

August 15, 1969

Mr. J. R. Riter, Chairman
Task Force on Operating Criteria
Colorado River Reservoirs
Office of Chief Engineer
U. S. Bureau of Reclamation
Building 67, Denver Federal Center
Denver, Colorado 80225

Dear Randy:

At the August 7, 1969 meeting in Salt Lake City of the group considering long-term operating criteria for Lake Powell and Lake Mead, Mr. Jacobson was requested to furnish you a determination of annual consumptive use over the study period 1914 to 1965 being used in the Type I Comprehensive Studies for the Upper Colorado Region.

Enclosed for your personal use and dissemination as you see fit is the requested determination of consumptive use. It should be understood that this determination is tentative and is subject to the review of the work group headed by Mr. Jacobson which includes state and federal representatives.

Sincerely yours,

Ival V. Goslin
Executive Director

IVG:hiw

Enclosure

Consumptive Use in the Upper Colorado Region

Records are not sufficient to indicate the complete year-by-year amounts of consumptive uses in the Upper Colorado Region over a 1914-1965 study period. Other than the present (1965) normalized consumptive use figure indicated herein, the only other known estimate of consumptive use was made in 1948 by the Advisory Engineering Committee to the Upper Colorado River Basin Compact Commission. The Committee's estimate, however, was in terms of an annual average for the period 1914 to 1945 amounting to 1,923,000 acre-feet per annum.

In order to approximate an annual variation in consumptive uses over the 1914-1965 study period, the following method was used:

Where data are available, the actual identifiable variations in consumptive uses were accounted for. The remainder, or unidentifiable variations in consumptive uses, were assumed to increase more or less uniformly from 1914 to 1965.

To effect a more or less uniform variation in the unidentifiable items, the Engineering Advisory Committee's 1914-1945 average figure (1,923,000 acre-feet) was applied at the mid point (1930) after adjusting it for transmountain diversions (123,000 acre-feet), the only identifiable annual variable in the Committee's estimate. Arbitrary slight decreases were then applied each year from 1930 back to 1914 and similarly increases were applied from 1930 ahead to 1945.

The present 1965 normalized consumptive use (3,451,000 acre-feet) was adjusted for identifiable annual variations (1,316,000), the result, representing unidentifiable uses, was applied in 1965 with more or less uniform variations back to 1945.

The annual sums of the identifiables, or actual variables, and the remainder, or unidentifiable uses, constitute the assumed year-by-year consumptive uses over the 1914-1965 period.

A listing of the identifiable uses and the remaining unidentifiable use is found at the conclusion of this statement, along with the calculations of annual variation of the total consumptive use. You will note that changes in reservoir contents are not considered as consumptive use.

This is a brief description of the present 1965 major water uses in the Upper Colorado Region. The Upper Colorado Region comprises the natural drainage area of the Colorado River above Lee Ferry, plus the Great Divide Closed Basin in Wyoming in which there are no significant man-made depletions.

Municipal and Industrial

Basic municipal, rural household, and industrial use by the 352,000 people in the basin is 25,100 acre-feet and evaporation from 24 municipal reservoirs is 2,300 acre-feet. Livestock use by approximately one million animals (in cattle units) is 11,000 acre-feet.

Electric Power

1965 water depletion by steam-electric generation plants is 23,200 acre-feet. This water is consumed primarily at 10 utility plants and several industrial plants which have a total capacity of about 1.5 million kilowatts. Principal use is for condenser cooling purposes.

Minerals

Mineral industry water use in 1965 is 33,700 acre-feet. Estimates are computed primarily from the Bureau of Mines 1962 water census and 1962-66 statistics. Depletions represent 39 percent of diversions for mineral industry activities.

Augmented Fish & Wildlife

The combined consumptive use total is 11,700 acre-feet, with 6,700 acre-feet for fish facilities, and 5,000 acre-feet for wildlife facilities. Evaporation from water areas was computed only on those facilities constructed and utilized primarily or specifically for fish and wildlife. Installations and facilities having water use numbered 127 for wildlife and 105 for fish.

Recreation

The amount of water consumed for recreation is not of major significance. Most is used at associated service facilities. The computed use is 7.70 gallons per recreation day for 55 million recreation days in the basin, or 1,300 acre-feet. None of the reservoirs in the Region has recreation as a dominant purpose, excluding fishing and wildlife facilities discussed in the preceding paragraph.

Stockwater Facilities

Average annual evaporation from 22,035 man-made stock ponds, used primarily for livestock water, is 23,900 acre-feet. An average annual 64 percent fullness factor (varying from 30 to 87%) is considered in computing evaporation on the total water surface area of 14,600 acres. Data on size and number of ponds are based on records of BLM, FS, BIA, and SCS.

Irrigation

Consumptive Use on 1,621,500 acres of irrigated cropland is 1.7 million acre-feet for 1965 average conditions. Consumptive use rates were computed utilizing the Blaney-Griddle Method and latest available data on local seasonal crop coefficients. The basin was divided into 61 evaluation areas for determining local consumptive irrigation requirements. The studies are based on present average irrigated acreage and cropping pattern data. Consumptively use adjustments were made to reflect present average short water supply on 548,000 acres. Also there are 124,400 acres idle or land not irrigated in the average year because of water shortages. 1931-60 normal climatic conditions were defined by utilizing weather bureau records at 151 stations.

Incidental Use on water-consuming non-cropped areas is use on those areas which consume water incidental to the cropped lands as a result of the practice of irrigation. It approximates .3 million acre-feet and is 18.6 percent of the overall consumptive use by irrigated crops. Incidental water use values for New Mexico and Utah are the figures in the 1948 Upper Colorado River Basin Compact Commissions Advisory Committee Report. Recent survey data from the Wyoming State Water Plan was used for Wyoming. Colorado data are from recent Type IV River Basin Cooperative Studies by the Colorado Water Conservation Board and USDA. Incidental water use in Arizona is estimated at 10 percent of consumptive irrigation requirement.

Irrigation Reservoir Evaporation from 309 reservoirs for 1965 normalized conditions is 114,900 acre-feet. These reservoirs provide 3.27 million acre-feet of usable capacity for regulation of streamflow. The 1965 normalized evaporation on reservoirs is based on operation studies under normal operating conditions. Data have been adjusted where available to reflect average conditions that may not have existed during 1965. On many reservoirs operational data are not available and estimates were made using general relations of supply and demand.

Export

Transmountain Diversion records for 42 facilities were analyzed to reflect present average export discharge from the basin, recognizing that during any one year many factors in addition to supply and demand affect the diversion discharge. Intraregional movement of water from one subregion to another is not included in these figures. There is a diversion of 109,500 acre-feet to the Great Basin; 353,400 acre-feet to the Platte River; 60,600 acre-feet to the Arkansas River; and 3,100 acre-feet to the Rio Grande River.

Evaporation Loss from regulating and exchange reservoirs, used in connection with export is 23,700 acre-feet. Storage in the eight reservoirs, and partially in one reservoir, is 1,182,200 acre-feet.

Water Supplies from Importation

Inflow to the region through a transmountain diversion from Sevier River in the Great Basin to Paria River averages 2,600 acre-feet.

Reservoir Evaporation (Main Stem)

Evaporation loss from main stem regulating reservoirs (Flaming Gorge - 67,000 acre-feet and Lake Power - 576,000 acre-feet) for 1965 normalized conditions is 643,000 acre-feet. The 1965 normalized evaporation on the reservoirs is based on Bureau of Reclamation operation studies under normal operating conditions.

SUMMARY OF PRESENT (1965) NORMALIZED CONSUMPTIVE USES

Upper Colorado Region

<u>Uses</u>	<u>1,000 acre-feet</u>
Municipal and Industrial	38,400
Electric Power	23,200
Mineral Industry	33,700
Fish and Wildlife	11,700
Recreation	1,300
Stockwater Facilities	23,900
Irrigation	
At Site Use	1,697,300
Incidental Use	315,600
Reservoir Evaporation	114,900
Exports	
Diversions	526,600
Reservoir Evaporation	23,700
(Less Water Import)	<u>(2,600)</u>
Subtotal	2,807,700
Main Stem Reservoir Evaporation	<u>643,000</u>
Total	<u><u>3,450,700</u></u>

CONSUMPTIVE USE - UPPER COLORADO REGION

(1,000 A.F.)/Yr.

Total Consumptive Use (1965 Normalized)

3,451,000

Less Identifiable Consumptive Uses (Normalized 1965)

Transmountain Diversions

527,000

Recent U.S.B.R. Projects

Eden		12,000
Moon Lake		17,000
Vernal		10,000
Colbran		7,000
Paonia		9,000
Hammond		<u>5,000</u>

60,000

Reservoir Evaporation

Lake Powell		576,000
Flaming Gorge		67,000
Navajo		31,000
Fontenelle		14,000
Strawberry	11.3	
Big Sandy	4.1	
Moon Lake	0.7	
Schofield	1.7	
Stanaker	<u>1.4</u>	

19,000

Green Mtn.	2.0	
Granby	4.6	
Shadow Mtn.	1.3	
Willow Creek	0.2	
William Fork	1.8	
Vega	0.7	
Dillon	<u>3.7</u>	

14,000

Paonia	0.6	
Taylor Park	1.8	
Crawford	0.6	
Fruitgrowers	<u>0.4</u>	

3,000

Vallecito 3.1

3,000

727,000

Unidentifiable Consumptive Uses

1,318,000

2,135,000

**ANNUAL CONSUMPTIVE USE
UPPER COLORADO REGION**

Year	Annual Distribution of Unidentified Uses	Transmountain Diversions	Recent Reclamation Project Uses	Reservoir Evaporation	Annual Distribution of Total Consumptive Use
1914	1,704	19			1,723
1915	1,710	33			1,743
1916	1,716	60			1,776
1917	1,722	80			1,802
1918	1,728	97			1,825
1919	1,734	94			1,828
1920	1,740	88			1,828
1921	1,746	85			1,831
1922	1,752	93			1,845
1923	1,758	104			1,862
1924	1,764	131			1,895
1925	1,770	113			1,883
1926	1,776	104			1,880
1927	1,782	98			1,880
1928	1,788	102			1,890
1929	1,794	96			1,890
1930	1,800	103			1,903
1931	1,806	98			1,904
1932	1,812	90			1,902
1933	1,818	84			1,902
1934	1,824	53			1,877
1935	1,830	93			1,923
1936	1,836	123			1,959
1937	1,842	138			1,980
1938	1,848	197	12		2,057
1939	1,854	182	17		2,053
1940	1,860	158	12	1	2,031
1941	1,866	173	9	5	2,053
1942	1,872	120	12	6	2,010
1943	1,878	186	14	8	2,088
1944	1,884	153	15	8	2,060
1945	1,890	193	11	8	2,102
1946	1,897	196	10	24	2,127
1947	1,904	175	16	26	2,121
1948	1,912	170	10	24	2,116
1949	1,920	188	13	24	2,145
1950	1,929	208	13	26	2,176
1951	1,938	267	12	28	2,245
1952	1,948	249	12	34	2,243
1953	1,958	358	20	37	2,373
1954	1,969	500	13	36	2,518
1955	1,980	492	16	35	2,523
1956	1,992	474	26	37	2,529

UPPER BASIN DEPLETION STUDIES

For Angleton 9/15/68
David T. Gosh...

FUTURE INCREASES IN DEPLETIONS ABOVE LEE FERRY

An investigation of the annual variation related to runoff of future Upper Colorado River Basin depletions in addition to those accounted for in the 1968 present modified flows was made by summarizing ultimate depletions for 19 potential projects for which a water supply operation has been prepared to support a feasible or definite project plan. Where the project operation did not include the full 1930-through-1963 period, it was extended by graphical regression with the closest streamflow or a similar project. These depletions by projects are shown on Table 1. The average depletion for the total of these projects for the period 1928-through-1963 is 1,476,000 a.f. The ultimate increased average depletion is 2,309,000 a.f. for the 1906-to-1968 period, based on 5.8 MAF Upper Basin use.

It is believed that the fluctuation in depletion of the 19 projects, which include four projects that export water from the basin, represent the fluctuation of the total depletions. A regression analysis was made by the least squares method, using the 1968 present modified flows at Glen Canyon as the independent variable and the total depletions for the 19 projects mentioned as the dependent variable. The correlation coefficient for this regression is .82 and the standard error is 223,000 a.f. The equation is

$$Y = 504 + .0918X$$

where Y is the depletion in 1000 a.f. and X is the 1968 present modified flow in 1000 a.f.

Recognizing that with carryover storage the depletion to Glen Canyon inflow is also dependent on previous years' flows, that is, the depletion for a high year following low previous years will be much greater than for a high year following a high year, a multiple linear regression analysis was made,

using for the second independent variable, the previous years 1968 present modified flow in 1000 a.f. plus 1/2 the year before that and 1/4 the flow of the year before that. This is termed "Z" in the following regression equation:

$$Y = 1127 + .0863X - .03Z.$$

The correlation coefficient is .87 and the standard error is 190,000 a.f.

This equation was used to make an estimate of depletions for the period 1906 through 1927 and 1966 through 1968. 1964 and 1965 depletions were estimated by extending the record of individual projects by correlation for those projects where there was no water supply operation and totalling the 19 projects.

The average estimated depletion for the 1906 through 1968 period for the 19 projects, corresponding to the 1,476,000 acre-feet for the 1928-1963 period, was found to be 1,539,000 a.f. To find the annual additional depletion for each particular year, within the estimated 5.8 MAF year 2030 Upper Basin use, the yearly depletion for the 19 projects was multiplied by the ratio of 2,339 to 1,539 to make the average increased depletion for the 1906 through 1968 period equal to 2,339,000 a.f. These values are shown on Table 2.

These total additional depletions for some of the critical periods of record are as follows:

WY 1953-1956	1,737,000 a.f. per year
WY 1953-1964	2,052,000 a.f. per year
WY 1953-1968	2,162,000 a.f. per year
WY 1931-1964	2,219,000 a.f. per year
WY 1906-1968	2,339,000 a.f. per year

TABLE 1

Effect of Future Projects on Flows

Year	Transmountain Diversion				Silt	Fruitland Meas	San Miguel	Dallas Creek	San Miguel	Fruitland Meas	Silt	Lyman	Sedalslate	Ulnch	Central Utah Project		Bemerville	Every County
	Navajo Indian, Navajo Mkt., San Juan-Chama	Alamosa-La Plata	Dolores	West Divide											Navajo**	Fryingpen-Arkansas		
1928	388	74	-39	80*	67	102	76	40*	30*	6	10	210	50*	15	15	22	27	1,91*
29	856	283	173	80*	-315	102	71	40*	30*	6	10	210	50*	15	15	22	27	1,91*
30	856	283	173	80*	-315	102	71	40*	30*	6	10	210	50*	15	15	22	27	1,91*
31	283	103	27	80*	592	61	70	40*	20*	4	13	150	25	18	12	15	17	1,224
32	888	232	6	30*	-272	86	56	-10*	40*	4	6	78	15	12	12	15	17	2,111
33	350	131	180	90*	120	67	66	70*	40*	4	11	133	16	20	23	19	17	1,211
34	-15	16	30	30*	397	71	48	20*	0*	4	4	98	15	10	4	13	17	1,211
35	1,016	211	93	110*	485	85	45	-10*	40*	2	6	275	40	22	2	15	18	1,666
36	357	184	130	80*	124	85	61	40*	30*	6	10	273	20	22	3	15	18	1,710
37	507	129	127	80*	-105	58	75	50*	30*	6	10	158	44	23	27	15	18	1,677
38	614	207	118	70*	185	53	87	10*	40*	6	14	247	33	14	34	198	16	1,667
39	228	75	30	40*	237	40	80	30*	40*	4	8	129	23	13	13	125	16	1,667
40	1,141	106	83	80*	237	40	80	40*	40*	6	5	128	31	15	9	97	13	1,711
41	222	86	274	80*	285	65	50	60*	39	8	14	335	49	14	6	196	38	2,288
42	317	169	35	90*	-531	79	65	40*	32	2	15	157	28	13	3	221	7	1,348
43	674	134	105	80*	285	83	70	40*	33	7	13	260	28	16	28	196	13	1,651
44	433	146	72	80*	-189	69	62	40*	30	7	12	267	49	13	1	151	6	1,237
45	42	140	27	90	369	63	54	30*	36	6	8	241	51	5	28	218	25	1,858
46	317	217	136	112	133	113	61	70	22	6	10	135	12	13	5	123	0	1,772
47	844	107	105	66	-373	82	75	36	33	6	9	219	47	13	29	263	41	1,772
48	703	157	113	79	-209	91	72	40	22	6	6	255	31	14	28	311	7	1,489
49	162	98	53	68	411	62	74	12	25	6	13	203	19	13	28	188	17	1,222
50	1,092	75	27	79	573	95	83	108	38	6	11	195	59	16	36	276	13	2,133
51	271	250	182	104	-273	73	82	24	21	6	6	194	8	14	1	112	6	1,188
52	171	24	9	56	275	24	49	28	0	6	1	168	29	13	-10	135	-11	1,085
53	178	137	61	86	247	24	37	-28	0	6	3	195	23	10	5	127	8	1,192
54	178	104	40	70	203	53	50	22	26	6	8	232	33	12	12	208	14	1,223
55	273	97	51	67	6	123	75	153	78	6	8	234	43	22	7	202	55	2,382
56	1,268	284	271	153	-634	123	81	33	78	6	6	115	23	20	13	203	13	1,772
57	583	119	20*	88	372	71	59	12	19	6	11	260	18	11	4	79	-16	1,327
58	40	119	90*	55	372	69	59	12	23	6	10	191	27	24	5	95	0	1,327
59	607	187	110*	82	-129	68	53	51	23	6	10	119	27	9	2	80*	13*	1,853
60	300	156	110*	67	139	50	46	33	15	6	14	301	47	32	28	250*	23*	1,185
61	344	167	100*	125	-71	92	52	40*	44	8	10	301	20*	9	28	100*	13*	1,185
62	136	111	100*	40*	282	38	69	20*	7	4	10	150*	20*	15	-1	100*	10*	1,091
63	200	98	60*	60*	129	66	47	10*	26	4	10	150*	20*	15	-1	100*	10*	1,091
64	1,121	295	200*	150*	-596	86	69	150*	67	8	10	280*	50*	26	20	270*	4*	2,406
65																		3,137
																		1928 to 1963 Total
																		1928 to 1963 Average
																		1,476

* Estimated by correlation.
** Remove the effect of Navajo Reservoir.

TABLE 2

(Unit: M.A.F.)

INCREASED DEPLETION IN UPPER COLORADO RIVER BASIN
ABOVE 1968 MODIFIED FLOWS

1	2	3	1	2	3
Year	Effect of 19 Projects	Increased Depletion	Year	Effect of 19 Projects	Increased Depletion
1906	2.02	3.07	1936	1.740	2.64
1907	2.03	3.09	1937	1.673	2.54
1908	1.02	1.55	1938	1.867	2.84
1909	2.14	3.25	1939	1.152	1.75
1910	1.20	1.82	1940	1.144	1.74
1911	1.65	2.51	1941	2.252	3.42
1912	1.80	2.74	1942	1.348	2.05
1913	1.36	2.07	1943	1.631	2.48
1914	1.98	3.01	1944	1.589	2.42
1915	1.23	1.87	1945	1.570	2.39
1916	1.92	2.92	1946	1.237	1.88
1917	2.00	3.04	1947	1.858	2.82
1918	1.30	1.98	1948	1.287	1.96
1919	1.17	1.78	1949	1.772	2.69
1920	2.14	3.25	1950	1.429	2.17
1921	1.99	3.02	1951	1.222	1.86
1922	1.49	2.26	1952	2.133	3.24
1923	1.64	2.49	1953	1.168	1.78
1924	1.21	1.84	1954	1.025	1.56
1925	1.45	2.20	1955	1.152	1.75
1926	1.54	2.34	1956	1.223	1.86
1927	1.94	2.95	1957	2.352	3.57
1928	1.380	2.10	1958	1.345	2.04
1929	1.935	2.94	1959	1.130	1.72
1930	1.224	1.86	1960	1.379	2.10
1931	.818	1.24	1961	1.327	2.02
1932	2.114	3.21	1962	1.853	2.82
1933	1.213	1.84	1963	1.185	1.80
1934	.724	1.10	1964	1.051	1.60
1935	1.686	2.56	1965	2.406	3.66
			1966	1.27	1.93
			1967	1.35	2.05
			1968	1.54	2.34
TOTAL 63 YEARS:			96.974	147.39	
AVERAGE:			1.539	2.339	

Footnote: Column 3 = Column 2 X $\frac{2.339}{1.539}$

Depletions for 1928 through 1965 are the sum of 19 projects. 1906 through 1927, and 1966 through 1968 were computed by multiple regression.

MEMORANDUM

April 9, 2007

To: File
From: John Whipple, Staff, Interstate Stream Commission
Subject: Changes to May 2006 Draft Hydrologic Determination

The State of Arizona on March 16, 2007, proposed to the Bureau of Reclamation via email the following changes to the May 2006 Draft Hydrologic Determination:

Page 3, Approach, second paragraph:

~~The~~Neither the Lower Division states nor the Upper Colorado River Commission does not agree with the modeling assumption ~~for the~~of an objective minimum release of 8.23 maf and the assumed delivery of 0.75 maf each year toward the Mexican Treaty obligation included therein. At the sole request of the Commission, this hydrologic investigation considers for planning purposes both the objective minimum release of 8.23 maf and a minimum release from Lake Powell of 7.48 maf annually. However, this hydrologic determination does not quantify the Colorado River Compact Article III(c) requirement or make or rely on a critical compact interpretation regarding Article III(c). The 1988 Hydrologic Determination also showed the Upper Basin yields under ~~these~~both minimum release scenarios.

Page 7, Conclusions, first paragraph, first sentence:

It is concluded that based on the analysis requested by the Commission, the Upper Basin yield and New Mexico water allocation needed to support New Mexico's revised Upper Basin depletions schedule are reasonably likely to be available.

To facilitate the Bureau of Reclamation submitting the Draft Hydrologic Determination for the Secretary of the Interior's consideration without contention from the Lower Division states, the State of New Mexico, acting through the Interstate Stream Commission, and representatives of the other six Colorado River Basin states verbally agreed to recommend to Reclamation the following changes in response to Arizona's proposal:

Page 3, Approach, second paragraph:

~~The~~Neither the Lower Division states nor the Upper Colorado River Commission does not agree with the modeling assumption for theof an objective minimum release used in this reportof 8.23 maf and the assumed delivery of 0.75 maf each year toward the Mexican Treaty obligation included therein. At the request of the Commission, this hydrologic investigation considers for planning purposes both the objective minimum release of 8.23 maf and a minimum release from Lake Powell of 7.48 maf annually. However, this hydrologic determination does not quantify the Colorado River Compact Article III(c) requirement or make or rely on a critical compact interpretation regarding

Article III(c). The 1988 Hydrologic Determination also showed the Upper Basin yields under ~~these~~both minimum release scenarios.

Page 7, Conclusions, first paragraph, first sentence:

It is concluded that based on the analysis performed by Reclamation in consultation with the Upper Colorado River Commission, the Upper Basin yield and New Mexico water allocation needed to support New Mexico's revised Upper Basin depletions schedule are reasonably likely to be available.

The Interstate Stream Commission emailed these recommended changes to the Bureau of Reclamation's Upper Colorado Regional Director on April 4, 2007.

For the record, the following paragraph more clearly describes the matter discussed in the May 2006 Draft Hydrologic Determination at page 3, Approach, second paragraph:

Neither the Upper Colorado River Commission nor the Lower Division states agree with the modeling assumption of the objective minimum release of 8.23 maf for Lake Powell. Nonetheless, this hydrologic investigation considers for planning purposes the objective minimum release of 8.23 maf consistent with the Secretary of the Interior's Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs Pursuant to the Colorado River Basin Project Act of September 30, 1968 (P.L. 90-537), amended March 21, 2005. At the request of the Commission and for consistency with the scenarios evaluated in the 1988 Hydrologic Determination, this hydrologic investigation also shows the Upper Basin yield assuming a minimum release from Lake Powell of 7.48 maf annually. Inclusion of the latter scenario in this investigation should not be construed to imply agreement of the Secretary, the Commission or the Lower Division states with a minimum release of 7.48 maf annually. This hydrologic determination does not quantify the Colorado River Compact Article III(c) requirement or make or rely on a critical compact interpretation regarding Article III(c).

Whipple, John J., OSE

From: John Shields [jshiel@seo.wyo.gov] **Sent:** Thu 3/29/2007 4:03 PM
To: Don Ostler; scott@balcombgreen.com; jlochhead@bhf-law.com; Patrick Tyrrell; randy.seaholm@state.co.us; rod.kuharich@state.co.us; ted.kowalski@state.co.us; Whipple, John J., OSE; Pete Michael; dennisstrong@utah.gov; normanjohnson@utah.gov; robertking@utah.gov
Cc: Lopez, Estevan, OSE; Dantonio, John, OSE; Trujillo, Tanya, OSE
Subject: RE: 2006 hydro determination changes - revised
Attachments:

John Whipple and all,

I visited with Pat Tyrrell on the telephone a bit ago and Wyoming concur with the position/opinion expressed by Don Ostler. We don't see the language as hurting our position either. Accordingly, the language edits as suggested by Arizona and California and concurred in by New Mexico are not objectionable to Wyoming.

Thanks for the opportunity to provide this input. Please advise as to the Department of Interior schedule to approve the Hydrologic Determination when you hear details. Thanks.

With best regards,

John W. Shields
 Interstate Streams Engineer
 Wyoming State Engineer's Office
 Herschler Building, 4th East, Cheyenne, WY 82002
 jshiel@seo.wyo.gov; <http://seo.state.wy.us>
 307-631-6151; 307-631-0898 (c); 307-777-5451 (f)

-----Original Message-----

From: Don Ostler [mailto:dostler@uc.usbr.gov]
Sent: Wednesday, March 28, 2007 8:54 AM
To: scott@balcombgreen.com; jlochhead@bhf-law.com; John Shields; Patrick Tyrrell; randy.seaholm@state.co.us; rod.kuharich@state.co.us; ted.kowalski@state.co.us; john.whipple@state.nm.us; Pete Michael; dennisstrong@utah.gov; normanjohnson@utah.gov; robertking@utah.gov
Cc: estevan.lopez@state.nm.us; john.dantonio@state.nm.us; tanya.trujillo@state.nm.us
Subject: Re: 2006 hydro determination changes - revised

Thanks John:

Below is my opinion:

I think I know what Ca. is trying to do with the language; however, I don't think it hurts the upper basin any further...I think the language is ok if it results in 7 state support for the hydro determination and moves it off dead center...

Don Ostler
 Upper Colorado River Commission

>>> "Whipple, John J., OSE" <john.whipple@state.nm.us> 03/27 3:50 PM

>>>

All:

Calii a requests a slight revision to the proposed Hydro Determination changes transmitted moments ago. The attached includes California's suggested edit in addition to the edits worked out with Arizona. Can you accept the proposed changes? Thanks again for your

<https://webmail.state.nm.us/exchange/john.whipple/Inbox/RE:%202006%20hydro%20determination>

OSE-0106

prompt attention to this matter.

John Whipple

From: Whipple, John J., OSE
Sent: Tue 3/27/2007 3:35 PM
To: ptyrre@seo.wyo.gov; jshiel@seo.wyo.gov; dennisstrong@utah.gov;
robertking@utah.gov; scott@balcombgreen.com; rod.kuharich@state.co.us;
randy.seaholm@state.co.us; pmicha@state.wy.us; normanjohnson@utah.gov;
ted.kowalski@state.co.us; jlochhead@bhf-law.com
Cc: dostler@uc.usbr.gov; Dantonio, John, OSE; Lopez, Estevan, OSE;
Trujillo, Tanya, OSE
Subject: 2006 hydro determination changes

All:

Please review the attached proposed changes to the May 2006 Draft Hydrologic Determination that were negotiated between Arizona and New Mexico. Please let us know if the proposed changes are acceptable to you. As you know, we would like to get this issue resolved as soon as possible. Thank you for your assistance.

John Whipple

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Whipple, John J., OSE

From: Dennis Strong [DENNISSTRONG@utah.gov] **Sent:** Wed 3/28/2007 10:15 AM
To: scott@balcombgreen.com; jlochhead@bhf-law.com; jshiel@seo.wyo.gov; ptyrre@seo.wyo.gov; randy.seaholm@state.co.us; rod.kuharich@state.co.us; ted.kowalski@state.co.us; Whipple, John J., OSE; pmicha@state.wy.us; Norman Johnson; Robert King
Cc: Lopez, Estevan, OSE; Dantonio, John, OSE; Trujillo, Tanya, OSE; dostler@uc.usbr.gov
Subject: Re: 2006 hydro determination changes - revised
Attachments:

The changes are acceptable to Utah.

>>> "Whipple, John J., OSE" <john.whipple@state.nm.us> 03/27/2007 3:50 PM >>>

All:

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Sent: Tue 3/27/2007 3:35 PM
To: ptyrre@seo.wyo.gov; jshiel@seo.wyo.gov; dennisstrong@utah.gov; robertking@utah.gov; scott@balcombgreen.com; rod.kuharich@state.co.us; randy.seaholm@state.co.us; pmicha@state.wy.us; normanjohnson@utah.gov; ted.kowalski@state.co.us; jlochhead@bhf-law.com
Cc: dostler@uc.usbr.gov; Dantonio, John, OSE; Lopez, Estevan, OSE; Trujillo, Tanya, OSE
Subject: 2006 hydro determination changes

All:

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Whipple, John J., OSE

From: Don Ostler [dostler@uc.usbr.gov] **Sent:** Wed 3/28/2007 8:53 AM
To: scott@balcombgreen.com; jlochhead@bhf-law.com; jshiel@seo.wyo.gov; ptyrre@seo.wyo.gov; randy.seaholm@state.co.us; rod.kuharich@state.co.us; ted.kowalski@state.co.us; Whipple, John J., OSE; pmicha@state.wy.us; dennisstrong@utah.gov; normanjohnson@utah.gov; robertking@utah.gov
Cc: Lopez, Estevan, OSE; Dantonio, John, OSE; Trujillo, Tanya, OSE
Subject: Re: 2006 hydro determination changes - revised
Attachments:

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Don Ostler

Upper Colorado River Commission

>>> "Whipple, John J., OSE" <john.whipple@state.nm.us> 03/27 3:50 PM

>>>

All:

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Cc: dostler@uc.usbr.gov; Dantonio, John, OSE; Lopez, Estevan, OSE; Trujillo, Tanya, OSE
Subject: 2006 hydro determination changes

All:

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John Whipple

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OSE-0109

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OSE-0110

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Attachments can contain viruses that may harm your computer. Attachments may not display correctly.

Whipple, John J., OSE

From: Whipple, John J., OSE

Sent: Mon 10/2/2006 11:52 AM

To: dostler@uc.usbr.gov

Cc:

Subject: EA meeting followup

Attachments:  [hydrodeter.lbresponse.doc\(29KB\)](#)  [upperbasin.yield.xls\(21KB\)](#)

Don:

Attached is a draft technical response to the Lower Basin letter for our discussion. Please let me know within the next week or so if you have any suggestions or edits to the response. I will send you a final version of the memorandum for your files later.

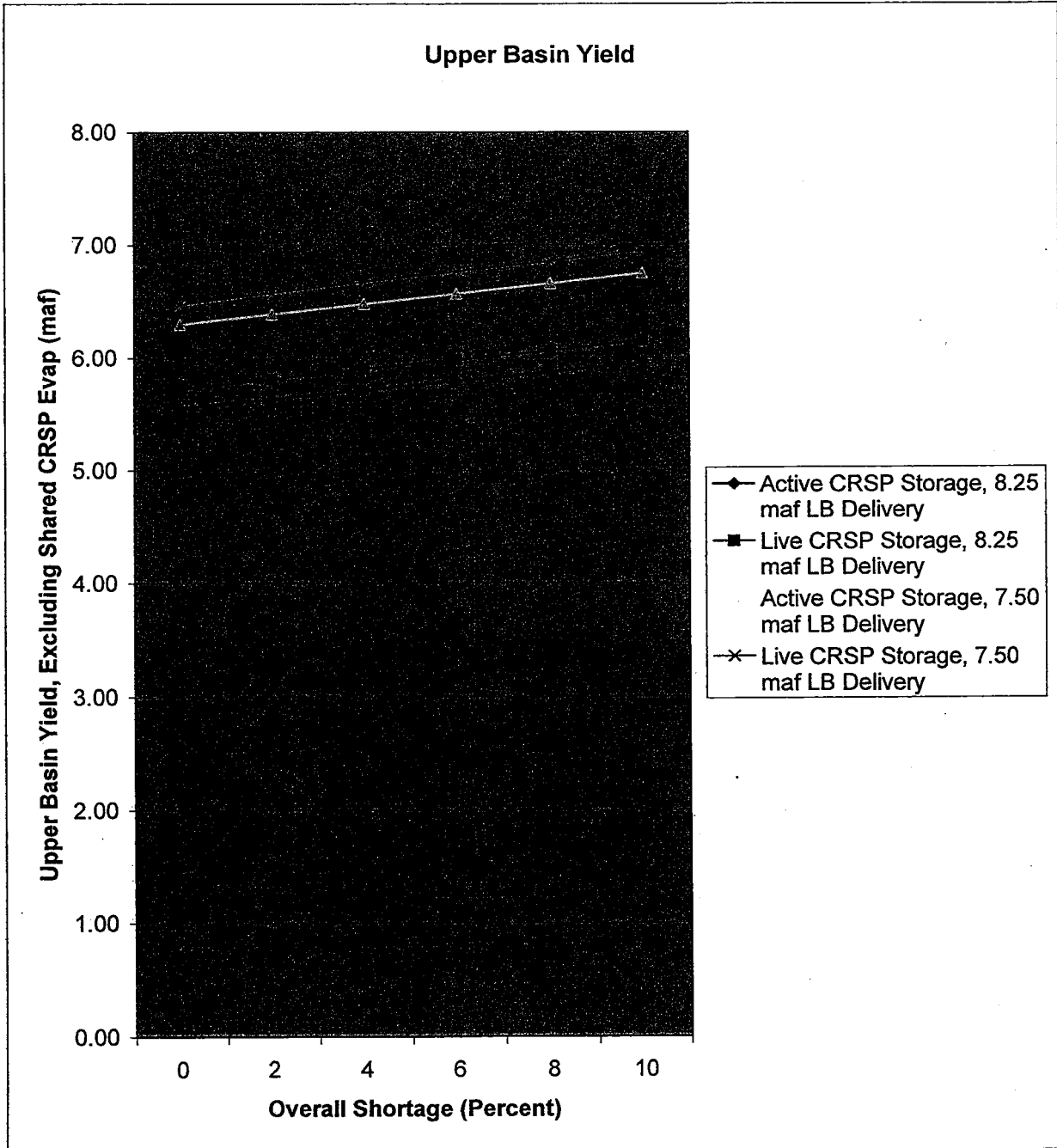
Also attached are the Upper Basin yield data from the water balance spreadsheets using USBR natural flows, and consequent yield curves that we discussed. You may wish to make graphs that do not include all four scenarios for presentation to the Commission.

John Whipple

OSE-0111

Upper Basin Yield, Excluding Shared CRSP Evap

Percent Shortage	Active CRSP Storage		Live CRSP Storage	
	8.25 maf Release	7.50 maf Release	8.25 maf Release	7.50 maf Release
0	5.55	6.30	5.72	6.47
2	5.63	6.39	5.81	6.57
4	5.71	6.48	5.90	6.67
6	5.79	6.57	5.98	6.76
8	5.87	6.66	6.06	6.85
10	5.95	6.75	6.15	6.95



Whipple, John J., OSE

From: spollack [spollack@navajo.org] **Sent:** Wed 9/20/2006 10:01 AM
To: Connor, Michael (Energy); Trujillo, Tanya, OSE; John Utton; Whipple, John J., OSE; Gentry, Nate (Energy)
Cc:
Subject: Arizona Interest in NM Settlement
Attachments:

FYI, We met with the Arizona State Parties yesterday concerning our Colorado River negotiations.

Our two main nemeses, CAWCD and SRP, were asking questions about when the legislation would be introduced, when they could see a draft, and how much will it cost.

I suspect that Arizona will attempt a two pronged strategy:

(1) Oppose the settlement legislation because it authorizes a project to deliver water to Arizona communities, and the Arizona water issues have not been worked out.

(2) Oppose a settlement with New Mexico unless all Navajo Colorado River issues are worked out comprehensively. In the discussions yesterday, it is clear that CAWCD views any assistance that Arizona provides in an Arizona settlement, namely, to allow an Upper Basin diversion out of Lake Powell for Lower Basin uses on the reservation, as a significant contribution to the settlement. Particularly since they claim that the other 7 basin states will want some form of *quid-quo-pro* at Arizona's expense. They also seem to be of the view that Upper Basin Resolution of 2003, allowing New Mexico to use its Upper Basin water in the Lower Basin, is an amendment to the 1922 Compact. They may push to have all compact issues resolved comprehensively.


This would be consistent with their "starvation" strategy for Navajo.

SP

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Stanley M. Pollack, Assistant Attorney General
Water Rights Unit
Navajo Nation Department of Justice
P.O. Box 2010
Window Rock, AZ 86515

928.871.6192 (P) / 928.871.6200 (F)

 You forwarded this message on 9/15/2006 3:49 PM.

Whipple, John J., OSE

From: Connor, Michael (Energy) [Michael_Connor@energy.senate.gov] **Sent:** Fri 9/15/2006 10:02 AM
To: Whipple, John J., OSE; Trujillo, Tanya, OSE
Cc:
Subject: RE: Colorado River Lower Basin States Meeting
Attachments:

John – I did get this before our meeting with Bob. Thanks.

We obviously didn't get into the UB/LB issues as in-depth as your e-mail does, but it was a good conversation about the hydrologic determination. It's advantageous that Bob has such a good knowledge about the Colorado River. I think he'll ensure that Reclamation doesn't raise issues with the hydrologic determination that are better addressed elsewhere. I sense, though, that they will hear the LB out, respond in time, and then hopefully move forward. It won't be a quick process, though.

Thanks for the analysis. I'd appreciate being kept in the loop as to the ongoing dialogue between the Basin States.

Mike

From: Whipple, John J., OSE [mailto:john.whipple@state.nm.us]
Sent: Friday, September 15, 2006 10:30 AM
To: Connor, Michael (Energy); Trujillo, Tanya, OSE
Subject: RE: Colorado River Lower Basin States Meeting

Tanya and Mike:

Additional comments for thought --

Delivery obligation. In raising the issue of whether 1/2 of the incremental river channel losses associated with the Mexican Treaty obligation should be charged against the Upper Basin, it seems to open up the issue that incremental channel losses associated with the regulation and delivery of Mead contract water, including Lake Mead evaporation, should be charged against the Lower Basin's compact apportionment. Incremental losses on Mexican deliveries is small, so I am not sure why the Lower Basin is raising this.

Additional storage. All increases in storage reduce streamflows, so including the storage increases to reduce flows in the water balance analysis at Powell is appropriate and proper. Including the storage reductions is also then appropriate for consistency and conserving the mass balance. If storage decreases used to meet Upper Basin uses were not included, then the Upper Basin uses should be reduced in the water balance analysis at Powell during dry years to reflect only the depletions of the streamflow and not

OSE-0114

<https://webmail.state.nm.us/exchange/john.whipple/Inbox/RE:%20Colorado%20River%20Lower%20Basin...> 9/15/2006

depletions from reservoir storage. The mass balance result if done properly would be the same.

Also, because the additional storage is largely to supply Upper Basin uses, it is not used to determine 602(a) storage for the purpose of protecting Upper Basin uses while delivering water to the Lower Basin. To do so would be to suggest that all Upper Basin storage must be used first to deliver water to Lee Ferry and the Upper Basin could only utilize the base flow of the river. This is clearly not consistent with authorized water development.

Analysis. The water budget analysis is a common way to determine yields. The water balance analysis was done using the lowest projected storage capacity within the next 55 years and the highest projected Upper Basin use within the next 55 years (2060 conditions with full use). The critical period was superimposed on these conditions to determine yield. Thus, the risk assessed is the highest possible risk for the study period, and analyzing risk to the Upper Basin for earlier conditions with greater storage not depleted by sediment and less Upper Basin development would give less risk. Thus, if the critical period is superimposed on a current condition, a 2020 condition, etc., the risks through the 2060 study period would be less than presented in the determination, either with the individual conditions separately or statistically weighted through multiple hydrologic traces as was done with CRSS for the Seven Basin States work. Thus, there is no need to use the approach suggested by the Lower Basin for the Upper Basin to assess its maximum risks.

Rather, I believe the Lower Basin is suggesting this approach so that it can get the 602(a) storage issue imbedded into the determination. Arizona in the current coordinated Powell/Mead reservoir operations EIS process is relentlessly pursuing redetermination of Reclamation's 602(a) storage algorithm to benefit the Lower Basin through increased Powell releases at the expense of the Upper Basin and Powell energy production, and previously argued to New Mexico that 602(a) storage needed to be included and evaluated in the determination. New Mexico responded previously to Arizona that under full yield development, 602(a) storage required is the full capacity of the CRSP reservoirs because it is that capacity which determines the yield, and thus 602(a) is not relevant to the determination. If the determination were to use statistics of multiple traces over time with time varying storage and Upper Basin use over the next 55 years, then the algorithm to compute 602(a) storage could be a technical issue in that risk analysis until the projected time when the Upper Basin would fully develop.

Shortage. The determination uses a 6 percent shortage for sensitivity analysis. The Upper Colorado River Commission does not "endorse" the 6 percent shortage, but did not say that it disagreed with it. Also, the 5.76 maf yield (excluding CRSP reservoir evap) would reflect a 5% shortage if only CRSP active storage is used and a 1% shortage if CRSP live storage is used, both assuming that the delivery to Lee Ferry is 8.25 maf annually as per the current Powell operating criteria (which used to be Arizona's line in the sand). These shortage percentages would be less if the delivery to Lee Ferry averages less than 8.25 maf. Actual future operations are left up to the UCRC to determine based on the circumstances that may exist at such time that a shortage occurs. Starting the reservoir levels out at reasonable levels less than full capacity would not affect the critical period yield because the hydrology prior to the critical period would fill the reservoirs. Common practice, including for Reclamation, for determining yields is determining the amount of water that can be used during the most critical period of reservoir drawdown from full storage to empty active storage. While severe drought has occurred in the Colorado River Basin during the past several years, the critical period of record has not changed since 2000.

Other. If the Secretary cannot approve the new determination, then the 1988 determination is the determination that is in operation. The 1988 determination found that the Upper Basin critical period yield is 6.0 maf in perpetuity, including CRSP reservoir evap. Relying on that supply analysis, the revised depletion schedule with revised depletions and critical period CRSP reservoir evap (instead of long-term average CRSP reservoir evap) could be used to show the availability of water for the Navajo-Gallup Project. Such a showing could suffice for meeting the requirement of Public Law 87-483 if the Secretary would provide it, or the settlement legislation could explicitly or implicitly amend Public Law 87-483 by approving the settlement contract without the Secretarial determination based on the Upper Basin's depletion schedules. The Lower Basin's letter does not object to the recognition of critical period evaporation, versus long-term average evaporation, in the critical period yield analysis or to New Mexico's revised schedule of depletions.

OSE-0115

John Whipple

From: Connor, Michael (Energy) [mailto:Michael_Connor@energy.senate.gov]
Sent: Fri 9/15/2006 5:23 AM
To: Trujillo, Tanya, OSE
Cc: Whipple, John J., OSE
Subject: Re: Colorado River Lower Basin States Meeting

Thanks Tanya -- this is helpful. My sense is that the LB letter is a reaction more to the UB Resolution (from a legal perspective) not the hydrologic determination. As you point out, the HD does assume an 8.25 Maf avg annual delivery option, not 7.5 Maf, and it seems like the LB concedes that the HD correctly uses the 6% overall shortage assumption (notwithstanding the UB's protests).

Also, it seems like the LB is now waking up to the 2003 Resolution which they are now agitated about. On this point, I'm still unclear as to why this is a big deal to them.

Overall, as long as the assumptions are still based on a avg. delivery obligation of 8.25 Maf, it seems like the LB doesn't have a dog in this fight. Am I getting the big picture? Does anything in the HD impact the ongoing shortage sharing and coordinated reservoir operation process?

Finally, the process concern having to do with the Assistant Secretary of Indian Affairs is just silly.

 Sent from my BlackBerry Wireless Handheld

-----Original Message-----

From: Trujillo, Tanya, OSE <tanya.trujillo@state.nm.us>
To: Connor, Michael (Energy)
CC: Whipple, John J., OSE <john.whipple@state.nm.us>
Sent: Thu Sep 14 21:47:56 2006
Subject: Colorado River Lower Basin States Meeting

Mike, in anticipation of Senator Bingaman's meeting tomorrow morning with Bob Johnson, I wanted to provide some quick responses to the issues raised in the Lower Basin States' letter to Secretary Kempthorne. John Whipple and I have spoken about our response, and John does not see any merit to the technical issues the letter raises. (and he would tell us if he did) I'm copying John on this email so he can correct things I have said in the morning if necessary. (John, the meeting tomorrow is at 11 am eastern time) Similarly, if you have questions, please send them, so that John can respond first thing tomorrow.

Despite the lip service to support for the Navajo settlement, the letter objects to NM's ability to develop the additional water necessary to implement the settlement. The UB states are concerned that the LB's reaction is an indication that the potential benefits to the UB of the 7 states agreement (ability to develop) will not be achieved and calls into question why the UB states should continue to support that process. The Upper Basin States are meeting on September 27 to prepare for the 7 states' meeting on the 28th. Bob Johnson, Bob Snow, Mark Limbaugh and Rick Gold are planning to attend our meeting. We will discuss responses to this letter during that meeting, in addition to the UB's positions in the 7states' process.

Water Delivery Obligation

The issue is whether the UB is required to deliver 1/2 of the treaty obligation (.75 MAF) every year (UB says no, LB says yes). The HD model included analysis of a release from Powell of 8.25 MAF/A, which includes 1/2 of the Mexican treaty obligation. Therefore, the risk to the was analyzed. There is no reason to include the lower basin's legal position regarding Mexican Treaty delivery obligations in the HD.

Additional Storage

As the LB acknowledges, the UB has a right to use water in non-CRSP reservoirs, therefore it is appropriate to include them in the calculation

OSE-0116

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of UB yield. It is up to the UB states to determine how to administer our own water rights if we need to curtail uses to make sure the compact is complied with. The LB concern is based on supposition that UB states will not be able to curtail uses if necessary -- which is not their business.

Analysis

Technical representatives from the upper basin states have worked with BOR for several months (a year?) to refine and analyze the hydrologic determination. Those representatives are very capable of assessing the risks to the upper basin states associated with impact the NG project may have on the upper basin states' ability to comply with the compact obligations and any other technical issues associated with the subject including whether the right years were included or not. There was professional debate regarding several issues, several scenarios were modeled and the draft report presents a solid, technical analysis.

Conclusion

The conclusion raises the legal issue about the use of UB water in the LB. The UB addressed this in its 2003 resolution. Our legislation will approve this. This process is consistent with the process applied to Arizona in the 1968 act.

Regarding Gila -- I have previously mentioned to Bob Johnson that we appreciated his staff's cooperation with us on the Gila planning process as a member of the coordinating committee. That planning process is fairly tenuous, especially with respect to whether FWS will be a productive participant or not. We need to encourage Johnson to make sure BOR remains committed to and supportive of the process.

And then there is the Silvery Minnow. I think you are up to speed enough on that subject.

Thanks and good luck.

Tanya

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Whipple, John J., OSE

From: Whipple, John J., OSE
To: Connor, Michael (Energy); Trujillo, Tanya, OSE
Cc:
Subject: RE: Colorado River Lower Basin States Meeting
Attachments:

Sent: Fri 9/15/2006 8:30 AM

Tanya and Mike:

Additional comments for thought --

Only Regopal up - UB aware of risk ~~associated~~ and this UB issue - UB should decide how to develop apportionment.

*give UB - ?
1. Lower starting content = 1/2 Capacity (show less spills to UB)
2. Extend record to 2004*

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full deficiency ex. yr. 2 UB right to develop all trib's? then accty of side inflows also in UB - system water when gets to Mead dam.

Additional storage. All increases in storage reduce streamflows, so including the storage increases to reduce flows in the water balance analysis at Powell is appropriate and proper. Including the storage reductions is also then appropriate for consistency and conserving the mass balance. If storage decreases used to meet Upper Basin uses were not included, then the Upper Basin uses should be reduced in the water balance analysis at Powell during dry years to reflect only the depletions of the streamflow and not depletions from reservoir storage. The mass balance result if done properly would be the same.

Exclude non-CRSP res. from call? or ex. accty. of this under

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critical period for 602(a) algorithm still 1953-64.

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Other. If the Secretary cannot approve the new determination, then the 1988 determination is the determination that is in operation. The 1988 determination found that the Upper Basin critical period yield is 6.0 maf in perpetuity, including CRSP

OSE-0118

reservoir evap. Relying on that supply analysis, the revised depletion schedule with revised depletions and critical period CRSP reservoir evap (instead of long-term average CRSP reservoir evap) could be used to show the availability of water for the Navajo settlement project. Such a showing could suffice for meeting the requirement of Public Law 87-483 if the Secretary would provide it, or the settlement legislation could explicitly or implicitly amend Public Law 87-483 by approving the settlement contract without the Secretarial determination based on the Upper Basin's depletion schedules. The Lower Basin's letter does not object to the recognition of critical period evaporation, versus long-term average evaporation, in the critical period yield analysis or to New Mexico's revised schedule of depletions.

John Whipple

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Sent: Fri 9/15/2006 5:23 AM
To: Trujillo, Tanya, OSE
Cc: Whipple, John J., OSE
Subject: Re: Colorado River Lower Basin States Meeting

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 Sent from my BlackBerry Wireless Handheld

-----Original Message-----

From: Trujillo, Tanya, OSE <tanya.trujillo@state.nm.us>
To: Connor, Michael (Energy)
Cc: Whipple, John J., OSE <john.whipple@state.nm.us>
Sent: Thu Sep 14 21:47:56 2006
Subject: Colorado River Lower Basin States Meeting

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Water Delivery Obligation

OSE-0119

<https://webmail.state.nm.us/exchange/john.whipple/Sent%20Items/RE:%20Colorado%20River%20Lower%...> 9/18/2006

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Thanks and good luck.

Tanya

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Whipple, John J., OSE

From: Whipple, John J., OSE
To: Connor, Michael (Energy); Trujillo, Tanya, OSE
Cc:
Subject: RE: Colorado River Lower Basin States Meeting
Attachments:

Sent: Fri 9/15/2006 8:30 AM

Tanya and Mike:

Additional comments for thought --

Delivery obligation. In raising the issue of whether 1/2 of the incremental river channel losses associated with the Mexican Treaty obligation should be charged against the Upper Basin, it seems to open up the issue that incremental channel losses associated with the regulation and delivery of Mead contract water, including Lake Mead evaporation, should be charged against the Lower Basin's compact apportionment. Incremental losses on Mexican deliveries is small, so I am not sure why the Lower Basin is raising this.

Additional storage. All increases in storage reduce streamflows, so including the storage increases to reduce flows in the water balance analysis at Powell is appropriate and proper. Including the storage reductions is also then appropriate for consistency and conserving the mass balance. If storage decreases used to meet Upper Basin uses were not included, then the Upper Basin uses should be reduced in the water balance analysis at Powell during dry years to reflect only the depletions of the streamflow and not depletions from reservoir storage. The mass balance result if done properly would be the same.

Also, because the additional storage is largely to supply Upper Basin uses, it is not used to determine 602(a) storage for the purpose of protecting Upper Basin uses while delivering water to the Lower Basin. To do so would be to suggest that all Upper Basin storage must be used first to deliver water to Lee Ferry and the Upper Basin could only utilize the base flow of the river. This is clearly not consistent with authorized water development.

Analysis. The water budget analysis is a common way to determine yields. The water balance analysis was done using the lowest projected storage capacity within the next 55 years and the highest projected Upper Basin use within the next 55 years (2060 conditions with full use). The critical period was superimposed on these conditions to determine yield. Thus, the risk assessed is the highest possible risk for the study period, and analyzing risk to the Upper Basin for earlier conditions with greater storage not depleted by sediment and less Upper Basin development would give less risk. Thus, if the critical period is superimposed on a current condition, a 2020 condition, etc., the risks through the 2060 study period would be less than presented in the determination, either with the individual conditions separately or statistically weighted through multiple hydrologic traces as was done with CRSS for the Seven Basin States work. Thus, there is no need to use the approach suggested by the Lower Basin for the Upper Basin to assess its maximum risks.

Rather, I believe the Lower Basin is suggesting this approach so that it can get the 602(a) storage issue imbedded into the determination. Arizona in the current coordinated Powell/Mead reservoir operations EIS process is relentlessly pursuing redetermination of Reclamation's 602(a) storage algorithm to benefit the Lower Basin through increased Powell releases at the expense of the Upper Basin and Powell energy production, and previously argued to New Mexico that 602(a) storage needed to be included and evaluated in the determination. New Mexico responded previously to Arizona that under full yield development, 602(a) storage required is the full capacity of the CRSP reservoirs because it is that capacity which determines the yield, and thus 602(a) is not relevant to the determination. If the determination were to use statistics of multiple traces over time with time varying storage and Upper Basin use over the next 55 years, then the algorithm to compute 602(a) storage could be a technical issue in that risk analysis until the projected time when the Upper Basin would fully develop.

Shortage. The determination uses a 6 percent shortage for sensitivity analysis. The Upper Colorado River Commission does not "endorse" the 6 percent shortage, but did not say that it disagreed with it. Also, the 5.76 maf yield (excluding CRSP reservoir evap) would reflect a 5% shortage if only CRSP active storage is used and a 1% shortage if CRSP live storage is used, both assuming that the delivery to Lee Ferry is 8.25 maf annually as per the current Powell operating criteria (which used to be Arizona's line in the sand). These shortage percentages would be less if the delivery to Lee Ferry averages less than 8.25 maf. Actual future operations are left up to the UCRC to determine based on the circumstances that may exist at such time that a shortage occurs. Starting the reservoir levels out at reasonable levels less than full capacity would not affect the critical period yield because the hydrology prior to the critical period would fill the reservoirs. Common practice, including for Reclamation, for determining yields is determining the amount of water that can be used during the most critical period of reservoir drawdown from full storage to empty active storage. While severe drought has occurred in the Colorado River Basin during the past several years, the critical period of record has not changed since 2000.

Other. If the Secretary cannot approve the new determination, then the 1988 determination is the determination that is in operation. The 1988 determination found that the Upper Basin critical period yield is 6.0 maf in perpetuity, including CRSP reservoir evap. Relying on that supply analysis, the revised depletion schedule with revised depletions and critical period CRSP
 OSE-0121

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reservoir evap (instead of long-term average CRSP reservoir evap) could be used to show the availability of water for the Navajo-Gallup Project. Such a showing could suffice for meeting the requirement of Public Law 87-483 if the Secretary would provide it, or the settlement legislation could explicitly or implicitly amend Public Law 87-483 by approving the settlement contract without the Secretary's determination based on the Upper Basin's depletion schedules. The Lower Basin's letter does not object to the recognition of critical period evaporation, versus long-term average evaporation, in the critical period yield analysis or to New Mexico's revised schedule of depletions.

John Whipple

From: Connor, Michael (Energy) [mailto:Michael_Connor@energy.senate.gov]
Sent: Fri 9/15/2006 5:23 AM
To: Trujillo, Tanya, OSE
Cc: Whipple, John J., OSE
Subject: Re: Colorado River Lower Basin States Meeting

Thanks Tanya -- this is helpful. My sense is that the LB letter is a reaction more to the UB Resolution (from a legal perspective) not the hydrologic determination. As you point out, the HD does assume an 8.25 Maf avg annual delivery option, not 7.5 Maf, and it seems like the LB concedes that the HD correctly uses the 6% overall shortage assumption (notwithstanding the UB's protests).

Also, it seems like the LB is now waking up to the 2003 Resolution which they are now agitated about. On this point, I'm still unclear as to why this is a big deal to them.

Overall, as long as the assumptions are still based on a avg. delivery obligation of 8.25 Maf, it seems like the LB doesn't have a dog in this fight. Am I getting the big picture? Does anything in the HD impact the ongoing shortage sharing and coordinated reservoir operation process?

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 OSE-0122

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Therefore, the risk to the UB was analyzed. There is no reason to include the lower basin's legal position regarding Mexican Treaty delivery obligations in the HD.

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And then there is the Silvery Minnow. I think you are up to speed enough on that subject.

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Tanya

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OSE-0124

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OSE-0126