



United States Department of the Interior

BUREAU OF RECLAMATION
UPPER COLORADO REGIONAL OFFICE
P.O. BOX 11568
SALT LAKE CITY, UTAH 84147

U.S. DEPARTMENT OF THE INTERIOR
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SEP 11 1987
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IN REPLY
REFER TO: UC-400

SEP 11 1987

Memorandum

To: Commissioner
Attention: WO-400

From: **ACTING** Regional Director

Subject: Colorado River Annual Operating Plan for 1988

CY 462

On September 10, 1987, as your representative, I, and my staff met with representatives of the Seven Colorado River Basin States regarding the Annual Operating Plan (AOP) for 1988. During the meeting, general agreement was reached on this AOP.

Attached is a draft memorandum on the above subject for approval by the Secretary of the Interior. Also attached is a proposed letter to the Governors of the Colorado River Basin States (States) for the Secretary's use in implementing the AOP and in notifying users of the availability of surplus water in the Basin.

At the meeting, the States' representatives concurred with this proposed letter for the Secretary's transmittal to the Governors. Representatives have also urged the Secretary to approve this plan no later than October 1, 1987, so that entities relying on Colorado River water and power operations can beneficially schedule and implement the use of this surplus water.

Clifford I. Barrett

2 Attachments

bc: Regional Director, Boulder City, Nevada
Attention: LC-460

D R A F T

Honorable Garrey Carruthers
Governor of New Mexico
Santa Fe, New Mexico 87504

Dear Governor Carruthers:

On September 10, 1987, your representative and the representatives of the other Colorado River Basin States agreed to an operating plan (copy enclosed) for the Colorado River reservoirs for water year 1988. The plan of operation reflects uses of the reservoirs for all purposes consistent with "Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs Pursuant to the Colorado River Basin Project Act of September 30, 1968," (Operating Criteria).

Given water supply and reservoir conditions, it is anticipated that there will be water in excess of all consumptive use requirements and other requirements in the Lower Basin, as stated in the Operating Criteria. Since surplus water exists, all requests for Colorado River water by holders of water delivery contracts with the United States, and of other water rights recognized in the decree in Arizona v. California, will be satisfied during calendar year 1988. Excess water will be released in a manner for effective river management. This will not cause releases to be made from Lake Powell relative to Article II (3)(b) of the Operating Criteria concerning the equalization of active storage between Lakes Powell and Mead.

Sincerely,

DONALD PAUL HODEL

Enclosure

cc: Mr. Steven E. Reynolds
State Engineer
State of New Mexico
Bataan Memorial Building, Room 101
Sante Fe, New Mexico 87503

See Enclosed Sheets for bc's and identical Letter List

Identical Letters Sent To:

Honorable Evan Mecham
Governor of Arizona
State Capitol Building, Ninth Floor
Phoenix, Arizona 85007

cc: Dr. Alan P. Kleinman
Director, Arizona Department
of Water Resources
99 East Virginia Avenue
Phoenix, Arizona 85024

Mr. Thomas C. Clark
General Manager, Central Arizona
Water Conservation District
23636 North 7th Street
Phoenix, Arizona 85024

Honorable George Deukmejian
Governor of California
State Capitol Building
Sacramento, California 95814

cc: Mr. Dennis B. Underwood
Executive Director, Colorado River
Board of California
107 South Broadway, Room 8103
Los Angeles, California 90012

Mr. Carl Boronkay
General Manager, The Metropolitan
Water District of Southern California
P.O. Box 54153
Los Angeles, California 90054

Honorable Roy Romer
Governor of Colorado
State Capitol Building
Denver, Colorado 80203

cc: Mr. J. William McDonald
Director, Colorado Water
Conservation Board
1313 Sherman Street, Suite 721
Denver, Colorado 80203

Mr. James S. Lochhead
Colorado River Commission
P.O. Drawer 2030
1011 Grand Avenue
Glenwood Springs, Colorado 81601

Colonel Todd Ono
District Engineer
Los Angeles District
Corps of Engineers
Department of the Army
P.O. Box 2711
Los Angeles, California 90053

Honorable Richard H. Bryan
Governor of Nevada
State Capitol Building
Carson City, Nevada 89710

cc: Mr. Jack L. Stonehocker
Director, Colorado River
Commission of Nevada
Mail Room Complex
Las Vegas, Nevada 89158

Honorable Norman H. Bangerter
Governor of Utah
State Capitol Building
Salt Lake City, Utah 84114

cc: Mr. D. Larry Anderson
Director, Division of Water
Resources
1636 West North Temple
Salt Lake City, Utah 84116

Honorable Michael Sullivan
Governor of Wyoming
State Capitol Building
Cheyenne, Wyoming 82002

cc: Mr. Gordan Fassett
State Engineer
State of Wyoming
Herschler Building
Cheyenne, Wyoming 82003

Mr. Gerald R. Zimmerman
Executive Director, Upper Colorado
River Commission
355 South 4th East Street, Suite 320
Salt Lake City, Utah 84111

Dr. Narendra J. Gunaji
Commissioner, United States Section
International Boundary and
Water Commission
The Commons, Building C, Suite 310
4171 North Mesa
El Paso, Texas 79902

Mr. William H. Clagett
Administrator, Western Area Power
Administration
Department of Energy
P.O. Box 3402
Golden, Colorado 80401

Memorandum

To: Secretary

Through: Assistant Secretary - Water and Science

From: Commissioner

Subject Summary: Colorado River Operating Plan for 1988

DISCUSSION: As my representative, Regional Director Clifford I. Barrett met on September 10, 1987, with representatives of the Governors of the Colorado River Basin States. During this meeting general agreement was reached on an Annual Operating Plan (AOP) for 1988. With the projected water supply and present reservoir conditions, it is anticipated that there will be water in excess of all consumptive use requirements and other requirements in the Lower Basin.

The authority to allow use of surplus water is identified in an attached background information document regarding the Supreme Court Decree in Arizona v. California and the "Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs Pursuant to the Colorado River Basin Project Act of September 30, 1968," (Operating Criteria). The availability of surplus water will authorize the diversion of water in excess of their "normal" apportionments during calendar year 1988 for use in the Lower Basin and permit the scheduling of excess water to Mexico. Also attached is a proposed letter to the Governors of the Basin States for your use in implementing the AOP.

Noted: _____
Assistant Secretary - Water and Science

Date: _____

Approved: _____
Secretary of the Interior

Date: _____

Attachments

Prepared by: Del Seely ext: 343-5471

See attached sheet for bc's

bc: Secretary's Surname
Secretary's Reading Files (2)
ES (8)
CL, SOL, AS/WS (3)
Regional Director, Salt Lake City, Utah, Attention: UC-400
Regional Director, Boulder City, Nevada, Attention: LC-400
Chief, Division of Planning Technical Services, E&R Center
Attention: D-750
W.O. Codes 104, 115, 130, 200, 400, 600, 700

Colorado River Operating Plan for 1988

The following paragraphs describe the operation of the Colorado mainstem reservoirs during water year 1988:

FONTENELLE - The modification and repair of Fontenelle Dam is continuing as planned. Irrespective of the statistical frequency of the WY 1988 spring runoff, Fontenelle Reservoir will be kept as near the target elevation of 6,443 feet as possible. All inflow will be immediately passed through to Flaming Gorge.

FLAMING GORGE - The general goal of the 3 operating scenarios is to minimize the month-to-month changes in release volumes while scheduling higher power releases in the winter and spring. Releases for research on the Colorado squawfish will occur again this year with August and September releases constrained to maximum releases of 2600 cfs and monthly release volumes to 100,000 acre-feet, although in the probable minimum the monthly releases volumes of these months have been cut to preserve storage (the reservoir recovers fully with an average year following). Probable maximum does not show a powerplant bypass although the upper decile runoff would need to be recognized by April 1 to avoid this.

BLUE MESA - The Aspinall Unit is by far the most difficult operation of the mainstem reservoirs as a result of the Blue Mesa uprates, Crystal turbine runner replacement, and the Blue Mesa transformer replacement. The operational goal is still to fill Blue Mesa without bypassing the powerplant. Due to the limited powerplant capacity through April 1988, Blue Mesa powerplant will be operating at capacity from now until then; we expect that bypassing Crystal is a given this year. An average year wouldn't cause too many problems, but a larger inflow year could result in large Crystal bypasses, particularly if the high runoff were not recognized early.

NAVAJO - Due to the modification underway, Navajo will be held near elevation 6,040 feet until next spring. This is much lower than usual and results in a maximum elevation 20 feet short of full with a most probable runoff in WY 1988. Probable maximum would fill the reservoir in the spring of 1988; probable minimum would leave it even lower than 6,040. Low releases of about 700 cfs are scheduled until the reservoir refills.

GLEN CANYON - The operation of Glen Canyon Dam will follow the same objectives as last year--a January 1 storage target of 22.6 MAF and bringing the reservoir to a nearly full condition during July. These objectives are achieved in the most probable and probable maximum scenarios but in the probable minimum scenario the January 1989 target is missed by 200,000 acre-feet and the reservoir does not fill because the inflow is less than the objective annual release of 8.23 MAF.

An important consideration in these operating plans is the avoidance of powerplant bypasses. To accomplish this goal, the strategy continues to be (1) high releases Jan - Mar to put the reservoir in a good position to react to changing climatic conditions and (2) limited scheduled releases June and July and a small amount of unfilled storage space to accommodate late season increases in the forecasted runoff. The planned releases during the winter months are of course tempered by the forecasted runoff to insure that conservation storage is not jeopardized.

The redistribution of excess water releases from Lake Mead has been carefully determined to minimize the risk of impacting the operation of Lake Powell. Under each of the 3 scenarios, the storage of Lake

invoked. Should a water supply circumstance arise that would require equalization releases at the end of water year 1988 due to the release of redistributed excess water, the required equalization would be made by December 31, 1988, thus accomplishing the intent of this portion of the Criteria as Lake Powell is drawn down in preparation for the following spring runoff.

LAKE MEAD - Development of the WY 88 Annual Operating Plan for Lake Mead proceeded according to the following process:

1. quantification and redistribution of excess water under most probable water supply assumption.
2. analysis of the impacts of the proposed redistribution under the probable minimum and probable maximum water supply assumptions.

Table 1 illustrates the first step in this process. Excess water as defined in this context is water that will flow to Mexico after meeting all US consumptive use requirements and after allowing Mexico to schedule an additional 200,000 AF of water in CY 88. Under most probable water supply conditions, this volume is computed to be approximately 2.7 MAF. This Table also illustrates the proposed redistribution of this water during WY 88 under the most probable water supply assumption. Table 2 outlines the study assumptions used in the analysis.

The AOP provides for excess releases from Lake Mead of approximately 1.1 MAF during July 1987 through December 1987. Since it is unlikely that the most probable water supply projection will deviate significantly during this period, the proposed release pattern does not change under the various water supply assumptions. If in actual operations the projected water supply were to change, excess releases during this period would be modified so as to maintain the operating objective of a 19,000 cfs release from Lake Mead in January, 1988.

Beginning in January and through June 1988, releases from Lake Mead will be either to meet downstream demands or the flood control requirements. Consequently, releases during this period will be driven by the water supply forecast. Under the most probable water supply conditions mandatory flood control releases of 19,000 cfs will be required in January and February. Under the probable minimum water supply no flood control releases would be required and the releases from Lake Mead will be limited to satisfying downstream requirements only. Under the probable maximum water supply mandatory flood control releases of 28,000 cfs are required from January through March, and 19,000 cfs releases will be required through June 1988.

Under the most probable water supply conditions approximately 0.4 MAF of excess water are scheduled to be released during the period July 1988 through September 1988. These releases will be subject to reevaluation in June 1988 under all water supply conditions.

Table 1
PROPOSED REDISTRIBUTION OF EXCESS WATER
Water Year 1988

Month	BASE CASE			PROPOSED REDISTRIBUTION			Net Change (maf)
	Hoover Downstream Requirements ^{1/} (kaf)	Projected Release ^{2/} (kaf)	Excess Water (kaf) - (maf)	Projected Release ^{2/} (kaf)	Excess Water (kaf) - (maf)	Net Change (maf)	
JUL 87	845	845	0	845	0		
AUG 87	949	950	1	990	41	0.3	+ 0.3
SEP 87	635	635	0	877	242		
OCT 87	419	420	1	710	291		
NOV 87	433	433	0	704	271	0.8	+ 0.8
DEC 87	473	473	0	729	256		
JAN 88	524	1,168	644	1,168	644		
FEB 88	544	1,093	549	1,093	549		
MAR 88	808	1,168	360	829	21	1.2	- 0.5
APR 88	1,027	1,131	104	1,028	1		
MAY 88	889	889	0	889	0		
JUN 88	875	876	1	876	1		
JUL 88	807	807	0	895	88		
AUG 88	851	852	1	929	78	0.4 ^{3/}	+ 0.4
SEP 88	629	630	1	857	228		
OCT 88	439	440	1	439	0		
NOV 88	538	858	320	538	0	0.0 ^{4/}	- 1.0
DEC 88	448	1,106	658	448	0		
TOTAL	12,133	14,774	2,641	14,844	2,711	2.7	0.0

1/ Schedule includes all United States' consumptive use requirements plus an additional 200,000 acre-feet to Mexico during calendar year 1988.

2/ Under most probable water supply conditions.

3/ Releases will be reevaluated in June 1988.

4/ Release decisions, October 1988 through December 1988, will be based on a similar analysis of the following operating year. Releases during this period in the 1988 AOP assume excess water will be available under most probable water supply conditions through calendar year 1989.

Table 2

Assumptions Used in the 1988 Annual Operating Plan

1. Water Supply - The Annual Operating Plan is based on the most probable water supply. Impacts on the AOP have been tested with other water supply assumptions. The most notable of which are the probable minimum and the probable maximum. The following table compares the water supply assumptions used for WY88 with the 25-year long term average (1961-1985):

	Most Probable	Probable Minimum	Probable Maximum
Oct-Dec	117%	117%	117%
Jan-Mar	106%	73%	114a%
Apr-Sep	102%	58%	159%
Total WY	104%	66%	149%

A perfect forecast is assumed in these studies.

2. Consumptive Uses - The Lower Basin consumptive use demands for CY88 were scheduled as follows in all three water supply scenarios:

Southern Nevada Water Project	141,000 acre-feet
Central Arizona Project	743,000 acre-feet
Metropolitan Water District	1,277,000 acre-feet
Demands below Parker Dam	5,052,000 acre-feet

3. Delivery to Mexico - For calendar year 1988, under the most probable water supply assumption, excess water is estimated to be about 2.7 million acre-feet. That amount is much greater than the amount of surplus water that can be consumptively used within the United States; therefore, ~~200,000~~ ^{1.7 million} acre-feet of ~~excess~~ water is scheduled for Mexico's use, even under the probable minimum water supply assumption. That is, in addition to Mexico's normal schedule of 1.5 million ^{200,000 acre-feet} acre-feet annually.

4. Lake Powell Storage Target - The storage target at Lake Powell on January 1 is 22.6 million acre-feet.

5. Hoover Dam Release Objective - The release objective at Hoover Dam is the minimum flood control release of 19,000 cubic feet per second during the month of January.
6. Storage Buffer at Lake Mead - A storage differential at the end of the water year between Lake Powell and Lake Mead is provided to insure that a release of excess water from Hoover Dam does not prompt a release from Glen Canyon Dam for equalization purposes. For water year 1988, that differential is about 1.4 million acre-feet under most probable water supply conditions.
7. Provision for Recovery - One operating objective when dealing with excess releases is to maintain the ability to return to a base case operation in a reasonable period of time. This means, given the most probable water supply projection and limiting the releases from Hoover Dam to downstream requirements, the vacant storage space at Lake Mead could be reduced to the minimum flood control requirement of 5.35 million acre-feet on January 1 of the year following the year excess releases were made.