of the signatory States. In the event of such termination, all rights established under it shall continue unimpaired.

Article XXI

This Compact shall become binding and obligatory when it shall have been ratified by the legislatures of each of the signatory States and approved by the Congress of the United States of America. Notice of ratification by the legislatures of the signatory States shall be given by the Governor of each signatory State to the Governor of each of the other signatory States and to the President of the United States of America, and the President is hereby requested to give notice to the Governor of each of the signatory States of approval by the Congress of the United States of America.

IN WITNESS WHEREOF, the Commissioners have executed six counterparts hereof, each of which shall be and constitute an original, one of which shall be deposited in the archives of the Department of State of the United States of America, and one of which shall be forwarded to the Governor of each of the signatory States.

Done at the City of Santa Fe, State of New Mexico, this 11th day of October, 1948.

CHARLES A. CARSON
Commissioner for the State of Arizona

CLIFFORD H. STONE
Commissioner for the State of Colorado

FRED E. WILSON
Commissioner for the State of New Mexico

EDWARD H. WATSON
Commissioner for the State of Utah

L. C. BISHOP
Commissioner for the State of Wyoming

GROVER A. GILES, Secretary

Approved:

HARRY W. BASHORE
Representative of the United States of America

APPENDIX J

BY-LAWS (Amended 12-11-58)

Article I

THE COMMISSION

1. The Commission shall be composed of one Commissioner representing each of the States of Colorado, New Mexico, Utah and Wyoming, designated or appointed in accordance with the laws of each such State, and, if designated by the President, one Commissioner representing the United States of America.

2. The credentials of each Commissioner shall be filed with the Secretary of the Commission.

3. Each Commissioner shall advise in writing the Secretary of the Commission as to his address to which all official notices and other communications of the Commission shall be sent to him and shall further promptly advise in writing the Secretary of the Commission as to any change in such address.

Article II

OFFICERS

1. The officers of the Commission shall be:

Chairman,
Vice-Chairman,
Secretary,
Treasurer,
Assistant Treasurer.

2. The Commissioner representing the United States of America shall be the Chairman of the Commission. The Chairman shall preside at meetings of the Commission. His duties shall be such as are usually imposed on such officers and such as may be assigned to him by these by-laws or by the Commission from time to time.

3. The Vice-Chairman shall be one of the Commissioners representing a State. He shall be elected at each annual meeting of the Commission and shall hold office until the next annual meeting and until his successor is elected. In the case of a vacancy in the office of Vice-Chairman, the Commission shall at its next meeting, whether regular or special, elect a Vice-Chairman to serve for the unexpired term. The Vice-Chairman shall perform all the duties of the Chairman when the

Chairman is unable for any reason to act or when for any reason there is a vacancy in the office of Chairman. In addition the Vice-Chairman shall perform such other duties as may be assigned to him by the by-laws or the Commission from time to time.

4. The Secretary shall not be a member of the Commission, or an employee of any state signatory to the Upper Colorado River Basin Compact or of the United States of America while acting as Secretary. The Secretary shall be selected by the Commission. He shall serve for such term and receive such salary and perform such duties as the Commission may direct. In the case of a vacancy in the office of Secretary, the Commission shall proceed as expeditiously as possible to select a new Secretary. The Secretary shall furnish a bond for the faithful performance of his duties if the Commission shall so direct. The cost of such bond shall be paid by the Commission. The Commission may from time to time designate, or it may authorize the Secretary to designate, an employee to serve as Acting Secretary during the time the Secretary temporarily may be incapacitated or absent from the principal office of the Commission.

5. Neither the Treasurer nor the Assistant Treasurer need be a member of the Commission. The Treasurer shall be elected at each annual meeting of the Commission and shall hold office until his successor is elected and shall have qualified. The Assistant Treasurer shall be appointed by the Treasurer with the approval of the Commission and shall hold office until his successor is appointed and shall have qualified. The Treasurer and the Assistant Treasurer shall have power to receive, hold and disburse funds of the Commission. The Treasurer and the Assistant Treasurer shall each furnish a bond, or they shall furnish a joint bond covering both, for the faithful performance of his, or their, duties in such amount as the Commission may direct. The cost of such bond, or bonds, shall be paid by the Commission. In the case of a vacancy in the office of Treasurer the Chairman shall appoint a new Treasurer to serve for the unexpired term or until such time as the Commission shall elect a successor at a regular or special meeting and the person so elected shall have qualified. In the case of a vacancy in the office of Assistant Treasurer, the Treasurer shall, with the approval of the Chairman, appoint a new Assistant Treasurer, who shall serve until such time as a successor shall have been appointed and such appointment shall have been approved by the Commission.

6. The Commission may employ such engineering, legal, clerical and other personnel as, in its judgment, may be necessary. They shall receive such compensation and perform such duties as may be fixed by the Commission.

Article III

PRINCIPAL OFFICE

1. The location of the principal office and place of business of the Commission shall be designated by the Commission.
2. The principal office shall be open for business on such hours and days as the Commission may from time to time direct.
3. All books and records of the Commission shall be kept at the principal office of the Commission. Except as otherwise provided in the Compact or herein, all records of the Commission shall be open to inspection by the public during the hours the principal office is open for business. Whenever the Commission believes that the purposes and objects of the Compact will best be served by reserving certain of its records from public inspection, it may so order.

Article IV

MEETINGS

1. The annual meeting of the Commission shall be held on the third Monday of September of each year.
2. The Commission shall hold a regular meeting on the third Monday of March of each year.
3. Special meetings of the Commission may be called by the Chairman, or in case of vacancy in the office of the Chairman or inability of the Chairman to act, by the Vice-Chairman. Upon written request of two or more Commissioners it shall be the duty of the Chairman to call a special meeting.
4. Notice of all meetings of the Commission shall be sent by the Secretary, or in the case of a vacancy in the office of Secretary or the inability of the Secretary to act, by the Chairman, to all members of the Commission by ordinary mail at least ten days in advance of each such meeting. The notice here required may be waived by unanimous consent of all members of the Commission.
5. Unless otherwise agreed to in advance by not less than four members of the Commission, all annual and regular meetings of the Commission shall be held at the principal office of the Commission. Special meetings shall be held at the office of the Commission unless the notice of any such special meeting shall designate some other place for the meeting. No meeting of the Commission shall be held other than in an Upper Colorado River Basin state or in Washington, D.C. unless at least four members of the Commission have consented in writing to the place for the meeting in advance of the transmittal of notices of the

meeting. The Commission shall hold no meetings outside of the United States of America.

6. The Commission shall employ a qualified Reporter to record and transcribe the proceedings of the meetings of the Commission. The transcript and the approved minutes of the Commission shall be preserved in a suitable manner. Minutes until approved by the Commission shall not be official and shall be furnished only to members of the Commission, its employees and committees.

7. Any four members of the Commission shall constitute a quorum: provided that, when a quorum is present, an absent member may be represented by his proxy and such proxy shall have all of the powers of a member at such meeting.

8. Each member of the Commission shall have one vote.

9. Except as otherwise provided in the Upper Colorado River Basin Compact or herein, the concurrence of four members of the Commission shall be required in any action taken by it.

10. At each meeting of the Commission, the order of business, unless agreed otherwise, shall be as follows:

- Call to order;
- Reading of minutes of last meeting;
- Approval of minutes of last meeting;
- Report of Chairman;
- Report of Secretary;
- Report of Treasurer;
- Report of Committees;
- Unfinished business;
- New business;
- Adjournment.

11. All meetings of the Commission, except executive sessions, shall be open to the public. Executive sessions shall be open only to officers and members of the Commission and two advisers designated by each member; provided, however, that the Commission may call witnesses before it in such sessions.

12. Any meeting of the Commission may be adjourned or continued from time to time and from the place set for the meeting to another place; provided that, without the written consent of four members of the Commission no adjournment or continuance shall be for more than thirty days or to a place other than that set for the meeting so adjourned or continued.

Article V

COMMITTEES

1. There shall be the following standing committees:
Engineering Committee,
Legal Committee,
Budget Committee.
2. The standing committees shall have the following duties:
 - (a) The Engineering Committee shall advise the Commission on all engineering matters that may be referred to it.
 - (b) The Legal Committee shall advise the Commission on all legal matters that may be referred to it.
 - (c) The Budget Committee shall prepare the annual budget and shall advise the Commission on all fiscal matters that may be referred to it.
3. Members of Committees may or may not be members of the Commission. The number of members of each committee shall be determined from time to time by the Commission. Each member of the Commission shall designate the member or members on each committee representing his government. In all committee action the vote shall be taken by governments with each government having one vote.
4. The Chairman and Secretary shall be ex-officio members of all committees.
5. The Chairman of each Committee shall be designated by the Chairman of the Commission from the members of the committee.
6. The Commission may from time to time create special committees, composed of such members and others and assigned such tasks as the Commission may determine.
7. Formal Committee reports shall be made in writing and filed with the Secretary of the Commission.

Article VI

RULES AND REGULATIONS

1. So far as consistent with the Upper Colorado River Basin Compact, the Commission may adopt Rules and Regulations.
2. All proposals for Rules and Regulations or for changes in Rules and Regulations must be presented to the Commission in writing and shall not be acted on at the meeting when first presented but shall go over for action at a designated subsequent meeting of the Commission.

3. Following presentation to the Commission, public notice of all proposed Rules and Regulations and changes in Rules and Regulations shall be given by two publications, at least one week apart, in some newspaper of general circulation in each of the member states. The Commission member from each state shall designate the newspaper in his state in which such publication shall be made. No Rule or Regulation and no change in any Rule or Regulation shall be effective until a date specifically stated in the published notice, which date shall be at least ten days after the last publication. It shall be the duty of the Secretary to see that the necessary notices are published as herein required.

4. The Secretary shall compile the Rules and Regulations of the Commission and shall prepare copies for distribution to the public under such terms and conditions as the Commission may prescribe.

Article VII

FISCAL

1. All funds of the Commission shall be received by the Treasurer or Assistant Treasurer and deposited by him in a depository or depositories designated by the Commission.

2. Disbursements of Commission funds shall be made by check by the Treasurer or Assistant Treasurer upon vouchers approved by the Chairman, Vice-Chairman, or the Secretary.

3. On or before December 1 of each year, the Commission shall adopt and transmit to the Governors of the four States and to the President of the United States a budget covering an estimate of its expenses for the following fiscal year and of the amount payable by each state under the provisions of the Upper Colorado River Basin Compact.

4. The payment of the expenses of the Commission and of its employees shall not be subject to the audit and accounting procedures of any of the four states.

5. All receipts and disbursements of the Commission shall be audited yearly by a qualified independent public accountant to be selected by the Commission and the report of the audit shall be included in and become a part of the annual report of the Commission.

6. The Secretary shall prepare and keep up to date an inventory of all of the property of the Commission.

7. The fiscal year of the Commission shall begin July 1 of each year and end June 30 of the next succeeding year.

Article VIII

ANNUAL REPORT

1. The Commission shall make and transmit annually on or before April 1 to the Governors of the states signatory to the Upper Colorado River Basin Compact and to the President of the United States a report covering the activities of the Commission for the water year ending the preceding September 30.

2. The annual report shall include among other things the following:

- (a) The estimated budget;
- (b) All hydrologic data which the Commission deems pertinent;
- (c) Estimates, if any, of the Commission forecasting water run-off;
- (d) Statements as to cooperative studies of water supplies made during the preceding year;
- (e) All findings of fact made by the Commission during the preceding water year;
- (f) Such other pertinent matters as the Commission may require.

Article IX

SEAL

1. The seal of the Commission shall be a circular seal with the words "Upper Colorado River Commission" imprinted around the border and the word "Seal" in the center thereof.

2. The Secretary of the Commission shall have custody of the seal of the Commission.

Article X

MISCELLANEOUS

1. The Commission and its Secretary shall on request make available to the Governor of each of the states signatory to the Upper Colorado River Basin Compact any information within its possession at any time, and shall always provide free access to its records by the Governors of such states, or their representatives, or authorized representatives of the United States of America. The cost of making information available shall be borne by the person or government requesting such information.

2. All contracts or other instruments in writing to be signed for and on behalf of the Commission, except matters relating to the receipt or disbursement of funds, shall be signed by the Chairman or Vice-Chairman and the Secretary. When necessary the seal of the Commission shall be affixed thereto.

3. Except as otherwise provided by the Compact or herein, meetings of the Commission shall be in accordance with Robert's Rules of Order.

Article XI

AMENDMENTS TO BY-LAWS

1. Amendments to the By-Laws may be made at any meeting of the Commission provided notice of the proposed amendment shall have been given in the notice of the meeting.

2. Unless a proposed amendment to the By-Laws is unanimously agreed to by all five members of the Commission, action on the proposed amendment shall go over to a succeeding meeting of the Commission at which meeting the concurrence of four members of the Commission shall be necessary to the adoption of the amendment.



The relief model of the Upper Colorado River Basin, pictured above, was constructed by the Upper Colorado River Commission in cooperation with the Babson Institute of Business Administration. This model shows the topographic features of the area and indicates location of major units of the Colorado River Storage Project and Participating Projects. It is used by the Commission in work connected with administration of Upper Basin activities and is available for display at conventions and other public events.

Upper Colorado River Commission

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