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No. 80

COLORADO-BIG THOMPSON PROJECT

SYNOPSIS OF REPORT

ON

COLORADO-BIG THOMPSON PROJECT, PLAN OF DEVELOPMENT AND COST ESTIMATE PREPARED BY THE BUREAU OF RECLAMATION, DEPARTMENT OF THE INTERIOR

PRESENTED BY MR. ADAMS

JUNE 15, 1937—Ordered to be printed without illustrations

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LETTER OF TRANSMITTAL

FEBRUARY 3, 1937.

From Senior Engineer Porter J. Preston.
To Chief Engineer.
Subject: Colorado-Big Thompson project.

1. Transmitted herewith is a synopsis of the report of plan of development and cost estimate of the Colorado-Big Thompson project.

2. The plans and designs upon which the estimates are based are shown in the full report to follow this synopsis.

3. The detail estimates have been worked out in the Denver office under the following divisions:

Canals: H. R. McBirney.
Reservoirs: K. B. Keener.
Power: L. N. McClellan.
Hydraulics: E. B. Debler.

4. The field work was done under the supervision of M. E. Bunger.

5. The economic study was carried on by R. L. Parshall, senior irrigation engineer, Bureau of Agricultural Engineering, United States Department of Agriculture. This study is later proposed to be issued as a separate document.

PORTER J. PRESTON.

Revised synopsis of report submitted June 11, 1937.

LETTERS OF SUBMITTAL

JUNE 11, 1937.

Hon. HAROLD L. ICKES,
Secretary of the Interior.

MY DEAR MR. SECRETARY: There is attached hereto the portion of the report on the Colorado-Big Thompson project in Colorado covering the principles and stipulations governing the construction and operation of said project for the protection of the rights and interests dependent on the Colorado River in Colorado.

The provisions contained therein have been considered by the Northern Colorado Water Users' Association, representing the irrigation and other interests on the eastern slope in Colorado, and we respectfully submit that they are satisfactory and meet the approval of said association.

We ask that acknowledgment be made of this communication.

Respectfully yours,

NORTHERN COLORADO WATER USERS' ASSOCIATION,
CHAS. HANSEN, *President.*
MOSES E. SMITH, *Vice President.*
THOMAS A. NIXON, *Attorney.*

JUNE 11, 1937.

Hon. HAROLD L. ICKES,
Secretary of the Interior.

MY DEAR MR. SECRETARY: There is attached hereto the portion of the report on the Colorado-Big Thompson project in Colorado covering the principles and stipulations governing the construction and operation of said project for the protection of the rights and interests dependent on the Colorado River in Colorado.

The provisions contained therein have been considered by the Western Slope Protective Association, representing the irrigation and other interests on the western slope in Colorado, and we respectfully submit that they are satisfactory and meet the approval of said association.

We ask that acknowledgment be made of this communication.

Respectfully yours,

THE WESTERN SLOPE PROTECTIVE ASSOCIATION,
SILMON SMITH, *Secretary.*
CLIFFORD H. STONE, *Director.*
A. C. SUDAN,
Special Representative of Grand County.

SYNOPSIS OF REPORT, COLORADO-BIG THOMPSON PROJECT

OUTLINE OF CONSTRUCTION AND OPERATING CONDITIONS

The Colorado-Big Thompson project in Colorado contemplates the diversion of surplus waters from the headwaters of the Colorado River on the Pacific or western slope to lands in northeastern Colorado on the Atlantic or eastern slope greatly in need of supplemental irrigation water.

To accomplish this diversion, the following features are required:

ON COLORADO RIVER

(1) Storage on the Blue River in what is called Green Mountain Reservoir located about 16 miles southeast of Kremmling, Colo., where the Blue enters the Colorado River. This reservoir is to be used to replace water diverted to the eastern slope that would be required by prior rights along the Colorado River.

(2) A hydroelectric plant below the Green Mountain Dam to utilize the flow of the Blue River and water stored in the reservoir for the generation of electrical energy.

(3) A storage reservoir located on the Colorado River about 6 miles northeast of Granby, Colo., to be known as Granby Reservoir. This reservoir will store the flow of the Colorado at this point as well as water diverted from Willow Creek, a tributary of the Colorado and Strawberry and Meadow Creeks, tributaries of the Fraser River.

(4) A diversion dam located about one-half mile below the junction of the North Fork and Grand Lake outlet and about 3 miles south of the village of Grand Lake. This dam will create a lake known as Shadow Mountain Lake which will have the same elevation as Grand Lake and will aid in supplying the transmountain diversion tunnel with water pumped from Granby Reservoir. This lake together with Grand Lake is to be kept at nearly constant level.

(5) An electrically driven pumping plant on the shore of Granby Reservoir, where water will be pumped into a canal feeding Shadow Mountain and Grand Lakes. The length of the canal is 4½ miles.

(6) An outlet channel at the east end of Grand Lake connecting the lake with the portal of a transmountain diversion tunnel and provided with control features that will regulate the level of Grand Lake within a fluctuating range of 1 foot.

(7) A transmountain diversion tunnel under the Continental Divide 13.1 miles in length extending from Grand Lake to a point in Wind River about 5 miles southwest of Estes Park village.

ON EASTERN SLOPE

(8) A conduit 5.3 miles in length extending from diversion tunnel outlet to penstock of a power plant on the Big Thompson River just below Estes Park village. This conduit will be made up of buried

pipe, siphons, tunnels, and open canal. It will be entirely concealed through the area authorized to be taken into Rocky Mountain National Park.

(9) The waste rock from the tunnel is to be terraced and landscaped and all structures connected with the tunnel will be constructed to blend into their natural surroundings.

(10) A power plant known as power plant no. 1 constructed along the Big Thompson River just below the village of Estes Park utilizing the western slope water.

(11) Four additional power plants down the Big Thompson Canyon to utilize all available fall and also all water available for power in the Big Thompson River in addition to the western slope water diverted.

(12) A diversion dam on Big Thompson River about 12 miles west of Loveland to divert the water by means of a canal 9 miles in length to a storage reservoir known as Carter Lake.

(13) Carter Lake Reservoir located 8 miles northwest of Berthoud, Colo., to store water brought over during winter months. Water is released from this reservoir through a 4-mile canal into the Big Thompson River and through a 9-mile canal into the St. Vrain River for irrigation purposes.

(14) A siphon across the Big Thompson River, 9 miles west of Loveland, Colo., and a canal 10 miles in length to convey water from the fourth power plant to a storage reservoir, located about 5 miles west of Fort Collins, known as Horsetooth Reservoir.

(15) A canal from Horsetooth Reservoir to the Cache La Poudre River and extended north to a pumping plant which lifts water high enough to serve the North Poudre Canal.

(16) A storage reservoir near the mouth of Buckhorn Creek to be known as Arkins Reservoir, supplied from a canal diverting from the Big Thompson River just below the last power plant. It is to be used to aid in balancing the demands for power and irrigation, also storing excess water available in the Big Thompson River. Water will be released from the reservoir for supplemental irrigation in the South Platte area.

(17) Transmission lines connecting the Valmont steam plant of the Public Service Co. with all the hydroelectric plants contemplated, also connecting with the transmountain tunnel portals and the Granby and North Poudre pumping plants. The line connecting power plant no. 1 and Granby pumping plant will run east, and south of the outside boundaries of the Rocky Mountain National Park, crossing the Continental Divide at Buchanan Pass.

In order to carry out the construction, operation, and maintenance of the project as outlined above, it will be necessary to comply with the following requirements as agreed to by representatives of the eastern and western slopes in Colorado and here made as a part of this report.

MANNER OF OPERATION OF PROJECT FACILITIES AND AUXILIARY FEATURES

The construction and operation of this project will change the regimen of the Colorado River below the Granby Reservoir. The project contemplates the maximum conservation and use of the waters of the Colorado River, and involves all of the construction features

heretofore listed. In addition thereto certain supplemental construction will be necessary. This will be for the primary purpose of preserving insofar as possible the rights and interests dependent on this water, which exist on both slopes of the Continental Divide in Colorado. The project, therefore, must be operated in such a manner as to most nearly effect the following primary purposes:

1. To preserve the vested and future rights in irrigation.
2. To preserve the fishing and recreational facilities and the scenic attractions of Grand Lake, the Colorado River, and the Rocky Mountain National Park.
3. To preserve the present surface elevations of the water in Grand Lake and to prevent a variation in these elevations greater than their normal fluctuation.
4. To so conserve and make use of these waters for irrigation, power, industrial development, and other purposes, as to create the greatest benefits.
5. To maintain conditions of river flow for the benefit of domestic and sanitary uses of this water.

In order to accomplish these purposes the project should be operated by an unprejudiced agency in a fair and efficient manner, equitable to all parties having interests therein, and in conformity with the following particular stipulations:

(*a*) The Green Mountain Reservoir, or similar facilities, shall be constructed and maintained on the Colorado River above the present site of the diversion dam of the Shoshone power plant, above Glenwood Springs, Colo., with a capacity of 152,000 acre-feet of water, with a reasonable expectancy that it will fill annually. Of said capacity, 52,000 acre-feet of water stored therein shall be available as replacement in western Colorado, of the water which would be usable there if not withheld or diverted by said project; 100,000 acre-feet shall be used for power purposes; and all of said stored waters shall be released under the conditions and limitations hereinafter set forth.

(*b*) Whenever the flow in the Colorado River at the present site of said Shoshone diversion dam is less than 1,250 cubic feet per second, there shall, upon demand of the authorized irrigation division engineer or other State authority having charge of the distribution of the waters of this stream, be released from said reservoir as a part of said 52,000 acre-feet, the amount necessary with other waters available, to fill the vested appropriations of water up to the amount concurrently being diverted or withheld from such vested appropriations by the project for diversion to the eastern slope.

(*c*) Said 100,000 acre-feet shall be stored primarily for power purposes, and the water released shall be available, without charge, to supply existing irrigation and domestic appropriations of water, including the Grand Valley reclamation project, to supply all losses chargeable in the delivery of said 52,000 acre-feet of water, and for future use for domestic purposes and in the irrigation of lands thereafter to be brought under cultivation in western Colorado. It shall be released within the period from April 15 to October 15 of each year as required to supply a sufficient quantity to maintain the specified flow of 1,250 cubic feet per second of water at the present site of said Shoshone diversion dam, provided this amount is not supplied from the 52,000 acre-feet heretofore specified. Water not required for the above purposes shall also be available for disposal to agencies for the development of the shale oil or other industries.

(*d*) The cost of construction and perpetual operation and maintenance of said reservoir or reservoirs shall be a charge against the project and shall be paid from revenues collected from this project as may be provided in contracts between the Secretary of the Interior and the beneficiaries of the project in eastern Colorado, and any other contracting parties.

(*e*) In the event said reservoir or reservoirs are not maintained with a capacity of 52,000 acre-feet, the Secretary of the Interior should withhold the diversion of water from the western to the eastern slope of Colorado until such storage capacity is made available.

(*f*) The Secretary of the Interior shall have the option to require the transfer to the United States of any and all rights initiated or acquired by the appropriation or use of water through the works of the project in eastern Colorado, at any time: *Provided, however,* That the title so taken shall be subject to a beneficial use of such water as may be provided in the repayment contract or contracts; and the rights to store water to the extent of said 152,000 acre-feet shall be initiated, acquired, and held by the appropriate authorities for use in western Colorado, for replacement of water diverted to the eastern slope, and for other purposes contemplated for this project.

(*g*) The Secretary of the Interior shall operate this project in accordance with the following stipulations as to priorities of water use as between the parties claiming or using project water and within the limits of his legal authority. Said 52,000 acre-feet of replacement storage in Green Mountain or other reservoirs shall be considered to have a date of priority for the storage and use of replacement water earlier than that of the priorities for the water diverted or stored for delivery to the eastern slope. The 100,000 acre-feet of storage in said reservoir shall be considered to have the same date of priority of appropriation as that for water diverted or stored for transmountain diversion.

(*h*) Said Green Mountain Reservoir, or such other replacement reservoirs as provided in paragraph (*a*) herein, as are planned as a part of the project, shall be constructed at the same time as the other parts of the project and shall be completed before any water is diverted to the eastern slope of the Continental Divide by means of said project.

(*i*) Inasmuch as the State of Colorado has ratified the Colorado River Compact, and inasmuch as the construction of this project is to be undertaken by the United States, the project, its operation, maintenance, and use must be subject to the provisions of said Colorado River Compact of November 24, 1922 (42 Stat. 171), and of section 13 of the Boulder Canyon Project Act, dated December 21, 1928 (45 Stat. 1057–1064). Notwithstanding the relative priorities specified in paragraph (*g*) herein, if an obligation is created under said compact to augment the supply of water from the State of Colorado to satisfy the provisions of said compact, the diversion for the benefit of the eastern slope shall be discontinued in advance of any western slope appropriations.

(*j*) An adequate system, as determined by the Secretary of the Interior, shall be provided for the irrigation of the lands in the vicinity of Kremmling, now irrigated by either natural or artificial means, and the installation made therefor shall be a part of this project. The rights to the use of water for the irrigation of these lands shall be considered to have a date of priority earlier than that of the rights to the use of water to be diverted through the works of this project to the eastern slope. This system shall be designed and built in a manner requiring the least possible continuing annual expense for operation

and maintenance but the cost thereof shall not exceed $300,000; and said system shall be provided and in operation before any water is stored for transmountain diversion. In addition, the Secretary shall protect, add to, or improve the source of supply of domestic waters for the municipalities of Kremmling and Hot Sulphur Springs in the manner and to the extent which he may determine to be necessary to provide a source of supply not less than that now available for these municipalities. The cost of these features shall be included in the total project cost.

(*k*) To compensate Grand County for the loss of taxes through the transfer of property to the United States for the construction of this project, $100,000 shall be paid to said Grand County. This payment shall be made in 10 annual installments of $10,000 each, commencing upon the date when 10 percent of the total property in Grand County required for said project has been removed from taxation.

(*l*) The project and all of its features shall be operated in a manner determined by the Secretary of the Interior as necessary to provide the water to preserve at all times that section of the Colorado River between the reservoir to be constructed near Granby and the mouth of the Fraser River as a live stream, and also to insure an adequate supply for irrigation, for sanitary purposes, for the preservation of scenic attractions, and for the preservation of fish life. The determination of the need for and the amount and times of release of water from Granby Reservoir to accomplish these purposes shall be made by the Secretary of the Interior, whose findings shall be final.

In order to facilitate compliance with the stipulation in paragraphs (*j*), (*k*), and (*l*) hereof a representative may be selected and designated by the interests dependent thereon in Grand County, Colo., and when so designated he will be recognized as the official spokesman of said interests in all matters dealing with project operations affecting Grand County.

The principles and provisions expressed in these stipulations have been approved by the Western Colorado Protective Association, representing interests in western Colorado, and the Northern Colorado Water Users Association as evidenced by the letters hereto attached.

SUMMARY

The Colorado-Big Thompson project comprises 615,000 acres of irrigated lands, out of approximately 800,000 acres lying under the canal systems in the northern and northeastern portions of Colorado.

The water supply for the area is to be derived from a portion of 782 square miles of drainage area above Hot Sulphur Springs lying west of the Continental Divide in Grand County, Colorado, and varying in elevation from 8,050 to 14,000 feet.

HISTORY

The first irrigation in northeastern Colorado occurred about 1860 where the early settlers plowed out small ditches with sufficient grade and length to irrigate a few acres of land in the first bottom—i. e lands not far above the high-water line of the streams and adjacent to them.

The first irrigation of the higher or second bench lands along the Cache La Poudre River was by the Old Union Colony, of Greeley, in

1870. This colony was organized by Horace Greeley, then editor of the New York Tribune, who will be remembered here especially for his advice to eastern young men to "Go west and grow up with the country."

This colony irrigated about 12,000 acres under their first project and it was a success from the start, due in a large measure to the fact that they were people of considerable means and were then able to finance themselves over the period required to bring raw prairie land into profitable cultivation.

This colony was soon followed by others along the Poudre at Fort Collins, on the Big Thompson, at Loveland and the St. Vrain near Longmont.

The difficulties experienced by these colonists in distributing the water between them led to the creation of Colorado's irrigation laws which have been copied by most of the irrigation States of the West.

This irrigated area of six hundred to eight hundred thousand acres was developed by means of individual initiative and by small scale cooperative enterprises. Today there are 6,400 irrigated farms, served by 124 canals and ditches and 60 storage reservoirs.

IRRIGATION USE

In the early days irrigation in this area was confined to growing crops to supply local needs, the lack of transportation contributing to high prices for the home-grown production and prohibiting shipping to distant points. The crops grown were mainly the grains and hay for local consumption, with some vegetables. Such irrigation corresponded with the run-off of the streams.

As mining developed in the State, Denver and other towns grew into cities, and after these cities were connected to the East by railroads the markets demanded a more diversified agriculture to supply their needs. Thus a gradual demand developed for late water which the streams could not supply.

This change created a need for storing the flood waters for late irrigation. From 1890 to 1910 was a period of reservoir construction, during which storage was provided for all the available water supply of the streams over and above the direct irrigation requirements for the area here under discussion. Much of this development took place during a decade of more than normal run-off on the eastern slope and also during a period expanding the agricultural area throughout the West.

Attempts to maintain the area under cultivation with the depleted run-offs during the past 10 years have spread the water supply to such an extent that much acreage has had an insufficient water supply to produce full crops or crops producing the higher values. Attempts have been made to supplement the individual farm water supply by the development of the underground sources by pumping from numerous wells throughout the region. This is lowering the water table and already is affecting the water supply of the lower South Platte Valley which receives its irrigation supply largely from return waters.

NEED OF SUPPLEMENTAL WATER

Under such conditions only the older water rights have any assurance of an adequate water supply, and in the dryer years the owners of junior rights are forced to confine their farming to crops that can

be matured by the early flood flow or that require a minimum amount of water. In years when the supply is not correctly estimated considerable loss results. Ordinarily the crops raised in this and other irrigated areas do not compete with those grown under rainfall conditions, but a shortage of water always leads to the raising of more of the competing crops. Such crops also cut the income of the irrigation farmer below what he can earn with the higher type, noncompetitive crops.

On fully three-fourths of the 615,000 acres in this area the water supply is inadequate, in spite of every effort to conserve, store flood water, or otherwise add to the water supply that has been within the financial ability of the farmer. This inadequacy is due not only to a development probably too large for the period when run-off of the streams was much higher than at present, but to the fact that the last 10 years have seen a very marked decrease in the stream flow. It must be emphasized that the additional water supply here contemplated is to be used for a supplemental supply and not to create a large new additional irrigated acreage.

There has been expended in this area to date for various types of irrigation works, including nearly $750,000 for pumping plants, most of which have been installed in the last 10 years, about $35,000,000 against which there is an outstanding indebtedness of only $1,510,650. These people, however, have about reached their limit as individuals and mutual irrigation companies to provide for themselves a supplemental water supply so badly needed to make their present water supply secure and are obliged to seek Government aid to bring this about.

It has been conceded by a majority of the irrigation interests in this section of the State that the water supply in 1926 was ample for all their present acreage now irrigated. In order, therefore, to determine the normal shortage in acre-feet over a period of years a comparison of the supply in these years with that of 1926 was made and the difference obtained. These differences are set up in the following table:

TABLE 1.—*Showing water districts, acreage irrigated, deficiencies 1925 to 1935 with tentative allocation of total supplemental supply*

Water district no.	Area irrigated	1926 diversion, acre-feet	Average diversion, 1925-35	Difference, 1926, 11-year average required supplementary water in acre-feet	Tentative allocation of supplemental supply			
					Colorado-Big Thompson project water	Moffat and Jones Pass tunnel water return	Present seepage return, acre-feet	Total supplemental supply, acre-feet
(1)	(2)	(3)	(7)	(15)	(16)	(17)	(18)	(19)
3	213,640	530,000	398,000	132,000	104,000	----------	49,500	153,500
4	68,408	235,000	163,000	72,000	44,100	----------	21,000	65,100
5	81,806	113,000	94,000	19,000	38,800	----------	18,500	57,300
1	92,394	663,000	457,000	206,000	81,400	11,000	83,000	175,400
2	37,899	170,000	154,000	16,000	5,000	4,500	5,100	14,600
64	121,289	513,000	383,000	130,000	36,700	14,500	37,400	88,600
Total	615,436	2,224,000	1,649,000	575,000	310,000	30,000	214,500	554,500

It will be noted from column no. 15 that the total average shortage in this project area which comprises water districts 3, 4, 5, 1, 2, and 64 is 575,000 acre-feet. Column no. 16 is a tentative allocation of the proposed supplemental supply to the various districts. Column no. 18 is the estimated usable return flow that would arise from the addition of 310,000 acre-feet of new water to this area. Column no. 19 is the total usable supplemental supply amounting to 554,520 acre-feet, an amount within 5 percent of the 10-year average shortage. The sale or rental of supplemental water, when available, in the Poudre Valley has averaged $4.50 per acre-foot over a period of years. In extreme cases it has sold as high as $9 per acre-foot.

The deficiency in water supply for the period 1925 to 1934, inclusive, reflected a direct economic loss in crop production of approximately $42,355,000.

The following shows the approximate annual loss in value of crops because of inadequate water supply:

Sugar beets	$1,900,000
Alfalfa	948,000
Small grain	470,000
Beans	302,000
Corn	228,000
Potatoes	425,000
All other crops	444,000
Total	4,700,000

This average annual direct crop loss is about 19 percent of the $24,800,000 estimated cost of the Colorado-Big Thompson irrigation project.

The crop loss in 1934, due to shortage of water, as compared to 1926, after variation in price and acreage factors had been accounted for, amounted to $12,400,000, or just one-half the cost of the project.

The losses here given are the farm losses and do not include the losses that are due to processing, transporting, or handling of that quantity of production, which would add several million dollars to the loss of the community as a whole.

The effect of such inadequate water supply for the period 1925–35 is shown graphically on drawing no. 1 following.

SUPPLEMENTAL WATER SUPPLY

In 1929 the State engineers of Colorado, in cooperation with the Platte Valley Water Conservation League, and the United States Army engineers, made a comprehensive study of the water resources of the South Platte Basin in northeastern Colorado. This study included the Cache La Poudre River in water district no. 3, the Big Thompson River in water district no. 4, and the St. Vrain River in district no 5. The investigators determined the excess water available on these streams above present normal demands and also above the normal demands on the South Platte River proper below where these streams enter.

The investigators also determined the location, capacity, and cost of the most feasible reservoir sites for the storage of this excess water.

The results are shown in the following table and have been brought up to date by using the same demands for irrigation as set up in the report and using the water-supply records furnished by the State engineer's office.

Stream	Excess supply available for storage, average, 1918–35	Capacity proposed reservoir by Army engineers	Average annual yields at reservoirs	Total reservoir costs	Cost per acre-foot capacity	Cost per acre-foot yield
	Acre-feet	*Acre-feet*				
Cache La Poudre	30,000	52,000	25,500	$2,747,000	$72	$147
Big Thompson	16,000	32,700	11,300	2,006,000	61	178
St. Vrain	16,000	30,000	14,000	2,186,000	73	156

From the foregoing table it is evident that there is not sufficient excess water available that originates in this area to supply the demands for supplemental water, and the cost of making use of what is available is prohibitive. It will be shown, however, that 16,000 acre-feet of this surplus is available for storage in the Colorado-Big Thompson project reservoirs on the eastern slope with no additional cost.

The water users in northeastern Colorado have now exhausted every possible source of obtaining supplemental water or augmenting their present supply either by storage, transmountain diversion within their individual cooperative means, and by pumping. Fortunately, however, there exists a surplus of water on the headwaters of the Colorado River west of this area and separated from it by the Continental Divide.

In the spring of 1935, $150,000 was allocated to the Bureau of Reclamation to make surveys and prepare plans and cost estimates for bringing water from the headwaters of the Colorado River into the area in northeastern Colorado in need of supplemental water.

In August 1935 the Bureau of Reclamation started surveys for the project and previously there had been started a land classification to determine the irrigated and arable land in the Colorado River Basin in Colorado in order to arrive at the approximate amount of water now used in the area and how much might be used when full development has been made. Both surveys have been completed, insofar as this project is involved, and the following is the result of the land classification.

LAND CLASSIFICATION—COLORADO RIVER AREA

Since the quantity of water available for diversion from the headwaters of Colorado River might be limited now by the water rights of lands already irrigated, or might in the future limit in turn the development of lands in the Colorado Basin within the State, all the land on Colorado River and its tributaries above the Colorado-Utah line, except the Gunnison River area, has been classified to show the location and extent of irrigated lands and of lands capable of irrigation.

This classification was undertaken in all areas covered by former reports, supplemented by local information as to possible projects and by reconnaissance. For localities with no records of water supply it was assumed to exist unless the contrary was obvious, and doubtful areas were included rather than excluded from the classification. The land was measured by plane-table survey except some small isolated areas which were estimated.

Land that had customarily been irrigated was so classed, no matter how inadequate the supply. Land capable of irrigation was

tested according to a set of standards which fairly represent the experience on this area and others as to what constitutes arable land. Where pumping for irrigation was involved land was classified up to 200 feet above the source of supply.

The result of the survey of the irrigated and arable land appears in the following table.

It should be stated, that, as will be shown under the discussion of water supply which follows, the present irrigated area above the Utah State line does not limit the diversion possible at the location chosen. It is also true that the diversion when in operation, and replacing the summer flow of Colorado River in the manner contemplated by the project plan, will not limit the future development of all the arable land on Colorado River and its tributaries above Gunnison River.

Colorado River drainage—Gunnison excepted—Colorado (land classification according to streams)

Stream name	Irrigated	Arable	Total
	Acres	*Acres*	*Acres*
Colorado River:			
1. To Granby Dam	2,600	1,100	3,700
2. Granby Dam to Hot Sulphur Springs	1,300	350	1,650
3. Hot Sulphur Springs to Kremmling	3,200	1,200	4,400
4. Kremmling to Glenwood Springs	1,100	260	1,360
5. Glenwood Springs to Palisade	7,000	2,500	9,500
6. Palisade to State line	70,600	32,800	103,400
Total	85,800	38,210	124,010
Tributaries:			
Willow Creek	860	120	980
Fraser River	7,100	650	7,750
South Fork Colorado River	610	30	640
Small streams [1]	2,300	4,000	6,300
Williams Fork River	3,600	10,900	14,500
Troublesome Creek	4,200	7,200	11,400
Muddy Creek	4,900	5,100	10,000
Blue River	8,400	3,100	11,500
Small streams [2]	610	570	1,180
Sheephorn Creek	1,200	50	1,250
Piney Creek	790	50	840
Egeria Creek	5,700	9,300	15,000
Cabin Creek area	5,700	2,600	8,300
Catamount Creek	1,000	10	1,010
Sweetwater Creek area	1,100	380	1,480
Eagle River	16,400	5,000	21,400
Small streams [3]	930	60	990
Roaring Fork River	33,100	9,400	42,500
Garfield Creek	2,100		2,100
Elk Creek	3,000	130	3,130
Divide and Mam Creeks	13,700	9,100	22,000
Rifle Creek	11,100	3,200	14,300
Parachute Creek	1,700	370	2,070
Roan Creek	5,600	3,300	8,900
Plateau Creek	24,000	7,000	31,600
Small streams [4]	10,200	3,000	13,200
Grand total	256,300	122,830	379,130

[1] Above Hot Sulphur Springs.
[2] Between Hot Sulphur Springs and Kremmling.
[3] Between Kremmling and Glenwood Springs.
[4] Between Glenwood Springs and Palisade.

WATER SUPPLY

The stream flow records at the different stations in the Colorado River Basin show the amount of water passing the stations after all present irrigation has taken place above, so there is no need for any further adjustment of stream flow to take care of water consumed in this irrigation.

It is assumed that all arable lands as shown will be irrigated some time in the future, notwithstanding the fact that quite a percentage

is so located that it would never be feasible to irrigate. It is also further assumed that reservoirs would be built on the tributaries to conserve a portion of the flood flows to make the irrigation of these arable lands possible.

With the above assumptions it has been found that in a year like 1931, with the run-off only 40 percent of the average for a 31-year period, and the lowest year of record, the Colorado-Big Thompson project would only have to supply approximately 53,000 acre-feet to replace water diverted by the proposed project that could have been used by the Colorado River water users for power and irrigation, provided the project was in operation at that time.

The average run-off of the Colorado for the years of record are: Hot Sulphur, 31 years, 523,000 acre-feet; Glenwood Springs, including Roaring Fork, 3,413,000 acre-feet, Fruita, 6,300,000 acre-feet. These amounts are exclusive of supply consumed in present irrigation of Colorado River Basin lands.

The following is the estimated amount of water available for diversion from the drainage area above the Colorado-Big Thompson collection system at 8,260 feet elevation.

YIELD OF GRANBY RESERVOIR

Stream-flow records available on the Colorado River near the Granby Dam site for the years 1908–11 and 1935–36, and on Willow Creek for the years of 1935 and 1936, were supplemented by estimates based on available stream-flow records on the Colorado River at Hot Sulphur Springs and Glenwood Springs to cover the 37-year period, 1900 to 1936, inclusive.

A capacity of 482,000 acre-feet was selected as the best capacity for the Granby Reservoir, considering cost and use. Of this capacity, 20,000 acre-feet were set aside for dead storage to reduce pumping lifts for waters delivered to Shadow Mountain Reservoir. A further objective is to keep to the lowest practicable area the exposure of reservoir bed when storage is exhausted. This leaves an active capacity of 462,000 acre-feet.

Reservoir operating studies are based on the following conditions:

(*a*) Recorded (or estimated) past flows of Colorado River at Shadow Mountain and Granby Dams reduced by 27 percent prior to 1906, and 13 percent thereafter, of the flow of the North Fork at Grand Lake to allow for increasing diversions by the Grand River ditch.

(*b*) Willow Creek diverted to reservoir to the extent of 90 percent of the flow of Willow Creek and other streams intercepted by the diversion canal from May to October, inclusive, of each year.

(*c*) Strawberry, Meadow, and Walden Hollow Creeks also diverted whenever practicable. The flow of these streams, together with some additional waters capturable from Willow Creek at times, are expected to offset evaporation and seepage losses in excess of present losses from the Granby and Shadow Mountain Reservoir sites.

(*d*) No releases from Granby Dam for any reason.

(*e*) Transmountain tunnel to be operated at full capacity from October 1 until March 31 following, with operations thereafter gaged to fit run-off conditions so as to avoid spills and yet concentrate flows in the period of July 15 to September 15, for the purposes of best

distribution in power production and to minimize reregulating storage requirements on the eastern slope. The computations assumed infallible forecasts of run-off.

(*f*) A minimum storage hold-over of 100,000 acre-feet on September 30 of each year to assure dependable power production in winter.

Under these conditions, a yield of 320,000 acre-feet of primary water is secured as follows:

Unit 1,000 acre-feet

Run-off year (October to September)	Inflow to Granby Reservoir		Tunnel diversion	Spills	Shortages
	Colorado River	Willow Creek			
1899-1900	242.8	52.4	320.0		
1900-1901	246.9	53.4	320.0		
1901-2	164.9	34.7	255.1		64.9
1902-3	222.0	48.8	270.8		49.2
1903-4	253.5	51.2	304.7		15.3
1904-5	287.9	64.9	310.2		9.8
1905-6	292.4	58.7	320.0		
1906-7	381.0	78.3	320.0		
1907-8	190.6	25.6	320.0		
1908-9	323.8	91.5	320.0		
1909-10	200.1	32.5	320.0		
1910-11	268.5	53.6	320.0		
1911-12	350.4	79.3	320.0		
1912-13	215.4	40.3	320.0		
1913-14	371.0	85.1	320.0		
1914-15	223.2	43.8	320.0		
1915-16	249.5	47.8	320.0		
1916-17	348.3	79.7	320.0		
1917-18	322.9	81.2	356.4	18.7	
1918-19	189.6	36.4	323.0		
1919-20	361.2	78.4	345.6		
1920-21	347.9	90.7	368.6	70.0	
1921-22	196.8	39.5	320.0		
1922-23	280.3	60.2	320.0		
1923-24	262.2	54.4	320.0		
1924-25	202.6	36.7	320.0		
1925-26	346.4	70.0	320.0		
1926-27	275.0	54.8	320.0		
1927-28	317.5	61.9	338.3		
1928-29	297.1	61.2	358.3		
1929-30	247.4	42.9	320.0		
1930-31	171.5	36.6	320.0		
1931-32	243.9	48.0	320.0		
1932-33	239.6	54.5	320.0		
1933-34	128.9	26.2	320.0		
1934-35	209.2	41.8	252.5		67.5
1935-36	279.7	53.8	310.0		10.0
Average	263.6	55.4	318.7	2.5	5.5

Operating results cannot be expected to result so favorably. The operating conditions enumerated imply superhuman ability to forecast stream flow. Occasional releases will be required from Granby Reservoir although small in amount. Interruptions in tunnel operation cannot always be arranged so as to lose no water.

In view of these conditions, it is concluded that the firm yield of tunnel water from the Granby and Shadow Mountain Reservoirs should be taken as 300,000 acre-feet annually. Shortages of 5 percent may be expected on an average of once every 5 years and shortages of 25 percent may be expected on an average of once every 20 years. Secondary water may be expected to be available in some years in amounts up to 50,000 acre-feet.

EFFECT OF THE PROPOSED TRANSMOUNTAIN DIVERSION ON FUTURE WESTERN SLOPE DEVELOPMENT

Most of the diverted water is derived from the spring floods, when there is an excess of water over all present and future requirements along the Colorado River in the State. To permit full use of the inflow to the Granby Reservoir, Ranch Creek Reservoir may be constructed near Tabernash to store water locally surplus. The waters there conserved would in part be utilized to replace the waters withheld at Granby Dam, but the greater part of the conserved water would be used to augment irrigation supplies down to Hot Sulphur Springs and to maintain a satisfactory stream flow in this locality for recreational purposes.

With the region above Hot Sulphur Springs taken care of by the Ranch Creek Reservoir, the critical points along the Colorado River, from the standpoint of present and future use of water, are at Glenwood Springs, where the Shoshone power plant of the Public Service Co. uses present stream-flows up to 1,250 second-feet, and near Palisades at the head of the Grand Valley, where the Government high-line canal diverts water for irrigation and power purposes. The present irrigated area along the Colorado River between Palisades and the Colorado-Utah State line is 70,600 acres.

The additional arable area in this region, not now irrigated, is as follows:

	Acres
Under constructed canals	13,800
Pumping unit of Grand Valley project, for which canal capacity has been provided	10,000
Lands on Mack Flat, no present provision for water service	9,000
Total	32,800

Maximum irrigation demand at the head of the Grand Valley for the present irrigated area and for the additional area of 23,800 acres for which provision has been made in the constructed canals, is estimated as 1,700 second-feet, and this amount is being demanded in the pending adjudication proceeding.

With maximum irrigation demands there is a full water supply for the Orchard Mesa pumping plant and for the Grand Valley power plant. In the nonirrigation season the controlling requirement is for power with a total demand of 800 second-feet for power and for domestic needs under the higher canals. With the new area of 9,000 acres developed, the future demands are then estimated as 1,800 second-feet in the months of May to August, inclusive, tapering off uniformly to 800 second-feet on April 1 and on November 30.

In determination of the effect of the Colorado-Big Thompson transmountain diversion on the western slope, the past stream flows at Glenwood Springs and at the head of the Grand Valley were first depleted to show the resulting stream flows with the following developments:

(*a*) Full irrigation development of 276,000 acres of irrigated and arable lands along the Colorado River and tributaries above Palisades (the present irrigated area is 186,000 acres).

(*b*) Full development of Moffat Tunnel diversion from Fraser River and tributaries, Jones Pass diversion from Williams River, and Independence Pass diversion from the Roaring Fork, including

replacement storage so that these projects may divert all flows interceptible.

From the reconstructed flows, thus computed, there was subtracted the water estimated to be withheld at the Granby Reservoir site. The reductions in stream flow at Glenwood Springs and at the head of the Grand Valley, during those periods of each year when the resulting stream flows would be less than the future demands above described, then represents the effect of the project on the western slope if no replacement storage were provided. These computations were made for the years 1926 to 1936, inclusive, at Glenwood Springs, and for the entire period of record, 1902 to 1936, inclusive, at the head of the Grand Valley, with the following results:

Year	Shortages at Glenwood Springs (acre-feet)			Shortages at head of Grand Valley (acre-feet)		
	End of flood season, Oct. 31 [1]	Nov. 1 to flood season of following year [2]	Total	Before flood season in spring [3]	After flood season to Oct. 31	Total
1902	(4)	(4)		6,000	39,000	45,000
1903	(4)	(4)		3,000	12,000	15,000
1904	(4)	(4)		None	2,000	2,000
1905	(4)	(4)		None	14,000	14,000
1906	(4)	(4)		None	None	None
1907	(4)	(4)		None	None	None
1908	(4)	(4)		None	6,000	6,000
1909	(4)	(4)		None	None	None
1910	(4)	(4)		None	12,000	12,000
1911	(4)	(4)		None	1,000	1,000
1912	(4)	(4)		None	None	None
1913	(4)	(4)		None	7,000	7,000
1914	(4)	(4)		None	None	None
1915	(4)	(4)		None	9,000	9,000
1916	(4)	(4)		None	None	None
1917	(4)	(4)		None	None	None
1918	(4)	(4)		None	1,000	1,000
1919	(4)	(4)		None	7,000	7,000
1920	(4)	(4)		2,000	None	2,000
1921	(4)	(4)		None	None	None
1922	(4)	(4)		None	None	None
1923	(4)	(4)		None	None	None
1924	(4)	(4)		None	4,000	4,000
1925	(4)	(4)		None	None	None
1926	18,000	19,000	37,000	None	2,000	2,000
1927	7,000	32,000	39,000	None	None	None
1928	10,000	18,000	28,000	None	None	None
1929	None	20,000	20,000	None	None	None
1930	12,000	14,000	26,000	None	None	None
1931	37,000	16,000	53,000	1,000	27,000	28,000
1932	14,000	24,000	38,000	None	3,000	3,000
1933	23,000	21,000	44,000	5,000	15,000	20,000
1934	31,000	17,000	48,000	None	28,000	28,000
1935	20,000	15,000	35,000	2,000	11,000	13,000

[1] Encroachment on irrigation supplies.
[2] Encroachment on winter power waters.
[3] These shortages occur in years of late run-off when irrigation requirements rise faster than stream flow. Winter flows are always adequate Nov. 1 to Apr. 1.
[4] Not computed.

DIVERSION PLAN AND STRUCTURES

REPLACEMENT

In order to protect the water users in the Colorado River Basin against any depletion of their water supply by diversions through the Continental Divide tunnel to northeastern Colorado, a storage reservoir is planned on the Blue River about 16 miles southeast of Kremmling, Colo. This reservoir is to be known as the Green Mountain.

The dam site is located in the E ½ of sec. 15, T. 2 S., R. 80 W., sixth principal meridian, near the head of a box canyon, between Green and Little Green Mountains, caused by the river cutting through a porphyry sill. The foundation bedrock consists of sedimentary rocks, either Dakota sandstone or Morrison shales, and the intrusive porphyry.

The irrigation outlet capacity is 1,000 cubic feet per second, and the power outlet capacity is 1,500 cubic feet per second. The spillway capacity is 25,000 cubic feet per second.

The reservoir will flood 2,100 acres of land and will have a capacity of 152,000 acre-feet.

From the water-supply studies it was found, assuming that full development had taken place in the Colorado River Basin and that the Big Thompson project had been in operation the last 35 years, that in the year 1931, the lowest year of dependable run-off record, the Colorado Basin users above Glenwood Springs would have been shorted 37,000 acre-feet for irrigation use and the Public Service Co. would have been shorted 16,000 acre-feet at their power plant at Shoshone during the nonirrigation season, or a total shortage of 53,000 acre-feet. Accordingly, 50,000 acre-feet of Green Mountain storage have been allocated to replacement purposes for which the water users in northeastern Colorado will pay $1,500,000. The remaining 100,000 acre-feet are allocated to power and will be paid for out of power revenues.

Since the average shortage for both power and irrigation for the last 10 years, the lowest 10 years of run-off record is 36,000 acre-feet. There would be the 16,000 acre-feet difference, and a portion of the 100,000 acre-feet let out for power that could be used by the Colorado Basin users to supply shortages that might occur in their irrigation use in years of extreme low run-off, these shortages not being caused by the transmountain diversion.

The total estimated cost of the dam and reservoir is $3,776,032, $2,276,032 of which will be paid for from power revenues.

GRANBY RESERVOIR AND STORAGE

The storage of Colorado River waters for the project is to be made in what is known as Granby Reservoir which is located in Tps. 2 and 3 N., Rs. 75 and 76 W., sixth principal meridian, in Grand County, Colorado. The reservoir basin occupies the valleys of Stillwater Creek, the south fork or Arapaho Creek, and the main Colorado River.

The damsite is located about 4 miles northeast of the town of Granby, Colo., in the NE¼ of sec. 11, T. 2 N., R. 76 W., in Grand County, Colo. It is located at the head of a short canyon which the river has cut through pre-Cambrian rocks forming a spur of the main Rocky Mountain mass. At the damsite the canyon at river-bottom level is 200 feet wide, while at elevation 8,275 it is 720 feet in width.

The dam is to be a combination earth and rockfill structure with a maximum height of 223 feet. The outlet capacity is 300 cubic feet per second and the spillway capacity is 12,000 cubic feet per second.

With the high-water line at elevation 8,275 feet the reservoir has a capacity of 482,860 acre-feet, and will flood an area of 6,943 acres.

This reservoir will not only intercept the flow of the Colorado at that point, but the flow of Willow Creek will be intercepted near Dexter, Colo., and brought into the reservoir through a canal of 1,000

cubic feet per second capacity. Willow Creek enters the Colorado about 2 miles below Granby Dam.

It is estimated that Willow Creek will supply an average of about 60,000 acre-feet per year, and that the total estimated cost of this diversion is $733,203.

The storage in Granby Reservoir will also be augmented by the flow of Meadow and Strawberry Creeks, tributaries of Fraser River which enters the Colorado about 5 miles below the dam. The canal intercepting these two creeks will have a capacity of 500 cubic feet per second, and it is estimated they will produce an average of 12,000 acre-feet a year. The total estimated cost of this diversion is $133,600.

If water supply records kept in the future show there is sufficient water supply left in the Fraser River below the City of Denver's diversion, a canal could be taken out of it just below the mouth of St. Louis Creek near the town of Fraser, Colo., and extend from there to Granby Reservoir, intercepting Ranch, Meadow, and Strawberry Creeks on the way. A small regulating reservoir should be built on Ranch Creek above where the Canal intercepts it.

NORTH FORK DIVERSION DAM AND SHADOW MOUNTAIN LAKE

In order to divert the water of the North Fork of the Colorado into Grand Lake and thence to the channel extending from it to the west portal of the Continental Divide tunnel, it is planned to construct a concrete overflow dam 35 feet in height, above streamed, across the North Fork about one-half mile below its junction with the Grand Lake outlet.

The dam site proper is located in the NW¼ of sec. 19, T. 3 N., R. 75 W., and is a glacial morain cut through by the river.

The water backed up by this dam will form a lake called Shadow Mountain, the name of a nearby mountain, which will have a surface area of 1,356 acres. The elevation of this lake will be the same as Grand Lake and connected with it by means of the present outlet.

NORTH FORK DIVERSION DAM

The dam proper is a concrete gravity overflow spillway section, 90 feet long, with crest elevation at 8,370. This spillway is designed for maximum discharge of 1,800 cubic feet per second. On each side of the overflow section is a concrete gravity section containing three automatic siphon spillways on each side. The total spillway capacity is 9,400 cubic feet per second.

The total estimated cost is $483,928.

GRANBY PUMPING PLANT

As stated before, the water surface elevation of Granby Reservoir is 8,275 and the water surface of Shadow Mountain and Grand Lakes is 8,369. In order to get the water stored in Granby Reservoir into Shadow Mountain Lake and available for delivery through the Continental Divide tunnel, a pumping plant is located on the north shore of Granby Reservoir about one-half mile above the junction of the South Fork with the Colorado. A granite spur juts out into the reservoir site at that point making it ideal for the intake tunnels and a shaft for the pump.

The proposed pumping plant will contain three motor-driven vertical-shaft pumping units having a total capacity of 900 cubic feet per second with full reservoir and 550 cubic second-feet at low water. At normal water surface the capacity will be 870 cubic feet per second.

Each pump will be driven by a 6,500-horsepower synchronous motor.

Power will be delivered to the plant from a 69,000-volt transmission line extending from power plant no. 1 just below Estes Park, around the Rocky Mountain National Park, and crossing the Continental Divide at Buchanan Pass about 5 miles south of the park boundary.

The water from the pumps empties into a canal of 900 cubic second-feet capacity and runs by gravity into Shadow Mountain Lake. It is planned to operate this canal all winter when temperatures get as low as 40° below zero. The latent heat in the water and the friction heat absorbed from the pumps will prevent this water from freezing and will keep quite an area open after the water reaches Shadow Mountain Lake.

The total estimated cost of the pumping plant is $1,250,000.

The total estimated cost of the pump canal is $417,553.

CONTINENTAL DIVIDE TUNNEL

The west tunnel portal is connected with Grand Lake by means of a channel constructed 67.5 feet in width and 15 feet in depth. At the lake end of this channel a permanent concrete barrier or weir will be placed with a crest elevation at 8,368 which would be the minimum elevation to which the water in Grand Lake could be drawn. Since the barrier is so constructed that it requires the water to be 1 foot in depth over it to supply the normal capacity of the tunnel, the normal elevation of Grand and Shadow Mountain Lakes would be 8,369 feet.

The present maximum fluctuation of Grand Lake is about 4 feet, or from an elevation of 8,368 in winter to 8,372 feet during the peak run-off from melting snow. The automatic control gates at the North Fork Diversion Dam and at tunnel inlet will so control the elevation of the water surface in Grand Lake that it would never fluctuate more than 1 foot.

The Continental Divide tunnel extends from the easterly end of Grand Lake to Wind River, southwest of Estes Park, with an azimuth of 242° 20′ 30″, and length of 69,023 feet. It is to be horseshoe shape 9.5 feet in diameter and lined throughout with a 9-inch concrete lining.

It will be located entirely in pre-Cambrian rock consisting of the Longs Peak and related granites and the gneisses and schists of the Idaho Springs formation. The granites are strong massive rocks. Gneisses predominate over schists and only a small proportion have prominent and continuous cleavage planes. The proportion of granite to gneiss and schist is approximately 4 to 1.

From a detailed geological survey of the tunnel and comparing it with conditions actually encountered in the Moffat Railroad tunnel, which was built under the Continental Divide for the Denver & Salt Lake Railroad, and about 25 miles due south of this one, it was estimated there would be only 400 feet of bad ground and 5,200 feet of ground needing support. However, for purposes of estimate, it was figured there would be 6,900 feet of bad ground and 17,500 feet of ground needing support.

The total estimated cost is $7,271,371.

POWER CONDUIT NO. 1

Power conduit no. 1 extends from the east portal of the Continental Divide tunnel in Wind River to the penstock of power plant no. 1 on the northeast slope of Prospect Mountain.

Both ends of the Continental Divide tunnel are without the national-park boundaries but the area east of the east portal is authorized by Congress to be taken in, through that area. The water will be taken through a closed conduit consisting of a 10-foot reinforced concrete pipe completely buried. The total length of power conduit is 5.36 miles, of which 1.86 miles is closed conduit, 1.19 miles is concrete lined tunnel, 0.98 mile is siphon, and the remainder is open canal.

The total estimated cost of power conduit no. 1 is $1,101,000.

POWER PLANT NO. 1

Power plant no. 1 will be located on the south bank of the Big Thompson River about one-half mile east of Estes Park. It will contain two 15,000 kilovolt-ampere generating units with auxiliaries. Each unit will consist of a vertical-shaft, single-runner, spiral-casing type hydraulic turbine operating under an effective head of 705 feet direct connected to a 15,000 kilovolt-ampere water-wheel type generator. A complete description with cost estimate will be found in Power and Pumping Summary.

Until there has developed a sufficient market for power to justify the construction of power plants nos. 2 and 3, the water will be turned into the Big Thompson at power plant no. 1 and carried by that stream to a diversion dam located in SE¼ sec. 1, T. 5 N., R. 71 W., about midway between the present diversion dam and power plant for the town of Loveland, Colo.

POWER CANAL NO. 4

From this diversion dam the water will be carried in a canal of 750 cubic second-feet capacity on the south side of the stream a distance of 4.93 miles to a point just above the mouth of the Big Thompson Canyon. At this point a portion of the water will drop direct into the Big Thompson River to supply the supplemental water demands of that stream and a portion will be siphoned across to elevation 5,450 to supply the canal going to the Poudre River, which will be described later. Power plants nos. 4 and 4–A will be constructed at this point to take advantage of a fall of 550 feet into the Thompson and 358 feet to the Poudre Canal when the power market justifies.

CARTER LAKE SUPPLY CANAL

About 3.07 miles below the diversion dam mentioned above, a canal of 300 cubic feet per second takes off toward the south and supplies Carter Lake.

This canal is 8.78 miles in length, of which 7,040 feet is tunnel 1,878 feet siphon, and the remainder is open canal.

The estimated cost of this supply canal is $710,629.

CARTER LAKE RESERVOIR

This site is located in Ts. 4 and 5 N., R. 70 W., of sixth principal meridian, about 1 mile north and 7 miles west of Berthoud, Colo.

The reservoir will occupy a valley about 2¾ miles long and from one-half to 1 mile wide. The northern portion of the area is a natural

basin called Carter Lake. This lake dried up during the last 5 drought years, for the first time within the memory of the white settlers.

The proposed maximum water surface in the reservoir is at elevation 5,760 with a capacity of 111,963 acre-feet. The area of high water line is 1,150 acres. For this water surface three dams will be required. Dam no. 1 is located at the natural outlet of the valley and will contain the outlet works for the reservoir; the other two dams will occupy saddles. These dams are earth and rock fill; the main dam is 243 feet high, and the saddles 43 and 48, respectively.

The capacity of the outlet to St. Vrain supply canal is 300 cubic feet per second, the outlet to the Big Thompson has a capacity of 1,000 cubic feet per second.

The total estimated cost of the reservoir is $1,822,202.

ST. VRAIN FEEDER CANAL

A canal of 300 cubic feet per second capacity will extend from the small outlet of Carter Lake to the St. Vrain, reaching the St. Vrain high enough to supply all ditches.

The length of this canal is 9.76 miles with 3,445 feet in tunnel, 1,575 feet of siphons, and the remainder open canal.

The estimated cost of the St. Vrain feeder is $368,951.

BIG THOMPSON FEEDER

About one-half mile below Carter Lake Dam a canal will be taken out of the draw leading from the dam, and will run into Cottonwood Creek, a tributary of the Big Thompson. This canal will have a capacity of 1,000 cubic feet per second and be 5.37 miles in length.

The cost is estimated at $155,246.

HORSETOOTH SUPPLY CANAL

This canal starts at the end of a siphon across the Big Thompson from power conduit no. 4. This water will pass through power plant no. 4–A when constructed. The canal starts at elevation 5,450 with a capacity of 250 cubic feet per second. The structures, however, are designed for a capacity of 400 cubic feet per second on the theory that some time in the future it might be necessary to increase the capacity of the canal to that amount. The length of this canal is 9.88 miles, of which 12,863 feet is tunnel, 3,296 feet is siphons, and the remainder open canal.

The elevation of 5,450 was chosen because it not only puts the water above all present diversions on the Poudre River, but it afforded the most direct and economical route.

The estimated cost of this feeder is $1,208,391.

HORSETOOTH RESERVOIR

The proposed Horsetooth Reservoir will occupy a valley 6 miles long and from one-quarter to three-quarters miles wide, extending in a north-south direction, formed by the erosion of soft red beds of Lykens formation between harder ridges of Lyons on the west and Dakota sandstone on the east. There are three natural outlets to the east through the Dakota hogback, namely, Soldier, Dixon, and

Spring Canyons, which are the sites of three proposed dams of the same names. The fourth proposed dam, Horsetooth, will cross the valley at the north end on a low saddle separating the valley from drainage to the north into the Poudre River. The outlet will be through the Horsetooth Dam saddle. There are no outlets through the other dams. The proposed water surface is at 5,400 feet in elevation which gives a capacity of 96,756 acre-feet. The area flooded will be 1,513 acres. The outlet capacity was designed for 1,200 cubic feet per second with reservoir full. This large capacity is necessary as the irrigation use requires that the entire amount of supplemental water be delivered at a rate that would supply it in 60 days.

The advantages of a reservoir at this point are: It is high enough to supply all users from the main Cache La Poudre River and is located close to it. It takes the place of 6 miles of canal through rough country and allows a canal of 250 cubic second-feet to be constructed from the Big Thompson instead of one for 1,000 cubic feet per second.

The estimated cost of the reservoir is $3,625,021.

POUDRE FEEDER CANAL

From the outlet of Horsetooth Reservoir a canal of 1,000 cubic second-feet capacity will extend north to Lewstone Creek, a tributary of the Poudre. The water will run down this creek to the Poudre above all the diversions except the Poudre Valley.

POUDRE VALLEY FEEDER CANAL

A canal will extend from Lewstone Creek to the Poudre Valley Canal about 1 mile below its headgate, crossing the Poudre River in a siphon. This canal will have a capacity of 400 cubic feet per second to take care of the supplemental demands of the Poudre Valley Canal and also the demands of the North Poudre irrigation district. The total length of the two canals is 5.48 miles.

The cost of the Poudre Feeder and Poudre Valley Canals is estimated at $632,843.46.

NORTH POUDRE FEEDER CANAL

It is planned to enlarge the Poudre Valley Canal for a distance of 3.58 miles from the point the supply canal enters to the location of the pumping plant for the North Poudre district. This will enlarge the canal from a capacity of 500 to 750 cubic feet per second and the estimated cost is $11,436.

NORTH POUDRE PUMPING PLANT

This pumping plant, constructed on the banks of the Poudre Valley Canal, will consist of two 75 cubic second-feet capacity vertical synchronous motor driven single stage pumps, operating against an effective head of 187 feet.

The estimated cost is $200,000.

NORTH POUDRE FEEDER CANAL

This canal of 150 cubic second-feet capacity extends from the pressure outlets of the pumping plant to the North Poudre Canal, a distance of 9.98 miles.

The estimated cost is $128,889.

ARKINS RESERVOIR

This reservoir is located on Buckhorn Creek, a tributary of the Big Thompson, in Tps. 5 and 6 N. R. 70 W., sixth principal meridian, and about 8 miles northwest of Loveland, Colo. The object of this reservoir is to provide storage for Colorado River waters brought over in the wintertime and to be used to supply supplemental water on the lower South Platte in water districts 1, 2, and 64. It will also serve in connection with the use of the 16,000 acre-feet of floodwater now available on the Big Thompson.

The bringing of more of the supplemental water over in the wintertime aids materially in the production of a maximum amount of power out of the waters of the Big Thompson River. For that reason the entire cost of the inlet to Arkins Reservoir and one-half the cost of the reservoir itself is assessed against power and paid for out of power revenues from plant no. 1.

The capacity of Arkins Reservoir is 50,000 acre-feet with a high water line at 5,275 feet elevation and floods 929 acres of land.

The dam site occupies a notch cut through the Dakota sandstone ridge by Buckhorn Creek.

The main dam is an earth- and rock-fill structure 155 feet in height with an outlet capacity of 650 cubic feet per second and a spillway of 10,000 cubic second feet capacity.

There is a saddle dam, in addition to the main dam of earth- and rock-fill construction, 50 feet maximum height, built across a saddle at the southern extremity of the reservoir.

The total estimated cost of the reservoir and dam is $1,740,737.

The estimated cost of the Arkins Reservoir inlet is $351,488.

This inlet diverts from the Big Thompson River just below the dam of the Handy Canal and follows around the north side of the river a distance of 2.33 miles to Arkins Reservoir.

ROCKY MOUNTAIN NATIONAL PARK

Every effort has been made in the survey and design of this project to not disturb the natural beauties of the Rocky Mountain National Park and its surrounding areas. The Continental Divide tunnel was lengthened 1.6 miles in order that its extremities should fall outside the boundaries of the park. The conduit leading from the east portal of the tunnel to power plant no. 1 is to be buried and the surface landscaped through the area authorized by Congress to be added to the park. The waste from the east portal of the tunnel placed in this area is to be terraced and planted with evergreen trees. The waste from the west portal is to be used to fill up some low areas and render the area suitable for the building of summer homes.

The approach to the Western Gateway of the Rocky Mountain National Park will be along the shores of Shadow Mountain Lake with

its fluctuation of only 1 foot instead of the swampy area that now breeds mosquitoes and exposes mud flats in low water.

The bill authorizing the creation of the Rocky Mountain National Park reserved the right for the Bureau of Reclamation to survey and construct an irrigation project within the boundaries of the park.

OPERATION OF THE SYSTEM

IRRIGATION PROJECT OPERATIONS

The system is planned and it is anticipated that it will be operated in a manner to have the water available in Carter Lake, Horsetooth and Arkins Reservoirs available by July 1, to the full capacity of those reservoirs, 256,000 acre-feet. The usual demand for supplemental water begins July 1 to 15 and extends to September 15 to 30. The outlets of the reservoirs are planned to deliver the water from the reservoirs in 60 to 75 days, including the water that must pass through them for direct delivery that may be in the way of being transferred from the Colorado River Basin to the eastern slope during the period of irrigation application. The balance of the 310,000 acre-feet, or 54-000 acre-feet, will be available for direct irrigation use as brought over during the above period or to some extent may be required prior to July 1.

The run-off of the waters of the Colorado River here contemplated to be used will largely be secured from the melting snows during May, June, and early July and stored in the Granby Reservoir. During the fall of that year, winter and spring of the following year, the water will be transferred from the Granby Reservoir through the Continental Divide tunnel at a uniform rate and restored in the Carter Lake, Horsetooth, and Arkins Reservoirs. This will permit a flow that is well suited to the development of firm power through the five power plants that will eventually be constructed along the Big Thompson as shown on the map of the general layout.

Granby Reservoir will act as a hold-over reservoir to carry the water from years of excessive run-off to years of subnormal flow.

POWER PROJECT OPERATION

Water will be carried through the Continental Divide tunnel at a uniform flow for the generation of power at the several power plants, except that the quantity will be reduced during the summer season when some water from the Big Thompson is available for power purposes in power plants nos. 2, 3, 4, and 4–A. At this period there will be little or no demand for power for pumping at the Granby pumping plant, which will permit the cutting down of the quantity of water to take care of the commercial power load.

It is planned to construct the Granby pumping plant and the Granby pump canal 150 percent of the capacity of the Continental Divide tunnel. This will permit the operation of the pumping plant at full capacity with off-peak power, and reduce the amount of pumping with firm power. The varying discharge of the pump ditch during the 24-hour period will be equalized by the Shadow Mountain and Grand Lakes, so that a uniform discharge will be maintained through the Continental Divide tunnel. The range in height of water surface in Shadow Mountain and Grand Lake to equalize this

flow will not exceed two-tenths of a foot, and will be greatest in the winter and early spring months.

There is an average of 16,000 acre-feet of surplus water on the Big Thompson available for storage in the system mainly in May and June. In order to take this water into the reservoirs it will be necessary to reserve capacity in the three reservoirs on the eastern slope until toward the latter part of June. The snowfall, the main source of this water supply, will be known well in advance so that operations of the several parts of the system, including the production of power at the several power plants, can be adjusted to take care of this water and hold back an equal amount in Granby Reservoir.

TENTATIVE PROJECT FINANCIAL SET-UPS

This proposed development consists of two projects: first, the irrigation project, and second, the power project.

It is planned that those features of the development that are used mainly for irrigation are grouped under the irrigation project set-up, while those used entirely, or are made of a greater capacity because of power development, are grouped in whole or in part in the power project set-up.

IRRIGATION PROJECT

The following major features with their appurtenant structures are given with the estimated field costs including 10 percent for engineering and 15 percent for contingencies. The full capacity of Arkins Reservoir is necessary to develop a larger portion of firm power than would otherwise be possible without it. At the same time, a reservoir of half its capacity or additional capacity in Horsetooth or Carter Lake Reservoirs would be necessary to provide capacity to deliver the irrigation water as needed. It is, therefore, deemed equitable to divide the cost of this reservoir equally between the irrigation and power projects.

The Green Mountain Reservoir, with a capacity of 152,000 acre-feet, is larger than is necessary to furnish replacement for a like amount of water diverted by the project above Granby Dam at a time when it would be required for irrigation, present and future, and to furnish the Shoshone power plant 1,250 second-feet or such lesser amount that they would be entitled to receive if the proposed project was not operating. From studies made, it appears that 50,000 acre-feet will be sufficient to replace all the water that the proposed project will take at a time when required for use lower down in the stream within the State. Therefore 52,000 acre-feet of the Green Mountain Reservoir capacity is allocated for replacement (including evaporation losses) and charged to the irrigation project. The balance of the capacity or 100,000 acre-feet is allocated to the power project and is to be paid for out of power revenues.

The following is a summary of the irrigation project costs:

Estimated cost chargeable to irrigation feature

Willow Creek feeder canal	$733,203
Granby Reservoir	2,813,703
Granby pumping plant	1,250,000
Granby pump canal	417,553
North Fork diversion dam	483,928
Continental Divide tunnel	7,271,371

Estimated cost chargeable to irrigation feature—Continued

Carter Lake supply canal		$710, 629
Horsetooth supply canal		1, 208, 391
St. Vrain feeder canal		368, 951
Big Thompson feeder canal		155, 246
Poudre feeder canal		632, 843
Poudre Valley feeder canal		11, 436
North Poudre feeder canal		128, 889
North Poudre pumping plant		200, 000
Horsetooth Reservoir		3, 625, 021
Arkins Reservoir		1, 859, 323
Carter Lake Reservoir		1, 925, 253
Green Mountain Reservoir (52,000 acre-feet replacement) (100,000 acre-feet for power)		3, 776, 032
Improvement of Colorado River above Kremmling to maintain fishing and to adjust the present irrigation system to the altered conditions		300, 000
		27, 871, 772
Less the following items tentatively chargeable to power:		
One-half cost of Arkins Reservoir	$929, 661	
Portion of cost of Green Mountain Reservoir for 100,000 acre-feet	2, 276, 032	
		3, 205, 693
Cost of irrigation features		24, 666, 079
Say		24, 800, 000

REPAYMENT

Twenty-four million eight hundred thousand dollars upon 310,000 acre-feet at $80 per acre-foot.

Two dollars per acre-foot on 40-year repayment basis.

In the above repayment is predicated upon the contracts to be made upon a basis of 310,000 acre-feet. Beside the 320,000 acre-feet available from the Colorado River drainage there is an average of 16,000 acre-feet available for storage on the Big Thompson, making 336,000 acre-feet in all, leaving 26,000 acre-feet for losses on the eastern slope and for the uncertain, heretofore mentioned in operations on the western slope.

The power costs are shown under the heading "Power and pumping system."

The construction of power plant no. 1 as shown in the power set-up is a necessary development in order to secure power for pumping purposes at the Granby pumping plant.

POWER AND PUMPING SYSTEMS

The ultimate power and pumping system is proposed to consist of the major pumping plant at Granby, power plant no. 1 near the town of Estes Park, power plant no. 2 near Drake post office, power plant no. 3 at Cedar Cove, power plants nos. 4 and 4–A near the mouth of the Big Thompson Canyon, and power plant no. 5 at the Green Mountain Reservoir. If conditions justify, there may also be a pumping plant on the Poudre River near the point where the proposed Poudre supply canal crosses the river. Power plant no. 5, Granby pumping plant, and power plant no. 1, would be interconnected by a single circuit 69,000-volt transmission line. Power p ants nos. 1 to 4–A, inclusive, would be interconnected by two 115,000-volt transmission lines and these same lines would extend to one or more load centers where the power could be disposed of commercially.

The buildings for the power and pumping plants would be of reinforced concrete construction of suitable size to house the machinery and provide space for such facilities as would be required for efficient and economical operation. For scenic reasons, special care would be taken in the architectural design of the buildings to make them blend in with the beauties of the surrounding territory so as to be both as inconspicuous as possible and also as artistic as feasible without undue expenditure. An artist's sketch of one of these buildings is included with the report.

Following is a tabulation covering the essential data for each of the power and pumping plants:

Power plants

Plant designation	Effective head in feet	Turbine capacity in cubic feet per second	Power available in horsepower	Number of units	Size of each unit in horsepower	Installed power in kilowatts
No. 1	704	550	38,800	2	20,000	30,000
No. 2	1,195	550	65,800	2	34,000	50,000
No. 3	328	550	18,000	2	9,000	13,500
No. 4	550	400	22,000	1	22,000	16,000
No. 4-A	381	250	9,500	1	9,500	7,000
No. 5	225	1,500	33,800	2	17,000	26,000
Total installed power in kilowatts						142,500

Pumping plants

Plant designation	Head in feet	Pump capacity in cubic feet per second	Capacity of each pump in cubic feet per second	Number of pumps	Rating of each motor in horsepower	Power required in kilowatts
Granby	130	870	290	3	6,500	15,000
Poudre	187	150	75	2	2,000	3,000
Total installed pumping, kilowatts						18,000

POWER PLANT NO. 1

Power plant no. 1 will be located on the south bank of the Big Thompson River about one-half mile east of the village of Estes Park and will contain two 15,000 kilovolt-ampere generating units with auxiliaries. Each unit will consist of a vertical-shaft, single-runner, spiral casing type hydraulic turbine operating under an effective head of approximately 705 feet and direct connected to a 15,000 kilovolt-ampere water-wheel type generator with direct connected exciter and pilot exciter. Water would be supplied to each turbine through a steel penstock approximately 5,000 feet long, with synchronous bypasses provided so that the flow through the penstock can be discharged either through the turbines or the bypasses into the Big Thompson River. The bypasses will be mechanically connected to the turbine gate operating mechanism so that rapid governing of the units under varying load conditions can be effected without creating excessive water hammer. Trashracks with shut-off gates for

each penstock will be provided in the forebay structure. The headgates will be controlled from the power plant. A spillway will be provided to care for the flow when the headgates are closed and the penstocks inoperative. The plant will be equipped with all necessary auxiliaries, including a traveling crane for handling the large pieces of equipment. A small machine shop will be provided for making minor repairs. An outdoor type substation with self-cooled transformers will be provided for stepping the voltage up to 69,000 for transmission to the Granby pumping plant, and to 115,000 volts for transmission to commercial markets. The substation structure will be of the conventional structural steel type with high voltage oil circuit breakers, lightning arresters and necessary auxiliaries. The control of the oil circuit breakers will be from the main power plant switchboard. Operators' quarters, a warehouse, and a large machine shop for general project repairs will be provided in the vicinity of the power plant.

POWER PLANT NO. 2

Power plant no. 2 will be located about one-half mile northwest of Drake, on the south bank of the north fork of the Thompson River just above its junction with the Big Thompson. The plant will contain two 25,000-kilovolt-ampere generating units of the horizontal shaft type. The net head will be approximately 1,195 feet. Each unit will consist of a double overhung impulse wheel hydraulic turbine with the generator mounted in the center, between the two runners. A direct connected exciter and pilot exciter will be mounted at one end. Water will be delivered to the turbines through two steel penstocks about 4,150 feet long. Each penstock will be provided with two branches to the turbine nozzles and each branch will be provided with a synchronous bypass arranged so that the flow through the penstock can be discharged through either the nozzles of the bypasses to the river. The bypasses will be mechanically connected to the turbine nozzle operating mechanism so that rapid governing can be effected under varying load conditions without excessive water hammer. The head-gate structure will be provided with trash racks and sliding gates at the end of the penstocks and a spillway to care for the flow when the gates are closed. The plant will be complete with all necessary auxiliaries for station service requirements and with a crane for handling the machinery. A structural steel outdoor type substation will be provided with self-cooled transformers for stepping the voltage to 115,000 volts, and with outdoor type oil circuit breakers, lightning arresters, and other necessary auxiliaries. The operation of the substation will be handled from the main switchboard of the power plant. Quarters for the operators will be provided adjacent to the power plant.

POWER PLANT NO. 3

Power plant no. 3 will be located about one-half mile east of the Loveland power-diversion dam on the north bank of the Big Thompson River. The plant will contain two 6,500 kilovolt-ampere generating units, each consisting of a vertical hydraulic turbine direct connected to a generator with main exciter and pilot exciter. The effective head will be approximately 328 feet. Water from the head-gate structure will be delivered to the turbines through steel

pen stocks about 650 feet long. Each pen stock will be provided with a synchronous bypass arranged so that the flow through the pen stock can be discharged either through the turbines or the bypasses to the Big Thompson River, and to allow rapid governing of the units without excessive water-hammer. The head-gate structure will be provided with trash racks and sliding gates at the head of the pen stocks and a spillway to care for the flow when the gates are closed. The plant will be complete with all necessary auxiliaries for station-service operation, and with a crane for handling equipment. The plant will be provided with a structural-steel outdoor-type substation similar to that proposed for plant no. 2.

POWER PLANTS NOS. 4 AND 4–A

Power plant no. 4 will be located about 2 miles east of Cedar Cove on the south bank of the Big Thompson River, while power plant no. 4–A will be located a short distance upstream from plant no. 4, and at an elevation about 175 feet above the river. The capacity of plant no. 4 will be 16,000 kilovolt-amperes and of plant no 4–A, 7,000 kilovolt-amperes. One unit only will be provided at each plant and will consist of a vertical-shaft, single-runner, spiral-casing type turbine direct connected to a vertical water wheel generator with direct connected main and pilot exciters. Plant no. 4 will have an effective head of about 550 feet, and plant no. 4–A, 380 feet. Plant no. 4 will receive its water through a single steel penstock about 1,960 feet long, and plant no. 4–A, through a similar pipe about 1,400 feet long. Each plant will be provided with synchronous bypasses similar to those in plants nos. 1 and 3. Plant no. 4 will discharge directly into the Big Thompson River. Plant no. 4–A will be siphoned under the river through a pressure tunnel to the proposed Poudre supply canal, but will have provisions so that if so desired, the water may be discharged directly into the Big Thompson River. The headgate structure will be provided with trashracks, sliding gates, and spillways similar to those in plants nos. 1, 2, and 3. A single outdoor structural steel type switchyard will be provided for the two plants. The equipment in this substation will be similar to that for plants nos. 1, 2, and 3. Plant no. 4–A will be remotely controlled from plant no. 4, so that the two plants can be operated with one set of operators. The plant will be complete with auxiliaries and cranes similar to that in other plants. Quarters for the operators will be provided in the vicinity of the plants.

POWER PLANT NO. 5

Power plant no. 5 will be located about 12½ miles southeast of Kremmling, on the east bank of the Blue River, immediately downstream from the dam forming the proposed Green Mountain Reservoir. The plant will contain two 13,000 kilovolt-ampere generating units of the vertical hydraulic-turbine driven type, with direct connected generator with main and pilot exciters. The plant will have a varying head depending upon reservoir water surface, but it is expected that the average head will be about 225 feet. The trashrack and intake structure will be located immediately upstream from the dam and a single steel penstock installed in the tunnel will conduct the water to the power plant. Each turbine will be provided with a

pressure regulator or relief valve to limit the water hammer under sudden change of load conditions. The plant will be complete with necessary auxiliaries for station service, a small machine shop for minor repairs, and a crane for handling equipment. An outdoor structural steel substation will be provided complete with equipment for stepping the voltage up to 69,000 volts for transmission and with oil circuit breakers and other necessary auxiliaries for the control and protection of the lines and equipment. The oil circuit breakers will be controlled from the main switchboard of the power plant. Quarters for operators will be constructed in the vicinity of the power plant.

GRANBY PUMPING PLANT

The Granby pumping plant will be located approximately 6 miles south of the village of Grand Lake on the north shore of the proposed Granby Reservoir. The plant will contain three motor-driven vertical-shaft pumping units having a total capacity of 900 second-feet at full reservoir, and 550 second-feet at low water. The total capacity at the normal water surface will be approximately 870 second-feet. The motors will be of the synchronous type and arranged for semi-magnetic operation. That is, the operator will be required only to close the main switch to the unit in order to place it in operation, and to open the same switch to discontinue operation. The motors will be equipped with direct connected exciters. The water from the Granby Reservoir will be delivered to the pumps through tunnels about 155 feet long. A channel in the reservoir will convey the water to the mouth of the intake tunnels in extreme low water. Water from each pump will be discharged through about 175 feet of tunnel, and 165 feet of steel pipe to the canal at elevation approximately 8,381. This canal, which will be approximately 4 miles in length, will discharge into the proposed Shadow Mountain Lake. The center line of each pump and propeller will be at approximately elevation 8,145, with the base of the motor driving the pump 135 feet above, or at elevation 8,280. Vertical shafts in the rock between the underground pump room and the motor room on the surface will accommodate the shafts connecting the pumps to the motors. Each pump will have a capacity of 290 second-feet when operating under a total dynamic head of 130 feet and will be driven by a 6,500-horsepower synchronous motor.

The entrances to the intake tunnels will be provided with trashrack and stop-log structures, and sliding gates will be installed at the intake and discharge of each pump. The intake gates will be located in the gallery adjoining the pump room and will be hydraulically operated. The discharge gates will be located at the head of the canal and will be of a type which will close automatically in the event power service is interrupted, so as to prevent water in the canal from running back down through the pump.

The pumping plant will be complete with auxiliary pumping units for unwatering the intake and discharge tunnels and the drainage sump. It will also be complete with all other necessary station auxiliaries, including a crane for handling the equipment. A small machine shop will be provided for making minor repairs. Quarters for the operators will be provided in the vicinity of the plant.

Power will be delivered to the plant from a 69,000-volt transmission line, through an outdoor structural steel type substation containing self-cooled transformers, together with all necessary protective appa-

ratus and auxiliaries. The operation of the substation will be handled from the main switchboard of the pumping plant.

POUDRE PUMPING PLANT

The Poudre pumping plant will be located on the Poudre Valley Canal at a point about 3 miles below the crossing of the proposed Poudre supply canal. It is proposed to have a capacity of 150 second-feet, composed of two 75-second-foot vertical synchronous-motor-driven single-stage pumps, operating against an effective head of 187 feet. The plant will be complete with all necessary auxiliaries, including a crane for handling the equipment. An outdoor substation will be provided for stepping the voltage down from transmission voltage to motor voltage. Due to the relatively short periods of operation, it is not probable that it will be necessary to construct operator's quarters at this plant.

TRANSMISSION SYSTEM

The transmission system will consist of a single 69,000-volt circuit connecting power plant no. 5 with the Granby pumping plant and power plant no. 1. Power plants nos. 1 to 4–A, inclusive, will be connected by two 115,000-volt lines and two 115,000-volt lines will continue to market. For the purpose of this report only, and to include a sufficient amount in the cost estimates for any probable transmission set-up, this market has been assumed as the valmont steam plant of the Public Service Co. of Colorado. Power plant no. 4 will be connected with the Poudre pumping plant by one 34,500-volt transmission line. The number of lines and mileage involved in each are as shown in the following tabulation:

From—	To—	Number of lines	Number of miles	Voltage
Power plant no. 5	Ka Rose	1	36	69,000
Granby pumping plant	Grand Lake	1	10	69,000
Do	Power plant no. 1	1	36	69,000
Power plant no. 1	Power plant no. 2	2	12	115,000
Power plant no. 2	Power plant no. 3	2	3	115,000
Power plant no. 3	Power plant no. 4	2	4	115,000
Power plant no. 4	Valmont	2	27	115,000
Do	Poudre pumping plant	1	18	34,500

The line to the Poudre pumping plant would be a wood-pole line with pin-type insulators. All other lines would be of the wood-pole, H-frame type, with suspension insulators, and combining all of the most modern features for continuity of service, ease of maintenance, and long life. The line from power plant no. 1 to the Granby pumping plant will probably require special construction to give added strength in the mountainous region near the Continental Divide.

In order to provide power for construction, it is proposed that one of the first features of the project would be to build one of the permanent 115,000-volt circuits from the Valmont plant to plant no. 1, the permanent 69,000-volt lines from plant no. 1 to Granby pumping plant and from Ka Rose to the Green Mountain dam site, and an extension from the Granby Pumping Plant to the west portal of the pro-

posed tunnel. Initially this entire line would be operated at 69,000 volts, and under such operation would be adequate for all contemplated construction activities. In connection with supplying construction power it would also be necessary to install a substation at the Valmont steam plant to step voltage up to 69,000 volts for transmission. Preliminary studies indicate that it would be advisable to make this substation of approximately 5,000 kilovolt-ampere capacity.

The estimated cost of installing the facilities to provide construction power are as indicated in the following tabulation:

From—	To—	Miles	Cost	
			Per mile	Total
Valmont	Power plant no. 2	34	$6,750	$229,500
Power plant no. 2	Power plant no. 1	12	4,100	49,200
Power plant no. 1	Granby pumping plant	36	3,600	129,600
Granby pumping plant	Grand Lake	10	3,200	32,000
Ka Rose	Power plant no. 5	36	3,600	129,600
Total transmission lines		128		569,900
Substation at Valmont				$61,300
Total to supply power for construction				631,200

The transmission system as provided to furnish construction power would be adequate for transmission of power to markets from power plant no. 1 or power plant no. 5 if either were built individually, but the additional complete system would probably be constructed when two or more plants are constructed. The additional costs of the lines involved in this construction are shown in the following tabulation:

From—	To—	Miles	Cost	
			Per mile	Total
Power plant no. 1	Power plant no. 2	12	$4,100	$49,200
Power plant no. 2	Valmont	34	6,750	229,500
Power plant no. 4	Poudre pumping plant	18	1,800	32,400
Total additional cost of permanent transmission system		64		311,100

In addition to the transmission lines required for the disposal of power, it may be necessary that the Government also construct a substation at the point of power disposal. As a market survey has not been conducted to establish the points at which this power can be disposed of, or the quantities involved at each point of disposal, it is assumed for the purpose of this report that the substations will average in cost $10 per kilowatt of capacity. Assuming that provision is made to dispose of a peak capacity of 140,000 kilowatts, this will involve an additional expenditure of $1,400,000.

POWER OUTPUT

Water supply studies indicate that with power plant no. 1 only constructed, there is available, above all requirements for pumping purposes, a constant power output at 100 percent load factor of 120,000,000 kilowatt-hours per year. Since the pumping plant capac-

ity proposed is sufficient to allow pumping to be done in 16 hours of each day it will be possible to handle peak commercial power requirements without undue interference. With this in mind, it has been assumed for the purpose of this report that a market can be found which has a load factor such that 60 percent of this power or 72,000,000 kilowatt-hours per year can be absorbed as firm energy. The balance of this energy, or 48,000,000 kilowatt-hours per year, plus about 40,000,000 kilowatt-hours additional, which is available during various parts of the year, is classed as secondary energy.

Since the Valmont steam plant of the Public Service Co. of Colorado has an installed capacity of 75,000 kilowatts, it appears that the 88,000,000 kilowatt-hours of secondary energy could be absorbed as a fuel saving measure if the price does not exceed fuel costs. Allowing 10 percent for line losses, this is equivalent to an average load of about 9,000 kilowatts.

FINANCIAL OPERATION OF POWER SYSTEM

It is contemplated that the initial power development would consist of the construction of power plant no. 1 only, together with such transmission lines and substations as are required to supply power to the Granby pumping plant and to commercial markets. The estimated construction cost of the strictly power features, as well as items which it is expected that power revenues will repay, is given below.

It is assumed that 5 mills per kilowatt-hour can be secured for firm energy and 1.8 mills per kilowatt-hour for secondary energy with delivery at the market. In each case 10 percent loss is allowed for transmission. The following gives the financial set-up for power plant no. 1, operation costs and returns.

While for the purpose of this report the allocation of construction cost to irrigation and power has been made on the basis set out below, it is understood that this allocation is not thereby fixed, and the same may be changed as further information may warrant until such time as the contract for repayment of the cost of the irrigation features has taken final form.

Power plant no. 1 construction costs

Power plant no. 1 near Estes Park	$1,778,000
Conduit from east portal continental divide tunnel to power plant no. 1	1,101,000
Transmission lines connecting power plant no. 1 with Granby pumping plant—with Valmont and line to North Poudre pumping plant	440,000
Commercial substation (30,000 kilowatts)	300,000
Headquarters at power plant no. 1 for operation of power system	100,000
Subtotal	3,719,000
Interest during construction, 3 percent	112,000
Total repayable in 50 years with interest	3,831,000
One-half cost of Arkins Reservoir	929,661
Portion of cost Green Mountain Reservoir, for 100,000 acre-feet allocated to power	2,276,032
Payable on 40-year oasis without interest	3,205,693
Total cost power plant no. 1 including other items that are required to be accomplished with the initial development	7,036,693

Annual revenues from power plant no. 1

From sale of 65,000,000 kilowatt-hours firm power, at $0.005	$325,000
From sale of 79,000,000 kilowatt-hours secondary power, at $0.0018	142,000
From rental of water for power development to privately owned plants	20,000
Gross annual income	487,000

Annual operation and maintenance plus retirement of principal

Brought forward	$487,000
3.887 percent, on $3,831,000, interest and retirement of investment on basis of 50 years	148,000
Repayment of $3,205,693 on basis of 40 years without interest	80,000
Operation and maintenance of power plant	36,000
Operation and maintenance Granby pumping plant	27,000
Operation and maintenance of transmission lines	13,800
Operation and maintenance conduit, tunnel, and canals	15,000
Depreciation, 1.5 percent, on $3,831,000	57,000
General expense	18,200
Total annual costs	395,000
Annual surplus during 40 years repayment period of the non-interest-bearing obligation	92,000

FULL POWER DEVELOPMENT

The results of this study indicate that the initial installation proposed is sufficient from a financial standpoint to return all necessary costs of operation and repayments.

There are five additional plants that can be developed in the future in a manner that will keep pace with the power requirements of the section that may be served and not have a large unearning investment tied up for some years.

The following is an estimate of the cost of the additional power plants that may be constructed in the future, but are not a part of the initial development.

Power plant no. 5	$1,190,000
Green Mountain-Ka Rose transmission line	130,000
Operators' quarters	60,000
Substation (20,000 kilowatts)	200,000
Subtotal	1,580,000
Interest during construction, 3 percent	47,400
	1,627,400

The above plant, together with plant no. 1, will produce: 113,000,000 kilowatt-hours firm power annually; 92,000,000 kilowatt-hours secondary power annually.

The following are the construction costs of developing power plants nos. 2, 3, 4, and 4–A with appurtenant structures:

Power plant no. 2	$2,325,000
Power plant no. 3	665,000
Power plant no. 4	760,000
Power plant no. 4–A	420,000
Power canal no. 2	2,444,000
Power canal no. 3	493,000
Power canal no. 3–A	113,000
Power canal no. 4	1,194,000
Operators' quarters	150,000

Substations (90,000 kilowatt hours)	$900,000
Additional transmission lines	311,000
Subtotal	9,775,000
Interest during construction, 3 percent	293,250
Total repayable in 50 years with interest	10,068,250
Arkins Canal feeder, payable in 40 years without interest	351,000
Total power plants nos. 2, 3, 4, and 4-A	10,419,250
Total power plant no. 5	1,627,400
Total second-stage development	12,046,650
Primary development plant no. 1	7,036,693
Cost of full power development	19,083,243

The total salable output of the full development is estimated as follows, exclusive of that used for pumping:

	Kilowatt-hours
Firm power, annually	360,000,000
Secondary power, annually	[1] 200,000,000

[1] Out of an available production of 387,000,000 kilowatt-hours secondary power.

CONCLUSIONS

(1) There is a large area (615,000 acres) of irrigated land in northeastern Colorado, the major portion of which has an inadequate water supply.

(2) The feasible storage possibilities with the available water supply in the drainage area has been exhausted.

(3) There is at least an available water supply of 310,000 acre-feet on the upper drainage area of the Colorado River that can be diverted to supplement the present water supply on the eastern slope.

(4) That the diversion of this quantity of water from the Colorado River watershed will not interfere with or encroach upon the present or future irrigation along the Colorado River and tributaries within the State, with the protection provided in the Green Mountain Reservoir.

(5) That the plan for the project here laid out appears entirely feasible from a construction point of view.

(6) That the cost of construction estimated at $2 per acre-foot per annum over the repayment period of 40 years is less than storage water is now commanding and that it will increase the crop values five or more times this annual cost, showing its economic worth.

(7) That the power developments that may be made in the six power plants will produce a large quantity of cheap hydroelectric power that will materially benefit Colorado.

(8) That the revenues from the commercial power generated at power plant no. 1 will pay for the power features as set up under the initial power development, in addition to the power required for pumping at Granby pumping plant, and in lieu of the irrigation features used in power development, the operation of the system to a point where the water leaves the tailrace of the lower power plants can be taken care of by the power development.

(9) That the cost of the irrigation feature of the project is within the ability of the water users to pay.

○

previous commitments to the State and the irrigation districts.

Some of the major issues concerning further irrigation development on the Columbia Basin Project are: (1) Effects and implications of the trade-offs associated with use of Columbia River waters presently being reserved by the United States under State law for future development; (2) how much can water users pay toward construction of distribution facilities and who besides the water users should share in the cost of construction; (3) should the United States provide facilities to serve additional irrigation lands; (4) what measures should be taken to protect and enhance fish and wildlife and provide suitable recreation facilities in the area to be developed; and (5) extent and requirements of existing agreements.

To insure that the full range of issues and alternatives related to this proposal are discussed and all significant issues are identified, scoping meetings will be held as follows:

Location	Date	Time	Place
Pasco, WA	Jan. 16, 1984	7:30 p.m.	Franklin Co. P.U.D. Auditorium.
Moses Lake, WA	Jan. 17, 1984	7:30 p.m.	Big Bend Community College—Student Center.
Spokane, WA	Jan. 18, 1984	7:30 p.m.	Whitworth College—Little Theater.
Seattle, WA	Jan. 19, 1984	7:30 p.m.	Seattle Center, Mercer Forum I and II.

Interested agencies, organizations, and individuals should write to or contact the Bureau of Reclamation at the address provided below. The contact person will be: Mr. Cline Sweet, Columbia Basin Project Office, Bureau of Reclamation, 32 C Street NW, P.O. Box 815, Ephrata, Washington 98823, Telephone: (509) 754–4611, Extension 209.

Dated: December 16, 1983.

James Furse, Jr.,

Acting Commissioner of Reclamation.

[FR Doc. 83-33910 Filed 12-21-83; 8:45 am]

BILLING CODE 4310-09-M

Operating Policy for Green Mountain Reservoir; Colorado-Big Thompson Project, Colorado

AGENCY: Bureau of Reclamation, Interior.

ACTION: Final notice of operating policy for Green Mountain Reservoir.

EFFECTIVE DATE: January 23, 1984.

FOR FURTHER INFORMATION CONTACT: Robert Berling, Project Manager, Bureau of Reclamation, South Platte River Projects Office, P.O. Box 449, Loveland, Colorado 80539, telephone (303) 667–4410.

SUMMARY: The Bureau of Reclamation has the responsibility to operate and maintain the CBT (Colorado-Big Thompson) Project in accordance with the provisions of Senate Document 80 (Act of August 9, 1937, 50 Stat. 564). The policy defines the water supply and water service available and sets forth the procedures whereby water users may subordinate power generation for their water supply needs and provides a solution for repayment of reimbursable costs for the dam and reservoir. A proposed policy was published in the **Federal Register** on March 26, 1981, with a public review and comment period of 45 days. This policy, issued by the Regional Director, Lower Missouri Region, reflects the comments received.

The Bureau constructed Green Mountain Dam and Powerplant as features of the CBT Project. Green Mountain Dam and Powerplant are located on the Blue River, a tributary of the Colorado River in north-central Colorado. The CBT Project was recommended by the Secretary of the Interior and approved by the President on December 21, 1937, pursuant to section 4 of the Act of June 25, 1910 (36 Stat. 8360), and subsection B of section 4 of the Fact Finders' Act (Act of December 5, 1924, 43 Stat. 672). Funds for construction of the project were appropriated by the Interior Department Appropriation Act of 1938 (Act of August 9, 1937, 50 Stat. 564).

Notices will be published in the **Federal Register** prior to negotiations for any potential water service contracts. Actual operation of Green Mountain Reservoir under the policy will commence in 1984 on the date fixed by the Secretary of the Interior as specified in paragraph 3 of the operating policy.

Background

The Bureau of Reclamation constructed Green Mountain Dam and Powerplant as feature of the CBT (Colorado-Big Thompson) Project. Green Mountain Dam and Reservoir were completed in 1943.

The use and disposition of the water stored in Green Mountain Reservoir are under the jurisdiction of the Secretary of the Interior as set forth in Senate Document 80 (Act of August 9, 1937, 50 Stat. 564) and reaffirmed in the Consolidated Cases (Civil Actions Nos. 2782, 5016, and 5017); United States District Court for the District of Colorado, (hereinafter referred to as Consolidated Cases). This authority has been delegated to the Regional Director, LMR (Lower Missouri Region), to be exercised in consultation with the Regional Director, UCR (Upper Colorado Region). The Consolidated Cases remain under the continuing jurisdiction of the District Court (United States District Court for the District of Colorado).

The purposes for adopting a policy for the operation of Green Mountain Reservoir at this time are to quantify the presently perfected uses of water dependent upon the reservoir and to provide an orderly means of disposition of the remaining water in the reservoir for beneficial consumptive uses in the geographic area of Colorado west of the Continental Divide (hereinafter referred to as western Colorado). The policy provided that upon release, either pursuant to the provisions of Senate Document 80, subsequent court decrees and stipulations, or contractual arrangements entered into in accordance with this policy, the administration of all released waters shall be by the Colorado State Engineer, Colorado Division of Water Resources. The policy specifically defines the water supply and water service available and sets forth the procedures whereby water may be made available for beneficial consumptive use. Nothing herein contained shall be deemed to alter or change the duties and obligations of the Department of the Interior under the judgments and decrees entered in the Consolidated Cases, Senate Document 80, above referred to, the applicable provisions of the Constitution of the State of Colorado regarding water, and the State of Colorado laws regarding the adjudication and administration of water.

The reservoir has been in operation since 1943. Since there commencement of operations, the have been several years of below-average river flows, necessitating release of water to meet irrigation and domestic uses in western Colorado not satisfied by natural flows. Under Senate Document 80, the first obligation of the reservoir in such a circumstance is to augment irrigation and domestic uses existing in 1937 and, if stored water is thereafter available for release, to augment all such subsequent similar needs arising to the extent stored water therefor is available. The release of approximately 66,000 acre-feet of water from storage to supplement natural flow shortage in western Colorado was necessary in 1977.

Policy

The operating policy for Green Mountain Reservoir is set forth in the nine policy statements that follow.

1. Green Mountain Reservoir has a total storage capacity of 153,639 acre-feet of water. Of that total capacity, 52,000 acre-feet are available to provide replacement water in western Colorado when water is diverted to the eastern slope through the CBT Project. The yield from remaining capacity (commonly referred to as the 100,000 acre-foot power pool), including the refill right, will to the extent feasible be released through the powerplant, and the water so released shall be available for other beneficial consumptive uses in western Colorado as hereinafter set out.

2. Water will be released from Green Mountain Reservoir for western Colorado use from the 52,000 acre-foot CBT replacement pool to the extent necessary to replace CBT diversions which would otherwise be curtailed by a legal call on the river. When the administration of water under the priority system established by the laws of the State of Colorado would result in curtailment in whole or in part of a water right for irrigation or domestic uses (as hereinafter defined) within western Colorado, which was perfected by use on or before October 15, 1977, and the water need is not met by the foregoing, water will be released without charge from Green Mountain Reservior from the 100,000 acre-foot power pool to the extent necessary to permit diversions to the full amount of said decrees; *Provided, however,* That releases from the power pool for these purposes shall not exceed 66,000 acre-feet of water per annum (measured at Green Mountain Dam), which quantity shall be deemed adequate to satisfy all such so perfected uses with a priority date senior to October 16, 1977. All such releases made pursuant to this paragraph shall be administered by the State Engineer under the priority system.

3. The releases required by paragraph 2 above shall be made within a 12-month period following the date fixed by the Secretary of Interior in accordance with pararaph 4(a) in the 1955 Stipulation in the Consolidated Cases.

4. When water is released for purposes other than those specified in paragraph 2 to meet certain western Colorado users' needs rather than for power generation at Green Mountain Powerplant (although power may be generated with such releases), an agreement will be required between the user and the Regional Director, LMR. Water service charges, including power interference charges when appropriate, relative to such agreements will be established by the Regional Director, LMR, after consultation with the Regional Director, UCR.

5. Differential water service charges will be charged for water released for domestic, irrigation (charges for domestic and irrigation uses shall be nominal), and industrial purposes. For the purposes of this operating policy, the following definition of the uses of water will apply.

a. *Domestic Use*—The use of water by individuals, cities, towns, public or quasi-public districts, private corporations, homeowners' associations, or other entities for domestic, municipal, and miscellaneous related purposes as those terms are traditionally and commonly construed, excepting only the irrigation and industrial uses of water as defined below.

b. *Irrigation Use*—The use of water for the commercial production of agricultural crops and livestock and other uses consistent with any water right decreed for irrigation purposes.

c. *Industrial Use*—The use of water for purposes of producing or processing a nonagricultural product or service for sale, including without limitation such uses as manufacturing, mining, milling, land reclamation, snowmaking, and nonhydroelectric power generation.

To the extent water is diverted by an individual, corporation, or other entity for uses heretofore described in 5 (a) and (b), such uses shall be so classified for water service charge purposes. All other uses by such an individual, corporation or entity, even if such use predates October 16, 1977, shall be subject to the requirements of paragraph 4 hereof.

6. Agreements as described in paragraph 4 with the water service charge based on the use as described in paragraph 5 may be consummated with water users in the geographic area of the Colorado River Basin. The water may be used in accordance with Colorado State law directly, by exchange, or by augmentation of water development to enable water to be benefically used in western Colorado. Any agreements for such use and any agreements provided for in paragraph 8 hereof shall be referred to the State Engineer for review as to administration feasibility prior to execution. Such water service agreements shall be provided to the Division Engineer of the State of Colorado for administration of releases and deliveries.

7. Upon request by the Division Engineer of the State of Colorado, the Bureau shall release water from the 100,000 acre-foot power pool: First, to satisfy the needs of users pursuant to paragraph 2 and second, to satisfy the contract needs of users pursuant to paragraph 4. The Bureau, based upon water supply information developed pursuant to the Stipulation, Judgment, and Decrees in the Consolidated Cases, will take reasonable and prudent actions to insure that water released pursuant to paragraph 4 does not impair or diminish the availability of water for release pursuant to paragraph 2 hereof.

8. In order that no waste of water results from the unnecessary storage thereof and in order to maximize the beneficial use of water stored in Green Mountain Reservoir, the Regional Director, LMR, on a yearly basis between April 1 and May 15 will determine the anticipated amount and uses of stored water reasonably necessary to meet the objectives of paragraphs 2 and 4 hereof. Any stored water in excess thereof may be disposed of on a short-term basis by agreement as provided in paragraphs 4 and 6 hereof.

9. Revenues resulting from any agreements provided for herein will be credited to the operation and maintenance costs of Green Mountain Dam and Reservoir, to power replacement, and to appropriate project costs.

Dated: December 16, 1983.

James Furse, Jr.,

Acting Commissioner of Reclamation.

[FR Doc. 83-33909 Filed 12-21-83; 8:45 am]

BILLING CODE 4310-09-M

Minerals Management Service

Information Collection Submitted for Review

The proposal for the collection of information listed below has been submitted to the Office of Management and Budget for approval under the provisions of the Paperwork Reduction Act (44 U.S.C. Chapter 35). Copies of the information collection requirement and supporting documentation may be obtained by contacting Jane A. Roberts at (703) 860-7916. Comments and suggestions on the collection of information should be made directly to the Office of Information and Regulatory Affairs, Attention: Desk Officer for the Department of the Interior, Office of Managment and Budget, Washington, D.C. 20503, with copies to Jane A. Roberts; Branch of Rules, Orders, and Standards; Offshore Rules and Operations Division; Mail Stop 646; Room 6A110; Minerals Management Service; U.S. Department of the Interior; 12203 Sunrise Valley Drive; Reston, Virginia 22091.

Bureau of Reclamation

Operating Policy for the Green Mountain Reservoir, Colorado-Big Thompson Project; Colorado

AGENCY: Bureau of Reclamation, Interior.

ACTION: Notice of amendment of the operating policy for Green Mountain Reservoir.

SUMMARY: On December 22, 1983, the Bureau of Reclamation published the operating policy for the Green Mountain Reservoir, Colorado-Big Thompson Project, Colorado. It was, and is, the intent of the operating policy to facilitate the marketing of water from Green Mountain Reservoir. In order to facilitate that action, the Bureau of Reclamation submits the proposed changes. Except for the proposed changes contained herein, all other provisions of the operating policy will remain in full force and effect.

Item 4 of the operating policy will be changed to read:

4. When water is released for purposes other than those specified in paragraph 2 to meet certain western Colorado users' needs rather than for power generation at Green Mountain Powerplant (although power may be generated with such releases), an agreement will be required between the user and the Regional Director, Missouri Basin Region (MB), or other person or entity designated by the Secretary of the Interior. Water service charges, including power interference charges, when appropriate relative to such agreements, will be established by the Regional Director, MB, or by such other person or entity designated by the Secretary of the Interior, after review and approval by the Regional Director, MB, after consultation with the Regional Director, Upper Colorado Region.

Further, all other references in the Operating Policy to "Regional Director, LMR" shall be changed to read, "Regional Director, MB."

RECLAMATION CONTACT: Written requests for the policy document or written comments should be addressed to the Regional Director, Missouri Basin Region, Bureau of Reclamation, 316 North 26th Street, Billings, Montana, 59107–6900. Telephone inquiries may be made to Mr. Roger Patterson at (406) 657–6214.

Date: September 3, 1987.

C. Dale Duvall,

Commissioner.

[FR Doc. 87–20870 Filed 9–10–87; 8:45 am]

BILLING CODE 4310–09–M

Fish and Wildlife Service

Receipt of Applications for Permits

The following applicants have applied for permits to conduct certain activities with endangered species. This notice is provided pursuant to section 10(c) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531, *et seq.*):

Applicant: Orangutan Research & Conservation, Project, Sacramento, CA—PRT–721268.

The applicant requests a permit to import blood samples taken from up to 24 rehabilitant orangutans (*Pongo pygmaeus*) in Tanjung Puting National Park, Borneo, Indonesia for analysis of genetic variability.

Applicant: Rocky Waters Farm, Winston, GA—PRT–721278.

The applicant requests a permit to export endangered species of artificially propagated cacti *Echinocereus, engelmannii, E. fendleri, E. kuenzleri, E. inermis, E. triglochidiatus, E. triglochidiatus arizonicus* and *E. viridiflorus davisii* to Leonardo Gavazzi, Pistoia, Italy.

Applicant: William S. Sachse, Polk City, IA—PRT–721285.

The applicant requests a permit to purchase in interstate commerce two pairs of Hawaiian (=nene) geese (*Nesochen* (=*Branta*) *sandvicensis*) from Charles Nugent, Kimbolton, Ohio for the purpose of enchancement of propagation.

Documents and other information submitted with these applications are available to the public during normal business hours (7:45 am to 4:15 pm) Room 611, 1000 North Glebe Road, Arlington, Virginia 22201, or by writing to the Director, U.S. Fish and Wildlife Service of the above address.

Interested persons may comment on any of these applications within 30 days of the date of this publication by submitting written views, arguments, or data to the Director at the above address. Please refer to the appropriate PRT number when submitting comments.

Date: September 8, 1987.

R.K. Robinson,

Chief, Branch of Permits, Federal Wildlife Permit Office.

[FR Doc. 87–20892 Filed 9–10–87; 8:45 am]

BILLING CODE 4310–55–M

Minerals Management Service

Development Operations Coordination Document; Conoco, Inc.

AGENCY: Minerals Management Service, Interior.

ACTION: Notice of the receipt of a proposed Development Operations Coordination Document (DOCD).

SUMMARY: Notice is hereby given that Conoco, Inc. has submitted a DOCD describing the activities it proposes to conduct on Lease OCS–G 2857, Block 42, East Cameron Area, offshore Louisiana. Proposed plans for the above area provide for the development and production of hydrocarbons with support activities to be conducted from onshore bases located at Cameron and Morgan City, Louisiana.

DATE: The subject DOCD was deemed submitted on September 2, 1987.

ADDRESS: A copy of the subject DOCD is available for public review at the Public Information Office, Gulf of Mexico OCS Region, Minerals Management Service, 1201 Elmwood Park Boulevard, Room 114, New Orleans, Louisiana (Office Hours: 8 a.m. to 4:30 p.m., Monday through Friday).

FOR FURTHER INFORMATION CONTACT: Michael J. Tolbert, Minerals Management Service, Gulf of Mexico OCS Region, Field Operations, Plans, Platform and Pipeline Section, Exploration/Development Plans Unit; Telephone (504) 736–2867.

SUPPLEMENTARY INFORMATION: The purpose of this Notice is to inform the public, pursuant to section 25 of the OCS Lands Act Amendments of 1978, that the Minerals Management Service is considering approval of the DOCD and that it is available for public review.

Revised rules governing practices and procedures under which the Minerals Management Service makes information contained in DOCDs available to affected States, executives of affected local governments, and other interested parties became effective December 13, 1979 (44 FR 53685). Those practices and procedures are set out in revised § 250.34 of Title 30 of the CFR.

Dated: September 2, 1987.

J. Rogers Pearcy,

Regional Director, Gulf of Mexico OCS Region.

[FR Doc. 87–20917 Filed 9–10–87; 8:45 am]

BILLING CODE 4310–MR–M

Development Operations Coordination Document; Hall-Houston Oil Co.

AGENCY: Minerals Management Service, Interior.

ACTION: Notice of the receipt of a proposed Development Operations Coordination Document (DOCD).

DISTRICT COURT, WATER DIVISION NO. 5, COLORADO

Case No. 91CW247

FINDINGS OF FACT, CONCLUSIONS OF LAW, JUDGMENT AND DECREE

CONCERNING THE APPLICATION FOR WATER RIGHTS OF THE GRAND VALLEY WATER USERS ASSOCIATION, ORCHARD MESA IRRIGATION DISTRICT, AND THE UNITED STATES OF AMERICA, IN MESA COUNTY, COLORADO

FINDINGS OF FACT

1. Filing of Application. This matter was commenced on December 30, 1991 by the filing of an Application to Confirm and Approve Appropriative Right of Exchange which application was amended by leave of Court on May 24, 1993.

2. Co-Applicants. The application and amendment were filed by the United States of America (the "United States"), the Grand Valley Water Users Association, a corporation (the "Association"), and the Orchard Mesa Irrigation District, a corporation ("OMID"). The United States, the Association and OMID are referred to herein as the "Co-Applicants."

3. Objectors.

3.1 Statements of Opposition Opposing Application. The following parties filed timely Statements of Opposition opposing the application or seeking protective terms and conditions:

Basalt, Town of
Basalt Water Conservancy District
Carbondale, Town of
Collbran, Town of
Colorado Division of Wildlife
Colorado Springs, City of
Copper Mountain, Inc.
Copper Mountain Consolidated Metropolitan District (successor-in-interest to Copper Mountain Water & Sanitation District)
DeBeque, Town of
Eagle, Town of
Glenwood Springs, City of

Grand County Water & Sanitation District No. 1
Middle Park Water Conservancy District
Mid Valley Metropolitan District
Mobil Mining and Minerals Company
Natec Resources, Inc.
New Castle, Town of
North Barton Creek Ltd. Liability Company
Palisade, Town of
Parachute, Town of
Pueblo, Board of Water Works of
Public Service Company of Colorado
Ralston Resorts, Inc. (successor-in-interest to Keystone Resorts Management, Inc. and Breckenridge Ski Corporation)
Rifle, City of
Rifle Land Associates, Ltd.
Silverthorne, Town of
Spruce Valley Ranch Foundation
Summit County Commissioners, Board of
Union Oil Company of California
Upper Eagle Regional Water Authority

3.2 Statements of Opposition in Support of Application. The following parties filed timely Statements of Opposition in support of the application:

Colorado River Water Conservation District
Colorado State Engineer
Division Engineer, Water Division No. 5
Grand Valley Irrigation Company

3.3 Intervenors. The following parties did not file timely Statements of Opposition, but were granted leave to intervene as Objectors:

Aurora, City of
Colorado Water Conservation Board
Cyprus Climax Metals Company
Exxon Company, U.S.A.
Englewood, City of
Frisco, Town of
Vail Associates, Inc.
Vail Valley Consolidated Water District

3.4 Withdrawals. The following parties subsequently withdrew their Statements of Opposition:

Collbran, Town of (by Order dated January 29, 1996)
Englewood, City of (by Withdrawal dated March 8, 1996 and Amended Withdrawal dated September 24, 1996)
Natec Resources, Inc. (by Order dated January 29, 1996)

4. Stipulation. On or about September 23, 1996, the parties filed the Stipulation and Agreement attached hereto as Attachment 1. The Stipulation and Agreement has been executed by the Co-Applicants and by all the Objectors who remain parties to the case and provides that the parties to the Stipulation and Agreement agree to the entry of a decree herein granting the application as amended and incorporating the terms of the Stipulation and Agreement.

5. Jurisdiction. Timely and adequate notice of the filing and contents of the application and amendment to the application herein was given in the manner required by law. The time for filing Statements of Opposition and for seeking leave to intervene has expired. The Court has jurisdiction over the subject matter of this proceeding and over all persons and owners of property affected hereby, irrespective of whether or not those persons and owners of property have appeared.

6. Relief Requested by Application. The application requests confirmation of an appropriative right of substitution and exchange for an existing exchange on the Colorado River which is based on the operation of a structure commonly referred to as the Orchard Mesa Check. Co-Applicants request adjudication of an absolute right for this existing exchange, in the amount of 640 c.f.s., with a priority of April 1, 1926.

7. Description of Exchange Facilities. In order to describe the exchange, it is helpful to describe the facilities by which the exchange is operated. These facilities are described as follows:

7.1 Point of Diversion. The point of diversion for the exchange and the upstream point of the exchange is the headgate on the right (West) side of the Grand Valley Project diversion dam on the Colorado River (commonly referred to as the "Roller Dam") located in the Northwest Quarter of Section 13, Township 10 South, Range 98 West, 6th P.M., in Mesa County, Colorado, on the right (West) bank of the Colorado River at a point whence the Southwest Corner of said Section 13 bears South 16°41' West 4,023 feet (the "Upstream Point of Exchange").

7.2 Point of Delivery of Substitute Supply. The water diverted by exchange is returned to the Colorado River immediately upstream from the Grand Valley Irrigation Company ("GVIC") diversion dam, which is located at a point on the right (West) bank of the Colorado River from whence the Northeast Corner of Section 3, Township 1 South, Range 2 East, of the Ute Meridian, in Mesa County, Colorado, bears North 13°18' East 1,800 feet (the "Downstream Point of Exchange").

7.3 Delivery Facilities. The water diverted by exchange at the Upstream Point of Exchange is delivered for a distance of approximately 4.6 miles through the Highline Canal located on the right (West) bank of the Colorado River, at which point it is diverted under the Colorado River by means of a siphon into the Orchard Mesa Power Canal located on the left (East) bank of the Colorado River. The Orchard Mesa Power Canal delivers the water diverted by exchange for a distance of approximately 3.8 miles to the Grand Valley Power Plant and the OMID Pumping Plant.

7.4 Grand Valley Power Plant. The Grand Valley Power Plant is owned by the United States and leased to the Association, OMID and the Public Service Company of Colorado. A portion of the water diverted by exchange is diverted into the Grand Valley Power Plant for power generation purposes.

7.5 OMID Pumping Plant. The remainder of the water diverted by exchange is diverted into the OMID Pumping Plant to operate hydraulic pumps which lift irrigation water into OMID irrigation canals.

7.6 Afterbay. All the water used for non-consumptive power generation purposes at the Grand Valley Power Plant and non-consumptive operation of hydraulic pumps at the OMID Pumping Plant passes into a common afterbay located below the Grand Valley Power Plant and the OMID Pumping Plant (the "Afterbay"). If the water in the Afterbay is allowed to flow in its natural course, it reenters the Colorado River at a point below the GVIC diversion dam.

7.7 Orchard Mesa Check. The Orchard Mesa Check (the "Check") is a structure which can be operated to alter the point at which water in the Afterbay reenters the Colorado River. The Check is located at or near the downstream end of the Afterbay, across the channel through which water from the Afterbay flows back to the Colorado River. The Check consists of three mechanically operated radial gates and a bypass channel which parallels the Colorado River to a point immediately above the GVIC diversion dam. The Check is operated by lowering one or more of the three radial gates. The lowered gate or gates block the flow in the channel leading from the Afterbay to the Colorado River, thus raising the level of the water in the Afterbay by up to eight feet, more or less. Raising the level of the water in the Afterbay causes water in the Afterbay to flow through the Check's

bypass channel. The water flowing in this bypass channel returns to the Colorado River immediately above the GVIC diversion dam. Thus, the operation of the Check alters the point at which water in the Afterbay is returned to the Colorado River. When the Check is not being operated, water flowing into the Afterbay is returned to the Colorado River at a point below the GVIC diversion dam. When the Check is being operated, some or all of the water flowing into the Afterbay is returned to the Colorado River above the GVIC diversion dam, where it can then be diverted by GVIC which owns water rights senior in priority to the water rights owned by Co-Applicants. The Check may be operated in varying degrees to return more or less water in the Afterbay to the Colorado River above the GVIC diversion dam depending upon the demands of GVIC and the Co-Applicants and the amount of water available at the Roller Dam.

8. Description of Orchard Mesa Check Exchange. The operation of the Check constitutes an appropriative right of substitution and exchange. This existing exchange has been operated as described below.

8.1 Point of Diversion/Upstream Point of Exchange. The point of diversion for the exchange, which is also referred to herein as the Upstream Point of Exchange, is the Roller Dam on the Colorado River, the location of which is set forth in paragraph 7.1, above.

8.2 Point of Delivery of Substitute Supply/Downstream Point of Exchange. The point of delivery of the substitute supply, which is also referred to herein as the Downstream Point of Exchange, is a point at which water diverted into the Check bypass channel returns to the Colorado River immediately above the GVIC diversion dam, the location of which is set forth in paragraph 7.2, above.

8.3 Exchange Reach. The reach of the Colorado River over which the exchange depletes river flows (the "Exchange Reach") extends from the Upstream Point of Exchange described in paragraph 7.1, above, to the Downstream Point of Exchange described in paragraph 7.2, above, and is approximately 8.4 miles in length.

8.4 Source. The source of the water diverted by exchange is the Colorado River.

8.5 Description of Operation of Exchange. The exchange operates by the diversion of water out of the Colorado River at the Upstream Point of Exchange, delivery of that water through the Highline Canal and the Power Canal to the Grand Valley Power Plant and the OMID Pumping Plant for non-consumptive power generation and hydraulic pumping purposes, and the return of the same amount of water to the Colorado River at the Downstream Point of Exchange through operation of the Check. The water returned to the Colorado River at the Downstream Point of Exchange by diversion through the Check bypass

channel can then be diverted by GVIC which owns water rights senior in priority to the water rights owned by Co-Applicants.

8.6 Amount. The maximum flow rate of the exchange is 640 c.f.s., absolute.

8.7 Use. The water diverted by exchange is used for non-consumptive power generation and hydraulic pumping purposes at the Grand Valley Power Plant and the OMID Pumping Plant.

8.8 Priority. The date of initiation of the appropriation is April 1, 1926, the date of completion of construction of the Check and the Check bypass channel. The appropriation was completed with reasonable diligence by the operation of the exchange up to its maximum rate of flow and beneficial use of water diverted by exchange for the uses described above. Co-Applicants have complied with the requirements of Rule 89, C.R.C.P., the exchange has been administered in a manner consistent with recognition of the original priority date of the exchange, and, pursuant to § 37-92-305(10), C.R.S., Co-Applicants are entitled to recognition of the original priority date of April 1, 1926 for this existing exchange, without postponement under § 37-92-306, C.R.S.

9. Terms and Conditions. The terms and conditions set forth below will prevent injury to the vested water rights and conditional water rights of others and will ensure that the substitute supply made available under the exchange will be of a quality, quantity and continuity adequate to meet the requirements of the uses to which the water of senior appropriators has normally been put.

9.1 Quality of substitute supply. The same water which is diverted by exchange out of the Colorado River at the Upstream Point of Exchange shall be returned to the Colorado River at the Downstream Point of Exchange. The return of the same water, after its use in non-contaminating power generating and hydraulic pumping facilities, will ensure that the water returned to the river, i.e., the substitute supply, is of a quality to meet the requirements of the uses to which senior appropriators have normally put such water.

9.2 Quantity of substitute supply. The amount of water returned to the Colorado River above the GVIC diversion dam at the Downstream Point of Exchange by operation of the Check (the "substitute supply") shall equal or exceed the amount of water diverted by exchange out of the Colorado River by means of the Roller Dam at the Upstream Point of Exchange.

9.3 Continuity of substitute supply. The water diverted by exchange out of the Colorado River at the Upstream Point of Exchange shall be returned to the Colorado River at the Downstream Point of Exchange in approximately the same time as it would take that water to flow in the Colorado River from the Upstream Point of Exchange to the Downstream Point of Exchange if the water were left in the river.

9.4 Intervening Seniors. All water rights located between the Upstream Point of Exchange and the Downstream Point of Exchange, i.e., within the Exchange Reach, which are senior to the date of appropriation of the exchange, shall be fully satisfied by the remaining flows subject to their call.

9.5 Terms of Stipulation Incorporated. The terms and conditions of the Stipulation and Agreement attached hereto as Attachment 1 are incorporated herein.

10. Decree Administrable. The Court notes that, by way of the Stipulation and Agreement attached hereto as Attachment 1, the State and Division Engineer for Water Division No. 5 stipulated to the entry of this decree. The Court finds that this decree is administrable by the Division Engineer for Water Division No. 5.

CONCLUSIONS OF LAW

11. Incorporation of Findings of Fact. The Court incorporates the foregoing Findings of Fact to the extent that these may constitute conclusions of law.

12. Jurisdiction. Timely and adequate notice of the filing and contents of the application and the amendment to the application herein was given in the manner required by law. The time for filing Statements of Opposition and for seeking leave to intervene has expired. The Court has jurisdiction over all persons and owners of property affected hereby, irrespective of whether or not those persons and owners of property have appeared.

13. Subject Matter Jurisdiction. The Court has jurisdiction over the subject matter of this proceeding. The application herein is one contemplated by law, and adjudication of the exchange described in this decree is authorized by law and is within the jurisdiction of this Court. §§ 37-80-120, 37-92-101, *et seq.*, C.R.S. The right of substitution and exchange decreed herein is an appropriative water right, with a priority date and, like other appropriative water rights, must be exercised within the priority system and in accordance with applicable state law. §§ 37-80-120(4), 37-92-101, *et seq.*, C.R.S.

14. Appropriative Right of Exchange. The appropriative right of exchange confirmed herein was initiated on April 1, 1926, was diligently prosecuted thereafter, and was completed with reasonable diligence by the diversion of water by exchange and the application of such water to the beneficial uses described herein. §§ 37-92-305(1), 37-92-305(9)(a) C.R.S.

15. Non-Injury. Subject to the terms and conditions of the Stipulation and Agreement, the exchange may be operated under terms and conditions which prevent injury to the vested water rights and conditional water rights of others, including the requirement that the substitute supply made available under the exchange will be of a quality, quantity and continuity adequate to meet the requirements of the uses to which the water of senior appropriators has normally been put. §§ 37-80-120(2), (3) & (4), 37-92-305(3) & (5), C.R.S.

16. Entitlement to Original Priority Without Postponement. Pursuant to § 37-92-305(10), C.R.S., Co-Applicants are entitled to recognition of the original priority date of April 1, 1926 for the exchange described herein, without postponement under § 37-92-306, C.R.S.

JUDGMENT AND DECREE

Based on the foregoing Findings of Fact and Conclusions of Law, it is hereby adjudged, ordered and decreed that:

17. Incorporation of Findings of Fact and Conclusions of Law. The foregoing Findings of Fact and Conclusions of Law are incorporated herein as if set out verbatim.

18. Confirmation of Orchard Mesa Check Exchange. Subject to the terms and conditions set forth herein, the Court hereby confirms and approves the Orchard Mesa Check Exchange which is more specifically described in the Findings of Fact, above, in the amount of 640 c.f.s., absolute, with a priority date of April 1, 1926, without postponement under § 37-92-306, C.R.S.

19. Terms and Conditions. The terms and conditions set forth in the Stipulation and Agreement, as well as paragraph 9, above, will prevent injury to the vested water rights and conditional water rights of others and will ensure that the substitute supply made available under the exchange will be of a quality, quantity and continuity adequate to meet the requirements of the uses to which the water of senior appropriators has normally been put.

20. Approval and Incorporation of Stipulation and Agreement. The parties have executed the Stipulation and Agreement attached hereto as Attachment 1. The Court, having reviewed the Stipulation and Agreement and being otherwise fully advised in the premises, hereby approves the Stipulation and Agreement and incorporates it into this decree as though it were restated here in full.

21. Retained Jurisdiction. The Court shall retain permanent jurisdiction over the subject matter of this case and parties hereto for all purposes set forth in the Stipulation and Agreement; provided, however, that the priority date and amount of the exchange are finally determined hereby and will not be further considered under the Court's retained jurisdiction.

22. Filing of Decree with State and Division Engineers. A copy of these Findings of Fact, Conclusions of Law, Judgment and Decree shall be filed with the State Engineer and the Division Engineer for Water Division No. 5.

Dated at Glenwood Springs, Colorado, this 1st day of October, 1996.

THOMAS W. OSSOLA
Water Judge
Water Division No. 5

Copy of the foregoing mailed to all
Counsel of record ✓ Water
Referee ---- Div. Engineer ✓ and
State Engineer ✓ Date 10-02-96

Deputy Clerk, Water Div. No. 5

Exhibit E

Orchard Mesa Check Exchange
Water Division No. 5 - Case 91CW247

Applicant	Counsel	Firm and Address
United States of America	Bruce D. Bernard, Esquire Stephen G. Bartell, Esquire	U.S. Department of Justice Environment and Natural Resources Division General Litigation Section 999 18th Street, Suite 945 Denver, Colorado 80202
Grand Valley Water Users Association	Mark Hermundstad, Esquire	Williams, Turner & Holmes, P.C. 200 North 6th Street, #103 P.O. Box 338 Grand Junction, Colorado 81502
Orchard Mesa Irrigation District	Flint B. Ogle, Esquire	Dufford, Waldeck, Milburn & Krohn, L.L.P. 744 Horizon Court, Suite 300 Grand Junction, Colorado 81506
Objector	**Counsel**	**Firm and Address**
City of Aurora, Colorado, acting by and through its Utility Enterprise	John M. Dingess, Esquire	Duncan, Ostrander & Dingess, P.C. 7800 East Union Avenue, #200 Denver, Colorado 80237
Basalt, Town of New Castle, Town of Mid-Valley Metropolitan District Rifle, City of	Loyal E. Leavenworth, Esquire	Leavenworth & Associates, P.C. P.O. Drawer 2030 Glenwood Springs, Colorado 81602

91cw247

Exhibit E

Orchard High Ditch Exhibits
Water Division No. 5 - Case 91CW247

Basalt Water Conservancy District Copper Mountain, Inc. Copper Mountain Consolidated Metropolitan District Mobil Mining & Minerals Company	Scott Balcomb, Esquire Lori Satterfield, Esquire	Delaney & Balcomb, P.C. 818 Colorado Avenue P.O. Drawer 790 Glenwood Springs, Colorado 81602
Carbondale, Town of Debeque, Town of Eagle, Town of Palisade, Town of	Sherry A. Caloia, Esquire	Caloia, Houpt & Light, P.C. 1204 Grand Avenue Glenwood Springs, Colorado 81601
Frisco, Town of Glenwood Springs, City of North Barton Creek, LLC Parachute, Town of Rifle Land Associates, Ltd. Silverthorne, Town of Spruce Valley Ranch Foundation	David W. Robbins, Esquire Mark J. Wagner, Esquire	Hill & Robbins, P.C. 1441 18th Street, #100 Denver, Colorado 80202
Colorado Division of Wildlife Colorado State Engineer Colorado Water Conservation Board Division Engineer, Water Division No. 5	Gale A. Norton, Attorney General Stephen K. Erkenbrack, Chief Deputy Attorney General Timothy M. Tymkovich, Solicitor General Jennifer L. Gimbel, Deputy Attorney General Wendy Weiss, First Assistant Attorney General	Natural Resources Section 1525 Sherman, 5th Floor Denver, Colorado 80203

RCW247

Exhibit E

Orchard Mesa Check Exchange
Water Division No. 1 - Case 91CW247

Colorado River Water Conservation District	David C. Hallford, Esquire	201 Centennial Street, #204 (81601) P.O. Box 1120 Glenwood Springs, Colorado 81602
Colorado Springs, City of	Mark T. Pifher, Esquire Wm Kelly Dude, Esquire	Dude, Pifher & Lebel, P.C. 104 South CascadeAvenue, Suite 204 Colorado Springs, Colorado 80903
Cyprus Climax Metals Company	Brian M. Nazarenus, Esquire	Gorsuch, Kirgis, L.L.C. 1401 17th Street, #1100 Denver, Colorado 80202
Exxon Company, U.S.A. Board of County Commissioners of Summit County, Colorado Vail Associates, Inc. Vail Valley Consolidated Water District Upper Eagle Regional Water Authority	Glenn E. Porzak, Esquire Steven Bushong, Esquire	Porzak, Browning & Johnson, L.L.P. 1300 Walnut Street, Suite 100 Boulder, Colorado 80302
Grand County Water & Sanitation District No. 1 Middle Park Water Conservancy District	Stanley W. Cazier, Esquire	Baker, Cazier & McGowan 62495 U.S. Highway 40, E P.O. Box 500 Granby, Colorado 80446
Grand Valley Irrigation Company	Frederick G. Aldrich, Esquire John T. Howe, Esquire	Hoskin, Farina, Aldrich & Kampf, P.C. 200 Grand Avenue, Suite 400 P.O. Box 40 Grand Junction, Colorado 81502
Pueblo, Colorado, Board of Water Works of	William F. Mattoon, Esquire William A. Paddock, Esquire Peter C. Fleming, Esquire	Peterson, Fonda, Farley, Mattoon Crockenberg & Garcia, P.C. 650 Thatcher Building P.O. Box 35 Pueblo, Colorado 81002 Carlson, Hammond & Paddock, L.L.C. 1700 Lincoln Street, Suite 3900 Denver, Colorado 80203

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Exhibit E

Orchard Mesa Check Exchange
Water Division No. 1 - Case 91CW247

Public Service Company of Colorado	William A. Hillhouse II, Esquire Kenneth L. Salazar, Esquire	Parcel, Mauro, Hultin & Spaanstra, P.C. 1801 California Street, Suite 3600 Denver, Colorado 80202
Ralston Resorts, Inc.	Gary L. Greer, Esquire	Sherman & Howard, L.L.C. 633 Seventeenth Street, Suite 3000 Denver, Colorado 80202
Union Oil Company of California (UNOCAL)	Charles N. Woodruff, Esquire James R. Montgomery, Esquire	Moses, Wittemyer, Harrison & Woodruff, P.C. 1002 Walnut, #300 (80302) P.O. Box 1440 Boulder, Colorado 80306

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91CW247

ATTACHMENT 1
TO FINDINGS OF FACT, CONCLUSIONS OF LAW, JUDGMENT AND DECREE

DISTRICT COURT, WATER DIVISION NO. 5, STATE OF COLORADO

Case No. 91CW247

STIPULATION AND AGREEMENT

CONCERNING THE APPLICATION FOR WATER RIGHTS OF THE GRAND VALLEY WATER USERS ASSOCIATION, ORCHARD MESA IRRIGATION DISTRICT, AND THE UNITED STATES OF AMERICA, IN MESA COUNTY, COLORADO

This Stipulation and Agreement, dated as of September 4, 1996, is made between the Co-Applicants, the Grand Valley Water Users Association, the Orchard Mesa Irrigation District ("OMID"), the United States of America ("United States"), and the following parties who are collectively referred to herein as the "Objectors":

Aurora, City of
Basalt, Town of
Basalt Water Conservancy District
Carbondale, Town of
Colorado Division of Wildlife
Colorado River Water Conservation District
Colorado Springs, City of
Colorado State Engineer
Colorado Water Conservation Board
Copper Mountain, Inc.
Copper Mountain Consolidated Metropolitan District (successor-in-interest to Copper Mountain Water and Sanitation District)
Cyprus Climax Metals Company
DeBeque, Town of
Division Engineer, Water Division No. 5
Eagle, Town of
Exxon Company, U.S.A.
Frisco, Town of
Glenwood Springs, City of
Grand County Water & Sanitation District No. 1
Grand Valley Irrigation Company
Middle Park Water Conservancy District
Mid Valley Metropolitan District
Mobil Mining & Minerals Company

New Castle, Town of
North Barton Creek Ltd. Liability Company
Palisade, Town of
Parachute, Town of
Pueblo, Board of Water Works of
Public Service Company of Colorado
Ralston Resorts, Inc. (successor-in-interest to Keystone Resorts Management, Inc., and Breckenridge Ski Corporation)
Rifle, City of
Rifle Land Associates, Ltd.
Silverthorne, Town of
Spruce Valley Ranch Foundation
Summit County Commissioners, Board of
Union Oil Company of California
Upper Eagle Regional Water Authority
Vail Associates, Inc.
Vail Valley Consolidated Water District

In consideration of the mutual agreements contained herein, Co-Applicants and Objectors agree as follows:

1. Definitions. Unless otherwise indicated, the following terms shall have the following definitions in this Stipulation and Agreement and in any decree which may be subsequently entered in this case:

- "15-Mile Reach" shall mean the reach of the Colorado River which extends, from the point at which the tailrace common to the Grand Valley Power Plant and the OMID pumping plant returns to the Colorado River below the Grand Valley Irrigation Company ("GVIC") diversion dam, downstream to the confluence of the Colorado River and Gunnison River.

- "Blue River Decrees" shall mean the stipulations, judgments, orders and decrees entered in consolidated Civil Action Nos. 2782, 5016 and 5017, United States District Court, District of Colorado, including without limitation the decrees dated October 12, 1955, and April 16, 1964.

- "HUP" shall mean the so-called "historic users pool" defined as water to be released from the Green Mountain Reservoir power pool as described in paragraphs 2 and 3 of the Operating Policy.

- "HUP beneficiaries" shall mean those persons or entities for whose benefit releases are made from the HUP pursuant to the Operating Policy.

- "OMID Right" shall mean the 450 c.f.s. decreed as Priority No. 197 as renumbered to the OMID System of Canals and Ditches by decree of the Mesa County District Court entered on July 25, 1941, in Case No. 5812.

- "Operating Policy" shall mean the Operating Policy for Green Mountain Reservoir; Colorado-Big Thompson Project, Colorado (Volume 48, No. 247 Federal Register 12/22/83; as amended in Volume 52, No. 176 Federal Register 9/11/87).

- "Orchard Mesa Check" shall mean the three mechanically operated radial gates and the bypass channel by which the water level in the common afterbay of the Grand Valley Power Plant and the OMID pumping plant can be raised to a level which causes water to flow through the bypass channel and return to the Colorado River immediately upstream of the GVIC diversion dam, and shall include any replacement structure in the same location which performs that same function.

- "Parties" shall mean each of the parties to this Stipulation and Agreement as identified in the first unnumbered paragraph, above. A "party" shall mean one of the parties.

- "Power Right" shall mean the 800 c.f.s., 400 c.f.s. during the irrigation season, decreed to the United States for the Grand Valley Project by decree of the Mesa County District Court entered July 25, 1941, in Case No. 5812.

- "Shoshone Rights" shall mean the water rights decreed for and associated with the Shoshone Power Plant (a.k.a. the Glenwood Power Canal), adjudicated for 1,250 c.f.s. on December 9, 1907, with an appropriation date of January 7, 1902, and adjudicated for 158 c.f.s. on February 7, 1956, with an appropriation date of May 15, 1929.

2. Application. The Co-Applicants filed an application on December 30, 1991, which application was amended on May 24, 1993, for approval of an exchange of water based upon the discharge of water from the common afterbay of the Grand Valley Power Plant and the OMID pumping plant into the Colorado River upstream from the GVIC diversion dam by means of the Orchard Mesa Check. The Co-Applicants have claimed an absolute right for an existing exchange of water with a 1926 priority date. Attached hereto as Exhibit A and incorporated herein by this reference is a list of all of the decreed water

rights of the Co-Applicants (the "Co-Applicants' Water Rights"), Mesa County Irrigation District and Palisade Irrigation District which are legally divertible at the headgate of the Government Highline Canal (commonly referred to as the "Roller Dam"). Attached hereto as Exhibit B and incorporated herein by this reference is a list of all the decreed water rights of the GVIC (the "GVIC Water Rights") which are legally divertible at the GVIC diversion dam.

3. Decree Provisions. The parties agree to the entry of a decree in Case No. 91CW247, in the form of the proposed decree attached hereto as Exhibit C, granting the application as amended and incorporating the terms of this Stipulation and Agreement.

3.a. Except as provided in paragraphs 3.a.(1), (2) and (3), below, the United States agrees not to exercise the Power Right from April 1 through October 31 of each year so as to place an administrative call which results in the curtailment of diversions by upstream water rights.

3.a.(1) During the months April through October, at any time diversions at the Roller Dam under the irrigation rights listed on Exhibit A are less than 1,310 c.f.s., the Power Right may be exercised so as to maintain a total call of 1,310 c.f.s. at the Roller Dam by the water rights listed on Exhibit A.

3.a.(2) In addition, at any time during the months April through October that diversions by the GVIC Water Rights are less than 400 c.f.s., the Power Right may be exercised for up to the amount that diversions by such GVIC rights are less than 400 c.f.s.; provided, however, that if GVIC gives written notice to the parties pursuant to paragraphs 3.e.(1) or (2) that the GVIC Water Rights shall no longer be subject to the terms of paragraph 3.b., then, at any time during the months April through October, the Power Right may be exercised for up to the amount that GVIC's diversions are less than the amount of GVIC's then existing decreed water rights or less than 400 c.f.s., whichever is less.

3.a.(3) If the Orchard Mesa Check is physically inoperable due to an Act of God or an emergency situation beyond the control of the Co-Applicants, the United States may exercise the Power Right to the full decreed amount for a period not to exceed a total of 14 days during the April 1 through October 31 period in any given year or until the Orchard Mesa Check becomes operable, whichever occurs first. For purposes of this provision, an emergency situation shall not be deemed to occur if the Orchard Mesa Check is inoperable due to a lack of funding or the non-performance of ordinary maintenance.

3.a.(4) Any calls of the Power Right pursuant to paragraphs 3.a.(1), (2) and (3), above, may be made only when and to the extent the Power Right is in priority, there is capacity in the power canal, and all water called thereunder is delivered to and through the Grand Valley Power Plant.

3.a.(5) For purposes of paragraph 3 of this Stipulation and Agreement, the priority date of the Power Right shall be considered to be August 3, 1934. So long as none of the provisions of paragraph 3 of this Stipulation and Agreement are suspended, the United States agrees not to seek administration under a more senior priority, which the United States asserts is decreed as February 27, 1908. By agreeing not to assert a 1908 priority for the Power Right while paragraph 3 of this Stipulation and Agreement is not suspended, the United States does not waive and shall not be estopped from asserting the right to seek administration under a 1908 priority, nor shall Objectors be estopped from challenging a 1908 priority, in the event any of the provisions of paragraph 3 of this Stipulation and Agreement shall be suspended, as addressed in paragraphs 3.b.(6), 5.c. and 5.d., below. The parties agree that the time for raising claims and defenses concerning the priority of the Power Right is tolled so long as none of the provisions of paragraph 3 of this Stipulation and Agreement are suspended.

3.a.(6) No provision of this Stipulation and Agreement shall be considered to affect in any way the right of the United States to call for the 800 c.f.s. power right from November 1 through March 31.

3.b. During the period April 1 through October 31 of any year that the conditions set forth in paragraphs 3.b.(1), (2) and (3), below, are met, diversions by HUP beneficiaries (except the HUP beneficiaries who own and/or operate the water rights listed in Exhibits A and B) shall not be curtailed by any administrative call by the water rights listed in Exhibits A and B:

3.b.(1) the Orchard Mesa Check is physically operable. For purposes of this provision, the Orchard Mesa Check shall be considered to be physically operable unless it is rendered inoperable due to an Act of God or an emergency situation beyond the control of the Co-Applicants. An emergency situation shall not be deemed to occur if the Orchard Mesa Check is inoperable due to a lack of funding or the non-performance of ordinary maintenance. If the Orchard Mesa Check is rendered inoperable, Co-Applicants shall make best efforts to bring the facility back into operation as soon as possible.

3.b.(2) there is at least 66,000 acre feet of water available for releases for the benefit of HUP beneficiaries when Green Mountain Reservoir ceases to be in-priority for its initial fill under the Blue River Decrees. Nothing in this Stipulation and Agreement shall be construed to limit or diminish the ability of the United States to exercise its full right to fill Green Mountain Reservoir as provided by the Blue River Decrees.

3.b.(3) the Shoshone Rights continue to be exercised in a manner substantially consistent with their historical operations for hydropower production at their currently decreed point of diversion.

3.b.(4) As provided in paragraph 3.c., below, this paragraph 3.b. shall not cause increased curtailment of diversions by non-HUP beneficiaries.

3.b.(5) If any of the three conditions set forth in paragraphs 3.b.(1), (2) or (3), above, is not met, Co-Applicants and GVIC (based on concurrence of any three out of four of those entities) may give written notice to the parties that the Operating Criteria developed pursuant to paragraph 5, below, and the non-curtailment provisions of this paragraph 3.b. shall be inoperative until each of said three conditions is being met (if paragraph 3.b. is rendered inoperative under this provision, it shall not be considered to be suspended for the purposes of this Stipulation and Agreement). During any period that the Operating Criteria are inoperative, no water in the HUP shall be deemed to be surplus to the needs of the HUP beneficiaries, and releases from the HUP shall only be made to replace out-of-priority depletions by HUP beneficiaries and to make direct deliveries to HUP beneficiaries. To the extent that such releases are less than the out-of-priority depletions of HUP beneficiaries, the water rights listed in Exhibits A and B may place an administrative call and seek curtailment of diversions by HUP beneficiaries, provided, however, that nothing herein shall diminish or limit the statutory authority and responsibility of the Division 5 Engineer.

3.b.(6) If any of the three conditions set forth in paragraphs 3.b.(1), (2) or (3), above, is not met, Co-Applicants and GVIC (based on concurrence of any three out of four of those entities) may give written notice to the parties that the terms of paragraph 3.a. of this Stipulation and Agreement are suspended until each of said three conditions is being met. During any period that the terms of paragraph 3.a. are suspended, the United States may fully exercise the Power Right, and the parties may raise the matters addressed in paragraphs 3.a.(5), 3.e., 3.f. and 3.g. of this Stipulation and Agreement. If an action raising any such matter is commenced during any period of

suspension of paragraph 3.a., the parties to such action shall be free to continue to prosecute and defend such action to its conclusion, notwithstanding that the conditions set forth in paragraphs 3.b.(1), (2) and (3) become fully satisfied and paragraph 3.a. goes back in effect after commencement of such action.

3.c. The parties recognize that under the terms of paragraph 3.b. of this Stipulation and Agreement, there may be instances when the actual releases from the HUP will be less than the out-of-priority depletions of the HUP beneficiaries. In such instances, the Division Engineer shall not curtail the water right(s) of any entity not entitled to benefits of the HUP to the extent that entity's water right(s) would otherwise have been in priority to divert if the out-of-priority depletions of HUP beneficiaries would have been fully replaced in the absence of the execution of this Stipulation and Agreement and the decree based thereon.

3.d. The provisions of paragraphs 3.a. and 3.b. of this Stipulation and Agreement shall not be considered to intend, evidence, or represent abandonment in whole or in part of any of the Co-Applicants' Water Rights, the GVIC Water Rights or other water rights listed on Exhibit A and Exhibit B, including, but not limited to, the Power Right.

3.e. Issues concerning waste and reasonable efficiency in the exercise of the water rights, diversion, carriage and delivery systems of the Co-Applicants, GVIC and other owners of the water rights listed on Exhibits A and B, are not determined in this proceeding and all claims and defenses regarding those issues are dismissed without prejudice and shall not be raised by any of the parties in any proceeding before the Division 5 Engineer or the State Engineer or in any judicial proceeding so long as none of the provisions of paragraph 3 of this Stipulation and Agreement are suspended. The parties agree that the time for raising claims and defenses concerning these issues is tolled so long as none of the provisions of paragraph 3 of this Stipulation and Agreement are suspended. Nothing herein shall diminish or limit the statutory authority and responsibility of the Division 5 Engineer. Nothing herein shall affect the rights of the parties regarding the disposition of water saved through implementation of conservation measures. Nor shall anything herein affect the rights of the parties regarding issues relating to administration of water rights, except those issues which the parties have agreed not to raise pursuant to paragraphs 3.a.(5), 3.e., 3.f. and 3.g.

3.e.(1) If, during any period of suspension of paragraph 3.a., an action is brought by any party to this Stipulation and Agreement raising issues concerning waste or reasonable efficiency in the exercise of the GVIC Water Rights, GVIC may then give written notice to the parties that the GVIC Water Rights shall no longer be subject to the terms of paragraph 3.b.

3.e.(2) In the event that any person or entity not a party to this Stipulation and Agreement brings an action raising issues concerning waste or reasonable efficiency in the exercise of the GVIC Water Rights, GVIC may give written notice to the parties that the GVIC Water Rights shall no longer be subject to the terms of paragraph 3.b. If GVIC elects to give such notice, the parties to this Stipulation and Agreement may then join in any such action or bring a separate action concerning issues of waste or reasonable efficiency in the exercise of the GVIC Water Rights.

3.f. Issues concerning the historical administration of Co-Applicants' Water Rights and GVIC's Water Rights and operation of the Orchard Mesa Check as a precondition to exercise of a call by such water rights and as a term and condition of the decree adjudicating the exchange herein are not determined in this proceeding, and all claims and defenses regarding those issues are dismissed without prejudice and shall not be raised so long as none of the provisions of paragraph 3 of this Stipulation and Agreement are suspended. The parties agree that the time for raising claims and defenses concerning the historical administration and operation of the Orchard Mesa Check is tolled as long as none of the provisions of paragraph 3 of this Stipulation and Agreement are suspended.

3.g. Certain Objectors moved the Court for partial summary judgment on the issue of whether OMID is precluded by the terms of the decrees heretofore awarded it from pumping more than 125 c.f.s. for actual irrigation usage. On June 22, 1995, the Court entered an order denying the motion based on the Court's conclusion that "it cannot be said as a matter of law that OMID is limited to an irrigation right of 125 c.f.s." The Court's Order did not preclude the parties from raising and litigating at trial issues concerning whether or not the OMID Right should be limited to 125 c.f.s., nor did it preclude the parties from raising these issues in a separate action. These issues are not determined in this proceeding and all claims and defenses regarding those issues are dismissed without prejudice and shall not be raised so long as none of the provisions of paragraph 3 of this Stipulation and Agreement are suspended. The parties agree that the time for raising claims and defenses concerning such issues is tolled as long as none of the provisions of paragraph 3 of this Stipulation and Agreement are suspended.

4. Operating Policy.

4.a. Nothing contained in this Stipulation and Agreement shall in any manner be construed or intended to limit the availability of water from Green Mountain Reservoir for contract pursuant to paragraphs 4 through 7 of the Operating Policy, subject to the terms and conditions of such contracts, or otherwise adversely affect any Green Mountain Reservoir water service contract.

4.b. Nothing in this Stipulation and Agreement or in the Operating Criteria attached hereto as Exhibit D shall be construed as a consent to the validity or enforceability of the Operating Policy or a waiver or relinquishment of any claims or defenses regarding the validity or enforceability of the Operating Policy.

5. Green Mountain Reservoir Historic User Pool Operating Criteria.

5.a. Co-Applicants and Objectors have jointly developed the Green Mountain Reservoir Historic User Pool Operating Criteria, attached hereto and incorporated herein as Exhibit D ("Operating Criteria"), in order to meet the purposes set forth therein, including defining the terms and conditions under which water in the HUP is surplus to the needs of HUP beneficiaries ("HUP surplus water"). HUP surplus water shall be available for delivery to beneficial uses in Western Colorado under contracts ("HUP surplus water contracts") to be developed by the Bureau of Reclamation. The parties agree that HUP surplus water contracts will provide that HUP surplus water will be delivered to and through the Grand Valley Power Plant to the extent that there is capacity in the power canal and water is needed to produce power at the Grand Valley Power Plant, and that HUP surplus water contracts may provide for delivery of HUP surplus water to other locations and facilities to the extent that there is not capacity in the power canal or that water is not needed to produce power at the Grand Valley Power Plant. Any HUP surplus water contract, entered into pursuant to this Stipulation and Agreement, for delivery of HUP surplus water upstream of the 15-Mile Reach shall be for non-consumptive use only. HUP surplus water contracts shall provide that return flows from delivery of HUP surplus water to and through the Grand Valley Power Plant shall be returned to the river through the tailrace common to the Grand Valley Power Plant and the OMID pumping plant, and that deliveries or return flows of HUP surplus water delivered to other locations and facilities shall flow through the 15-Mile Reach or be returned or delivered to the Colorado River as near as practicable to the upstream point of the 15-Mile Reach, thereby augmenting flows for the recovery of endangered Colorado River fish species.

5.b. The Operating Criteria shall be binding upon and observed by the parties; provided, however, that the Operating Criteria may be amended by mutual agreement of the parties or otherwise modified as provided in this paragraph 5 and paragraph 6 of this Stipulation and Agreement. The parties agree to implement the Operating Criteria and, if necessary, to use good faith efforts to modify such criteria to promote the purposes set forth in paragraph 2 of the Operating Criteria.

5.c. If any party desires to request a modification to the Operating Criteria, based upon an allegation that use of one or more of the party's water rights in existence as of May 31, 1996 have been injured by the Operating Criteria and/or this Stipulation and Agreement, whether such injury be in water quantity, water quality or any injury which occurs as a result of a significant expansion of the amount of water required to offset or satisfy the demands of HUP beneficiaries, as a result of amendment or modification of the Operating Policy, or as a result of a substantial change in the manner in which the Shoshone Rights are exercised, the parties shall follow the procedures set forth below.

5.c.(1) Notice of the asserted injury shall be mailed to all parties to this Stipulation and Agreement. A party's failure to assert a particular type of injury during a given water year shall not limit that party's right to assert such an injury in subsequent water years unless the conditions upon which the claimed injury are based have existed during any five years out of any seven year period following execution of this Stipulation and Agreement.

5.c.(2) The parties shall each have the opportunity to designate a representative to serve on a committee which will review the injury claim and make an initial determination as to whether the alleged injury exists and, if so, whether it was caused by operation of the Operating Criteria and/or the provisions of this Stipulation and Agreement. Any party choosing not to designate a representative shall be deemed to accept the finding of the committee.

5.c.(2)(A) In the event the committee unanimously determines that no injury has occurred or that the injury alleged was not caused in whole or part by operation of the Operating Criteria and/or this Stipulation and Agreement, then the Operating Criteria and all provisions of this Stipulation and Agreement shall remain in full force and effect. If the committee cannot unanimously agree, then the party claiming injury may submit the issue to arbitration in accordance with paragraph 5.c.(3), below.

5.c.(2)(B) If the committee unanimously determines that injury has been caused in whole or in part by the operation of the Operating Criteria and/or this Stipulation and Agreement, then the committee shall attempt to reach agreement as to how to modify the Operating Criteria and/or this Stipulation and Agreement to alleviate such injury to the satisfaction of the parties. If such an agreement is reached, the Operating Criteria and/or this Stipulation and Agreement shall be modified in accordance with that agreement and a stipulated motion to modify this Stipulation and Agreement shall be filed with the Court and any modifications to appropriate documents shall be made.

5.c.(2)(C) In the event the committee unanimously determines that injury has occurred and that it was caused in whole or in part by operation of the Operating Criteria and/or this Stipulation and Agreement, but cannot determine how to alleviate the injury to the satisfaction of the parties, the Operating Criteria and the provisions of paragraph 3 of this Stipulation and Agreement shall be suspended. In that event, any participating party may file a motion in this case or a separate action for determination of such issue and for appropriate relief. The Operating Criteria and the provisions of paragraph 3 of this Stipulation and Agreement shall remain suspended unless and until the Court determines otherwise.

5.c.(2)(D) The committee shall have a maximum period of one year from the date notice of the asserted injury is sent to the parties in which to make its determination of injury and, if injury is found, to reach agreement concerning how to alleviate the injury. During this period, the Operating Criteria and all provisions of this Stipulation and Agreement shall remain in full force and effect.

5.c.(3) Upon written notification from the committee organized under paragraph 5.c.(2), above, notifying all parties that the committee has been unable to agree upon a determination of injury or noninjury, or upon expiration of the one year period to make such determination, any party claiming injury may submit the issue of whether injury has occurred by operation of the Operating Criteria and/or this Stipulation and Agreement to arbitration.

5.c.(3)(A) Arbitration shall be governed by the rules of the American Arbitration Association (or, if it no longer exists, a similar organization). A panel of three arbitrators shall be selected as follows: (i) One person shall be selected by Co-Applicants and GVIC; (ii) One person shall be selected by Objectors; and, (iii) The two

selected arbitrators shall select a third. The arbitrators shall be engineers, hydrologists, geologists, or practicing or retired water lawyers familiar with Colorado water law. None of the arbitrators shall have had any previous association with this case, absent the express consent of the parties.

5.c.(3)(B) Any party to the Stipulation and Agreement may participate as a party in the arbitration. All participating parties shall share in the costs of arbitration equally. Participating parties shall cooperate to conclude the arbitration expeditiously.

5.c.(3)(C) The arbitrators shall issue a written determination within 60 days following the conclusion of the taking of evidence. The arbitrators are only authorized to make determinations as to whether injury has occurred and, if so, whether it was caused by the Operating Criteria and/or this Stipulation and Agreement.

5.c.(3)(C)(i) If the arbitrators determine that injury has occurred and that it was caused by operation of the Operating Criteria and/or this Stipulation and Agreement, the Operating Criteria and the provisions of paragraph 3 of this Stipulation and Agreement shall be suspended. The parties shall then re-convene the committee organized under paragraph 5.c.(2), above, and the committee shall attempt to reach agreement as to how to alleviate such injury to the satisfaction of the parties. If such an agreement is reached, the Operating Criteria and/or this Stipulation and Agreement shall be modified in accordance with that agreement and a stipulated motion to modify this Stipulation and Agreement shall be filed with the Court and any modifications to appropriate documents shall be made. The committee shall have a maximum of six months from the date the arbitrators' determination is sent to the parties in which to reach agreement concerning how to alleviate the injury. Upon written notification from the committee notifying all parties that the committee has been unable to agree as to how to alleviate the injury, or upon expiration of the six month period for the committee to reach agreement, any participating party may proceed as provided in paragraph 5.c.(2)(C), above. The Operating Criteria and the provisions of paragraph 3 of this Stipulation and Agreement shall remain suspended unless and until the committee is able to unanimously agree on necessary modifications to the Operating Criteria and/or this Stipulation and Agreement, or unless and until the Court determines otherwise.

5.c.(3)(C)(ii) If the arbitrators determine that no injury has occurred, or that injury has occurred but was not caused by operation of the Operating Criteria and/or this Stipulation and Agreement, the Operating Criteria and all provisions of this Stipulation and Agreement shall remain in full force and effect.

5.c.(3)(D) Any party to the arbitration who disagrees with the arbitrators' decision may file a motion in this case or a separate action for de novo review of the issue of injury and its causation and any issues related thereto, including whether the Operating Criteria and/or whether any provisions of this Stipulation and Agreement should be suspended, reinstated, or modified.

5.d. In the event the Operating Criteria are suspended, no water in the HUP shall be deemed to be surplus to the needs of the HUP beneficiaries, and releases from the HUP shall only be made to replace out-of-priority depletions by HUP beneficiaries and to make direct deliveries to HUP beneficiaries. In the event the Operating Criteria are suspended, the provisions of paragraph 3 of this Stipulation and Agreement shall also be suspended, and the Power Right may be fully exercised and the water rights listed in Exhibits A and B may place an administrative call and seek curtailment of diversions by HUP beneficiaries to the extent that HUP releases are less than the out-of-priority depletions of HUP beneficiaries.

5.e. In the event the Operating Criteria or HUP surplus water contracts are determined to be invalid or unenforceable by a court of competent jurisdiction, then the Operating Criteria shall be deemed suspended under paragraph 5.d., and paragraph 5.d. shall apply.

6. Entry of Decree. The parties agree that the decree attached hereto as Exhibit C shall be entered by the Court and that the Court shall retain jurisdiction for the purposes of considering any motion filed pursuant to paragraph 5 of this Stipulation and Agreement. In the event the Operating Criteria and the provisions of paragraph 3 of this Stipulation and Agreement are suspended, the parties shall then be free to raise any and all claims, whether in this case or in a separate action, including but not limited to, the matters addressed in paragraphs 3.a.(5), 3.e., 3.f. and 3.g. of this Stipulation and Agreement, except that the priority date and rate of the exchange shall not be relitigated. The parties agree that the Court shall not use the entry of the decree adjudicating the exchange and the priority thereof in a manner prejudicial to the positions or claims of either Co-Applicants or Objectors in any such subsequently filed motion or action. Any and all claims and defenses

asserted in this proceeding, including issues as to the relevancy of various matters to this application, may be asserted by the parties and shall not be deemed waived.

7. Binding Effect. Upon the execution of this Stipulation and Agreement by all of the parties hereto, which execution must take place on or before September 4, 1996, and upon the Court's approval of this Stipulation and Agreement, this Stipulation and Agreement shall become effective and the rights and obligations created hereby shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns; provided, however, that the Operating Criteria and the limitations set forth in paragraphs 3.a. and 3.b. shall not take effect until the beginning of the 1997 irrigation season, i.e., April 1, 1997. The parties to this Stipulation and Agreement may consist of less than all the parties to Case No. 91CW247 only if the parties to this Stipulation and Agreement consent in writing to the full effectiveness hereof notwithstanding the failure of other parties to Case No. 91CW247 to execute the same.

8. Authority of Counsel to Bind Parties. Counsel executing this Stipulation and Agreement represent that they are authorized by their client(s) to do so.

9. Notice. All notices required or permitted under this Stipulation and Agreement shall be effective when sent to a party by certified United States mail, return receipt requested, to the address shown for that party on the attached Exhibit E, or to any new address of any party or any party's successor-in-interest, provided that notice of any such new address has been sent to all parties in accordance with this paragraph.

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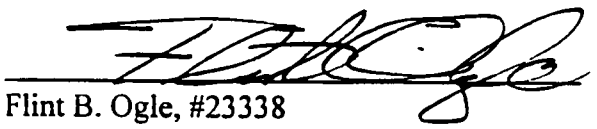

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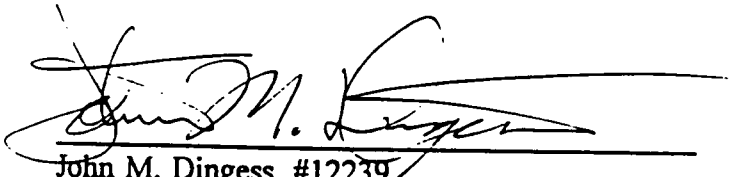

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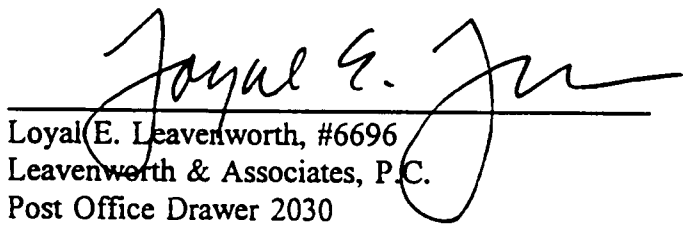

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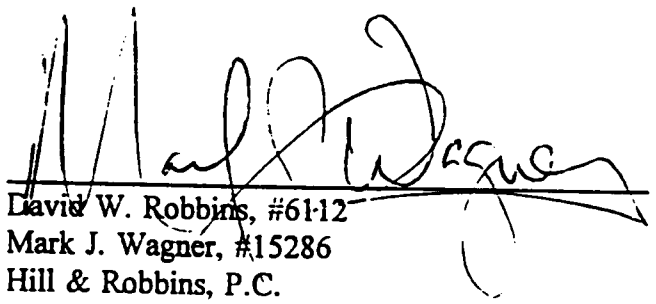

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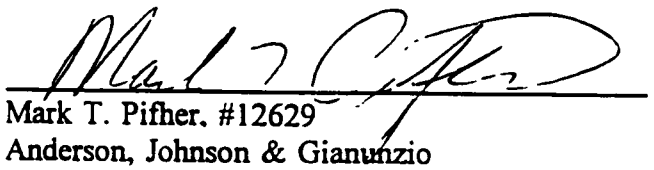

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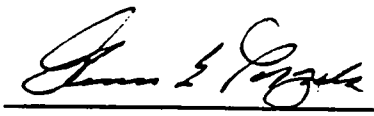

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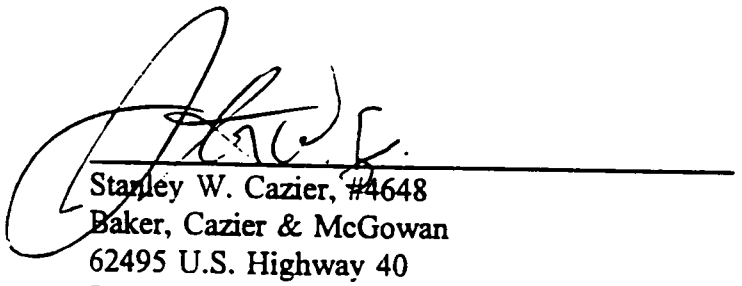

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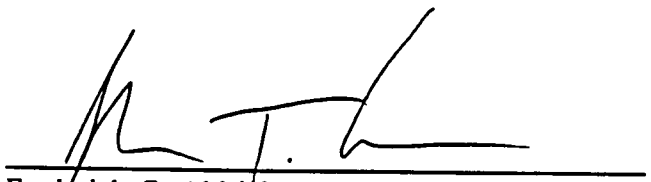

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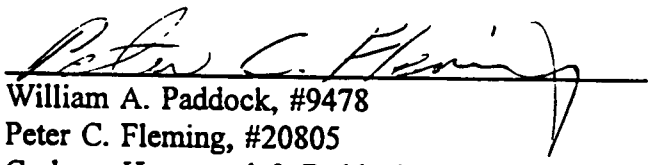

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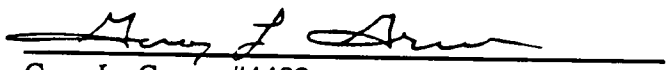

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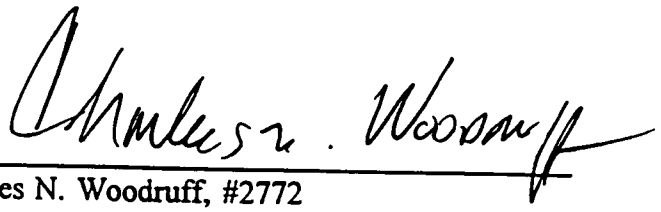

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EXHIBIT A

Stipulation and Agreement
Case No. 91CW247, Water Division No. 5

CO-APPLICANTS' WATER RIGHTS

Owner	Amount/cfs	Adjudication Date	Appropriation Date	Source
Irrigation use:				
Orchard Mesa Irrigation District	450	07/22/1912	10/25/1907	Colorado R.
Orchard Mesa Irrigation District	10.2	07/22/1912	10/01/1900	Colorado R.
Grand Valley Water Users Association/United States	730	07/22/1912	02/27/1908	Colorado R.
Palisade Irrigation District	80	07/22/1912	10/01/1889	Colorado R.
Palisade Irrigation District	23.5	07/25/1941	06/01/1918	Colorado R.
Mesa County Irrigation District	40	07/22/1912	07/06/1903	Colorado R.
Power:				
Grand Valley Water Users Association/United States 1/	400/800	07/25/1941	02/27/1908	Colorado R.

1/ 400 during irrigation season & 800 during non-irrigation season.

91cw247

EXHIBIT B

Stipulation and Agreement
Case No. 91CW247, Water Division No. 5

GVIC WATER RIGHTS

Owner	Amount/cfs	Adjudication Date	Appropriation Date	Source
Grand Valley Irrigation Company	520.81	07/22/1912	08/22/1882	Colorado River
Grand Valley Irrigation Company	119.47	07/25/1941	04/26/1914	Colorado River

91CW247

91CW247

EXHIBIT C
Stipulation and Agreement
Case No. 91CW247, Water Division No. 5

DISTRICT COURT, WATER DIVISION NO. 5, COLORADO

Case No. 91CW247

FINDINGS OF FACT, CONCLUSIONS OF LAW, JUDGMENT AND DECREE

CONCERNING THE APPLICATION FOR WATER RIGHTS OF THE GRAND VALLEY WATER USERS ASSOCIATION, ORCHARD MESA IRRIGATION DISTRICT, AND THE UNITED STATES OF AMERICA, IN MESA COUNTY, COLORADO

FINDINGS OF FACT

1. Filing of Application. This matter was commenced on December 30, 1991 by the filing of an Application to Confirm and Approve Appropriative Right of Exchange which application was amended by leave of Court on May 24, 1993.

2. Co-Applicants. The application and amendment were filed by the United States of America (the "United States"), the Grand Valley Water Users Association, a corporation (the "Association"), and the Orchard Mesa Irrigation District, a corporation ("OMID"). The United States, the Association and OMID are referred to herein as the "Co-Applicants."

3. Objectors.

3.1 Statements of Opposition Opposing Application. The following parties filed timely Statements of Opposition opposing the application or seeking protective terms and conditions:

Basalt, Town of
Basalt Water Conservancy District
Carbondale, Town of
Collbran, Town of
Colorado Division of Wildlife
Colorado Springs, City of
Copper Mountain, Inc.
Copper Mountain Consolidated Metropolitan District (successor-in-interest to Copper Mountain Water & Sanitation District)

DeBeque, Town of
Eagle, Town of
Glenwood Springs, City of
Grand County Water & Sanitation District No. 1
Middle Park Water Conservancy District
Mid Valley Metropolitan District
Mobil Mining and Minerals Company
Natec Resources, Inc.
New Castle, Town of
North Barton Creek Ltd. Liability Company
Palisade, Town of
Parachute, Town of
Pueblo, Board of Water Works of
Public Service Company of Colorado
Ralston Resorts, Inc. (successor-in-interest to Keystone Resorts Management, Inc. and Breckenridge Ski Corporation)
Rifle, City of
Rifle Land Associates, Ltd.
Silverthorne, Town of
Spruce Valley Ranch Foundation
Summit County Commissioners, Board of
Union Oil Company of California
Upper Eagle Regional Water Authority

3.2 Statements of Opposition in Support of Application. The following parties filed timely Statements of Opposition in support of the application:

Colorado River Water Conservation District
Colorado State Engineer
Division Engineer, Water Division No. 5
Grand Valley Irrigation Company

3.3 Intervenors. The following parties did not file timely Statements of Opposition, but were granted leave to intervene as Objectors:

Aurora, City of
Colorado Water Conservation Board
Cyprus Climax Metals Company
Exxon Company, U.S.A.
Englewood, City of
Frisco, Town of

Vail Associates, Inc.
Vail Valley Consolidated Water District

3.4 Withdrawals. The following parties subsequently withdrew their Statements of Opposition:

Collbran, Town of (by Order dated January 29, 1996)
Englewood, City of (by Withdrawal dated March 8, 1996)
Natec Resources, Inc. (by Order dated January 29, 1996)

4. Stipulation. On or about September 23, 1996, the parties filed the Stipulation and Agreement attached hereto as Attachment 1. The Stipulation and Agreement has been executed by the Co-Applicants and by all the Objectors who remain parties to the case and provides that the parties to the Stipulation and Agreement agree to the entry of a decree herein granting the application as amended and incorporating the terms of the Stipulation and Agreement.

5. Jurisdiction. Timely and adequate notice of the filing and contents of the application and amendment to the application herein was given in the manner required by law. The time for filing Statements of Opposition and for seeking leave to intervene has expired. The Court has jurisdiction over the subject matter of this proceeding and over all persons and owners of property affected hereby, irrespective of whether or not those persons and owners of property have appeared.

6. Relief Requested by Application. The application requests confirmation of an appropriative right of substitution and exchange for an existing exchange on the Colorado River which is based on the operation of a structure commonly referred to as the Orchard Mesa Check. Co-Applicants request adjudication of an absolute right for this existing exchange, in the amount of 640 c.f.s., with a priority of April 1, 1926.

7. Description of Exchange Facilities. In order to describe the exchange, it is helpful to describe the facilities by which the exchange is operated. These facilities are described as follows:

7.1 Point of Diversion. The point of diversion for the exchange and the upstream point of the exchange is the headgate on the right (West) side of the Grand Valley Project diversion dam on the Colorado River (commonly referred to as the "Roller Dam") located in the Northwest Quarter of Section 13, Township 10 South, Range 98 West, 6th P.M., in Mesa County, Colorado, on the right (West) bank of the Colorado River at a point whence the Southwest Corner of said Section 13 bears South 16°41' West 4,023 feet (the "Upstream Point of Exchange").

7.2 Point of Delivery of Substitute Supply. The water diverted by exchange is returned to the Colorado River immediately upstream from the Grand Valley Irrigation Company ("GVIC") diversion dam, which is located at a point on the right (West) bank of the Colorado River from whence the Northeast Corner of Section 3, Township 1 South, Range 2 East, of the Ute Meridian, in Mesa County, Colorado, bears North 13°18' East 1,800 feet (the "Downstream Point of Exchange").

7.3 Delivery Facilities. The water diverted by exchange at the Upstream Point of Exchange is delivered for a distance of approximately 4.6 miles through the Highline Canal located on the right (West) bank of the Colorado River, at which point it is diverted under the Colorado River by means of a siphon into the Orchard Mesa Power Canal located on the left (East) bank of the Colorado River. The Orchard Mesa Power Canal delivers the water diverted by exchange for a distance of approximately 3.8 miles to the Grand Valley Power Plant and the OMID Pumping Plant.

7.4 Grand Valley Power Plant. The Grand Valley Power Plant is owned by the United States and leased to the Association, OMID and the Public Service Company of Colorado. A portion of the water diverted by exchange is diverted into the Grand Valley Power Plant for power generation purposes.

7.5 OMID Pumping Plant. The remainder of the water diverted by exchange is diverted into the OMID Pumping Plant to operate hydraulic pumps which lift irrigation water into OMID irrigation canals.

7.6 Afterbay. All the water used for non-consumptive power generation purposes at the Grand Valley Power Plant and non-consumptive operation of hydraulic pumps at the OMID Pumping Plant passes into a common afterbay located below the Grand Valley Power Plant and the OMID Pumping Plant (the "Afterbay"). If the water in the Afterbay is allowed to flow in its natural course, it reenters the Colorado River at a point below the GVIC diversion dam.

7.7 Orchard Mesa Check. The Orchard Mesa Check (the "Check") is a structure which can be operated to alter the point at which water in the Afterbay reenters the Colorado River. The Check is located at or near the downstream end of the Afterbay, across the channel through which water from the Afterbay flows back to the Colorado River. The Check consists of three mechanically operated radial gates and a bypass channel which parallels the Colorado River to a point immediately above the GVIC diversion dam. The Check is operated by lowering one or more of the three radial gates. The lowered gate or gates block the flow in the channel leading from the Afterbay to the Colorado River, thus raising the level of the water in the Afterbay by up to eight feet, more or less. Raising the level of the water in the Afterbay causes water in the Afterbay to flow through the Check's

bypass channel. The water flowing in this bypass channel returns to the Colorado River immediately above the GVIC diversion dam. Thus, the operation of the Check alters the point at which water in the Afterbay is returned to the Colorado River. When the Check is not being operated, water flowing into the Afterbay is returned to the Colorado River at a point below the GVIC diversion dam. When the Check is being operated, some or all of the water flowing into the Afterbay is returned to the Colorado River above the GVIC diversion dam, where it can then be diverted by GVIC which owns water rights senior in priority to the water rights owned by Co-Applicants. The Check may be operated in varying degrees to return more or less water in the Afterbay to the Colorado River above the GVIC diversion dam depending upon the demands of GVIC and the Co-Applicants and the amount of water available at the Roller Dam.

8. Description of Orchard Mesa Check Exchange. The operation of the Check constitutes an appropriative right of substitution and exchange. This existing exchange has been operated as described below.

8.1 Point of Diversion/Upstream Point of Exchange. The point of diversion for the exchange, which is also referred to herein as the Upstream Point of Exchange, is the Roller Dam on the Colorado River, the location of which is set forth in paragraph 7.1, above.

8.2 Point of Delivery of Substitute Supply/Downstream Point of Exchange. The point of delivery of the substitute supply, which is also referred to herein as the Downstream Point of Exchange, is a point at which water diverted into the Check bypass channel returns to the Colorado River immediately above the GVIC diversion dam, the location of which is set forth in paragraph 7.2, above.

8.3 Exchange Reach. The reach of the Colorado River over which the exchange depletes river flows (the "Exchange Reach") extends from the Upstream Point of Exchange described in paragraph 7.1, above, to the Downstream Point of Exchange described in paragraph 7.2, above, and is approximately 8.4 miles in length.

8.4 Source. The source of the water diverted by exchange is the Colorado River.

8.5 Description of Operation of Exchange. The exchange operates by the diversion of water out of the Colorado River at the Upstream Point of Exchange, delivery of that water through the Highline Canal and the Power Canal to the Grand Valley Power Plant and the OMID Pumping Plant for non-consumptive power generation and hydraulic pumping purposes, and the return of the same amount of water to the Colorado River at the Downstream Point of Exchange through operation of the Check. The water returned to the Colorado River at the Downstream Point of Exchange by diversion through the Check bypass

channel can then be diverted by GVIC which owns water rights senior in priority to the water rights owned by Co-Applicants.

8.6 Amount. The maximum flow rate of the exchange is 640 c.f.s., absolute.

8.7 Use. The water diverted by exchange is used for non-consumptive power generation and hydraulic pumping purposes at the Grand Valley Power Plant and the OMID Pumping Plant.

8.8 Priority. The date of initiation of the appropriation is April 1, 1926, the date of completion of construction of the Check and the Check bypass channel. The appropriation was completed with reasonable diligence by the operation of the exchange up to its maximum rate of flow and beneficial use of water diverted by exchange for the uses described above. Co-Applicants have complied with the requirements of Rule 89, C.R.C.P., the exchange has been administered in a manner consistent with recognition of the original priority date of the exchange, and, pursuant to § 37-92-305(10), C.R.S., Co-Applicants are entitled to recognition of the original priority date of April 1, 1926 for this existing exchange, without postponement under § 37-92-306, C.R.S.

9. Terms and Conditions. The terms and conditions set forth below will prevent injury to the vested water rights and conditional water rights of others and will ensure that the substitute supply made available under the exchange will be of a quality, quantity and continuity adequate to meet the requirements of the uses to which the water of senior appropriators has normally been put.

9.1 Quality of substitute supply. The same water which is diverted by exchange out of the Colorado River at the Upstream Point of Exchange shall be returned to the Colorado River at the Downstream Point of Exchange. The return of the same water, after its use in non-contaminating power generating and hydraulic pumping facilities, will ensure that the water returned to the river, i.e., the substitute supply, is of a quality to meet the requirements of the uses to which senior appropriators have normally put such water.

9.2 Quantity of substitute supply. The amount of water returned to the Colorado River above the GVIC diversion dam at the Downstream Point of Exchange by operation of the Check (the "substitute supply") shall equal or exceed the amount of water diverted by exchange out of the Colorado River by means of the Roller Dam at the Upstream Point of Exchange.

9.3 Continuity of substitute supply. The water diverted by exchange out of the Colorado River at the Upstream Point of Exchange shall be returned to the Colorado River at the Downstream Point of Exchange in approximately the same time as it would take that water to flow in the Colorado River from the Upstream Point of Exchange to the Downstream Point of Exchange if the water were left in the river.

9.4 Intervening Seniors. All water rights located between the Upstream Point of Exchange and the Downstream Point of Exchange, i.e., within the Exchange Reach, which are senior to the date of appropriation of the exchange, shall be fully satisfied by the remaining flows subject to their call.

9.5 Terms of Stipulation Incorporated. The terms and conditions of the Stipulation and Agreement attached hereto as Attachment 1 are incorporated herein.

10. Decree Administrable. The Court notes that, by way of the Stipulation and Agreement attached hereto as Attachment 1, the State and Division Engineer for Water Division No. 5 stipulated to the entry of this decree. The Court finds that this decree is administrable by the Division Engineer for Water Division No. 5.

CONCLUSIONS OF LAW

11. Incorporation of Findings of Fact. The Court incorporates the foregoing Findings of Fact to the extent that these may constitute conclusions of law.

12. Jurisdiction. Timely and adequate notice of the filing and contents of the application and the amendment to the application herein was given in the manner required by law. The time for filing Statements of Opposition and for seeking leave to intervene has expired. The Court has jurisdiction over all persons and owners of property affected hereby, irrespective of whether or not those persons and owners of property have appeared.

13. Subject Matter Jurisdiction. The Court has jurisdiction over the subject matter of this proceeding. The application herein is one contemplated by law, and adjudication of the exchange described in this decree is authorized by law and is within the jurisdiction of this Court. §§ 37-80-120, 37-92-101, *et seq.*, C.R.S. The right of substitution and exchange decreed herein is an appropriative water right, with a priority date and, like other appropriative water rights, must be exercised within the priority system and in accordance with applicable state law. §§ 37-80-120(4), 37-92-101, *et seq.*, C.R.S.

14. Appropriative Right of Exchange. The appropriative right of exchange confirmed herein was initiated on April 1, 1926, was diligently prosecuted thereafter, and was completed with reasonable diligence by the diversion of water by exchange and the application of such water to the beneficial uses described herein. §§ 37-92-305(1), 37-92-305(9)(a) C.R.S.

15. Non-Injury. Subject to the terms and conditions of the Stipulation and Agreement, the exchange may be operated under terms and conditions which prevent injury to the vested water rights and conditional water rights of others, including the requirement that the substitute supply made available under the exchange will be of a quality, quantity and continuity adequate to meet the requirements of the uses to which the water of senior appropriators has normally been put. §§ 37-80-120(2), (3) & (4), 37-92-305(3) & (5), C.R.S.

16. Entitlement to Original Priority Without Postponement. Pursuant to § 37-92-305(10), C.R.S., Co-Applicants are entitled to recognition of the original priority date of April 1, 1926 for the exchange described herein, without postponement under § 37-92-306, C.R.S.

JUDGMENT AND DECREE

Based on the foregoing Findings of Fact and Conclusions of Law, it is hereby adjudged, ordered and decreed that:

17. Incorporation of Findings of Fact and Conclusions of Law. The foregoing Findings of Fact and Conclusions of Law are incorporated herein as if set out verbatim.

18. Confirmation of Orchard Mesa Check Exchange. Subject to the terms and conditions set forth herein, the Court hereby confirms and approves the Orchard Mesa Check Exchange which is more specifically described in the Findings of Fact, above, in the amount of 640 c.f.s., absolute, with a priority date of April 1, 1926, without postponement under § 37-92-306, C.R.S.

19. Terms and Conditions. The terms and conditions set forth in the Stipulation and Agreement, as well as paragraph 9, above, will prevent injury to the vested water rights and conditional water rights of others and will ensure that the substitute supply made available under the exchange will be of a quality, quantity and continuity adequate to meet the requirements of the uses to which the water of senior appropriators has normally been put.

20. Approval and Incorporation of Stipulation and Agreement. The parties have executed the Stipulation and Agreement attached hereto as Attachment 1. The Court, having reviewed the Stipulation and Agreement and being otherwise fully advised in the premises,

hereby approves the Stipulation and Agreement and incorporates it into this decree as though it were restated here in full.

21. Retained Jurisdiction. The Court shall retain permanent jurisdiction over the subject matter of this case and parties hereto for all purposes set forth in the Stipulation and Agreement; provided, however. that the priority date and amount of the exchange are finally determined hereby and will not be further considered under the Court's retained jurisdiction.

22. Filing of Decree with State and Division Engineers. A copy of these Findings of Fact, Conclusions of Law. Judgment and Decree shall be filed with the State Engineer and the Division Engineer for Water Division No. 5.

Dated at Glenwood Springs, Colorado, this ____ day of _____, 1996.

THOMAS W. OSSOLA
Water Judge
Water Division No. 5

91CW247

EXHIBIT D

Stipulation and Agreement

Case No. 91CW247

GREEN MOUNTAIN RESERVOIR HISTORIC USER POOL

OPERATING CRITERIA

1. DEFINITIONS. The definitions set forth in paragraph 1 of the forgoing Stipulation and Agreement are incorporated herein. For purposes of these Operating Criteria and the Stipulation and Agreement, "HUP surplus water" shall mean that amount of the HUP which, in accordance with paragraph 8 of the Operating Policy is included in that portion of the stored water in Green Mountain Reservoir in excess of that necessary to meet the objectives of paragraphs 2 and 4 of the Operating Policy, and which is determined under these Operating Criteria to be available for releases for HUP surplus water contracts at any particular time after taking into consideration releases to be made to meet the replacement and direct delivery needs of HUP beneficiaries.

2. PURPOSES AND OBJECTIVES. The purposes and objectives of these Operating Criteria are to:

2.a. Ensure that a sufficient quantity of water is retained in the HUP for release to meet the replacement needs of HUP beneficiaries throughout the irrigation season.

2.b. Ensure that a sufficient quantity of water is retained in the HUP for release to meet the direct delivery needs of the Grand Valley Water Users Association, Orchard Mesa Irrigation District, Grand Valley Irrigation Company, Mesa County Irrigation District and Palisade Irrigation District throughout the irrigation season.

2.c. Ensure that a sufficient quantity of water is retained in the HUP at the end of the irrigation season for release to meet the winter needs of HUP beneficiaries.

2.d. Define the terms and conditions under which water in the HUP is surplus to the needs of HUP beneficiaries, and therefore available for delivery to beneficial uses in Western Colorado, in accordance with paragraph 8 of the Operating Policy, under contract(s) to be developed, and indirectly to the 15-Mile Reach to augment flows for the recovery of endangered Colorado River fish species.

3. HUP Operating Criteria. Figure 1, attached to these Operating Criteria, depicts the estimated "Upstream HUP Replacement Allocation," estimated "Winter HUP Allocation," and estimated "Total HUP Draw Down Band".

3.a. The Upstream HUP Replacement Allocation represents the maximum volume required to fully meet the irrigation, domestic and municipal replacement needs of HUP beneficiaries upstream of Shoshone (a.k.a. the Glenwood Power Canal) for the remainder of the irrigation season. The total volume of water estimated for this purpose is 14,685 acre-feet at the beginning of the irrigation season. This volume diminishes throughout the irrigation season as depicted in Figure 1. Attachment A to these Operating Criteria documents the data and technical analyses used to estimate this volume.

3.b. The Winter HUP Allocation represents the maximum volume required to fully meet the domestic and municipal replacement needs of HUP beneficiaries during the winter or non-irrigation season. The total volume of water estimated for this

purpose is 500 acre-feet. Attachment A to these Operating Criteria documents the data and technical analyses used to estimate this volume.

3.c. The Total HUP Draw Down Band represents the estimated range of storage volumes that will serve as a guideline for managing HUP releases in dry years similar to those analyzed in Attachment A to these Operating Criteria to accomplish the purposes of Section 2 as more fully described in Section 3.d and 3.e of these Operating Criteria. Attachment A to these Operating Criteria documents the data and technical analyses used to estimate this range of volumes.

3.d. In order to meet the purposes and objectives of Section 2, above, the Bureau of Reclamation, after direct consultation with the Grand Valley Water Users Association, Orchard Mesa Irrigation District, Grand Valley Irrigation Company, Colorado Division of Water Resources, Colorado Water Conservation Board and Fish and Wildlife Service (the Bureau of Reclamation and the above mentioned entities with whom the Bureau of Reclamation shall consult in managing releases of water from the HUP are hereafter collectively referred to as the "managing entities"), will attempt to manage the release of water from the HUP to maintain actual storage conditions within the range of storage volumes as represented by the Total HUP Draw Down Band and will attempt to manage the release of water from the HUP so that the entire HUP, except the Winter HUP Allocation, will be released by the end of the irrigation season unless the managing entities determine that the release of such water is not necessary to meet the purposes and objectives of Section 2, above, considering hydrologic, demand and operational conditions. However, it is expressly recognized that in some years release of

the entire HUP by the end of the irrigation season may not be necessary or possible. Grand Valley Water Users Association, Orchard Mesa Irrigation District and Grand Valley Irrigation Company retain exclusive control of determining their irrigation demands, subject to the otherwise applicable administrative powers of the Colorado Division of Water Resources and the provisions of the Stipulation and Agreement. It is recognized that actual storage conditions may deviate from the indicated range due to hydrologic, demand and operational conditions; however, the managing entities will take all reasonable actions to maintain actual HUP storage conditions within the indicated range. The obligation of the managing entities to take reasonable actions to maintain actual HUP storage conditions within the indicated range shall be limited to operation of the Orchard Mesa Check and such other actions as to which the managing entities agree. At any particular time during the irrigation season, the actual HUP storage volume shall not fall below the volume indicated by the sum of the Upstream HUP Replacement Allocation at that time and Winter HUP Allocation, as depicted in Figure 1, unless required by Acts of God or emergency situations beyond the control of the managing entities, or unless modified as provided for in paragraph 5 of the Stipulation and Agreement.

3.e. To accomplish management of the HUP as described in Section 3.d, the managing entities agree to participate in the following process.

3.e.(1) On or before June 30 of each year, the Bureau of Reclamation will conduct a meeting, involving the managing entities, to review HUP storage conditions, projected runoff forecasts, climatological conditions, projected irrigation

demands and 15-Mile Reach flow needs, and other operational conditions to determine an annual operational plan for the Green Mountain Reservoir HUP, the Orchard Mesa Check and the Grand Valley Power Plant ("Annual HUP Operating Plan"). The Annual HUP Operating Plan will cover water operations for the July through October irrigation season. Water in the HUP shall not be deemed to be surplus to the needs of HUP beneficiaries prior to the determination that there is at least 66,000 acre feet of water available for releases for the benefit of HUP beneficiaries when Green Mountain Reservoir ceases to be in priority for its initial fill under the Blue River Decrees, as provided by paragraph 3.b.(2) of the Stipulation and Agreement.

3.e.(2) The managing entities agree to participate in subsequent meetings during the irrigation season to reexamine HUP storage conditions, projected runoff forecasts, climatological conditions, projected irrigation demands and 15-Mile Reach flow needs, and other operational conditions on an as-needed basis to modify the Annual HUP Operating Plan. Any of the managing entities may call for a meeting, and all of the managing entities agree to participate to reexamine changing conditions and to modify the Annual HUP Operating Plan. All such meetings will be open to the public.

3.e.(3) The managing entities agree to make good faith efforts to develop an Annual HUP Operating Plan that is unanimously supported by the managing entities. If however, an Annual HUP Operating Plan cannot be developed that is unanimously agreed to, the Bureau of Reclamation reserves the right to establish a release schedule from the HUP for the irrigation season in question consistent with the Total HUP Draw Down Band and the State water right priority system. The Bureau of

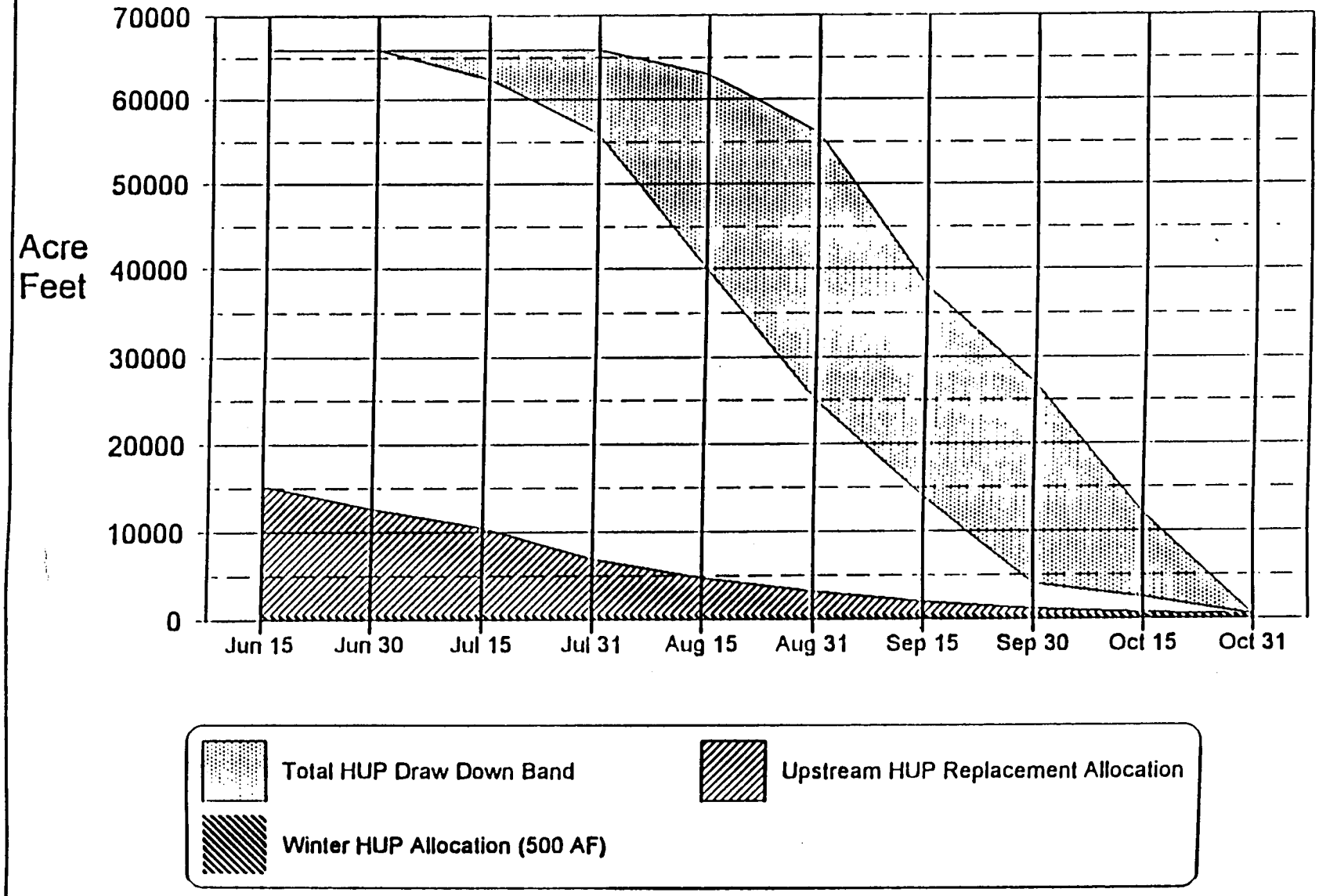
Reclamation's establishment of a release schedule pursuant to the preceding sentence shall not prevent any other of the managing entities from requesting a subsequent meeting to reexamine changing conditions and to develop the Annual HUP Operating Plan.

4. Nothing contained in these Operating Criteria shall diminish or limit the statutory authority and responsibility of the Colorado Division of Water Resources or be deemed to alter the duties and responsibilities of the Bureau of Reclamation under the Operating Policy, Senate Document 80 and the Blue River Decrees.

Figure 1

Green Mountain Reservoir

HUP Operating Criteria - Dry Years



January 11, 1996

91cw247

9/CW 247

July 18, 1996

Orchard Mesa Check Case: Effects of Settlement Proposal on 15-Mile Reach Flows

Hydrology studies were conducted to evaluate effects of the settlement proposal on flows and water quality in the Colorado River near Cameo, use of the Green Mountain Reservoir 66,000 acre-foot Historic User Pool (HUP), and use of Ruedi Reservoir for fish releases. This document contains study results pertaining to flows in the 15-Mile Reach ("Reach") of the Colorado River for seven drier than average years between 1977 and 1994.

To analyze the effects of the settlement proposal compared to historic conditions, a computer model was developed to simulate four different scenarios:

1) Historic Conditions (*Historic*)
2) Historic Conditions Without Ruedi Reservoir Fish Releases (*Historic without Ruedi*)
3) Settlement Proposal Without Ruedi Reservoir Fish Releases (*Settlement without Ruedi*)
4) Settlement Proposal with Ruedi Reservoir Fish Releases (*Settlement with Ruedi*)

The "*without Ruedi*" scenarios (2 and 3 above) were necessary because no Ruedi fish releases were made historically until 1989. Also, in 1989 and 1990, only 10,000 acre-feet were released for fish. The *Settlement with Ruedi* scenario assumes 20,000 acre-feet available for fish releases in all seven years analyzed.

Comparing results between *Historic without Ruedi* and *Settlement without Ruedi* shows the effect of the settlement due to changes in Green Mountain Reservoir HUP releases only (effects of Ruedi fish releases, if any, were removed). Comparing results between *Historic* and *Settlement with Ruedi* shows the effect of the settlement with both HUP releases and Ruedi fish releases. *Historic without Ruedi* and *Settlement without Ruedi* must be compared to evaluate the effect of the settlement in the years where historic Ruedi fish releases were less than 20,000 acre-feet (zero in 1977, 1981, and 1988; 10,000 acre-feet in 1989 and 1990). Although *Settlement with Ruedi* does provide an estimated flow projection, it should be compared with *Historic* only in the years where historic Ruedi fish releases actually totaled 20,000 acre-feet (1991 and 1994).

Analysis Results

Tables and graphs are attached showing estimated flows in the Reach from March through November for the seven years analyzed. In four of the years analyzed, the estimates show that releasing surpluses from the Green Mountain HUP under the terms of the settlement could result in higher average flows in the Reach than occurred historically (increases ranged from 6 cfs to 78 cfs). In two of the years evaluated (1977 and 1989), average flows under the settlement were essentially the same as historically (1 cfs to 2 cfs lower). In these years, no surplus HUP water was available to increase flows under the terms of the settlement. Lower average flows in 1994 are due to limited canal capacity to deliver surplus water from the HUP to the Grand Valley Power Plant (discussed below), not due to lack of water in the HUP. Results for 1994 with increased canal capacity to utilize the HUP show an average flow increase of about 37 cfs.

Modeling Approach

For each of the seven years evaluated, daily historic records were compiled for river flows, irrigation diversions, and releases from the two reservoir pools. The period March through November was modeled for each year. All seven years had below-average annual water yields, ranging from a low of 46 percent of the long term yield in 1977 to a high of 77 percent in 1991. The percentages below are based on the 1991 (58-year) long term yield of the United States Geological Survey (USGS) Colorado River near Cameo streamflow gaging site:

Year	Annual Yield (Acre Feet)	Percentage of Long Term Yield
1977	1,304,000	46
1981	1,529,000	54
1988	2,096,000	75
1989	1,851,000	66
1990	1,638,000	58
1991	2,174,000	77
1994	2,071,000	74

A computer model was used to calculate historic flows in the Reach and to calculate projected flows under the settlement proposal. USGS gaged records of flows in the Reach were not available for any year modeled except 1994; the 1994 historic flows were calculated in the same manner as the other years. Flow in the Reach was calculated as: flow at Cameo, minus irrigation and power diversions, plus flow from Plateau Creek, plus return flows from the Orchard Mesa Power and Pumping plants. The 15-Mile Reach historic flows calculated for 1994 are higher than the USGS gaged flows for 1994; this is believed to be due to accuracy problems with the Cameo and Palisade gages in 1994.

Existing hydropower capacity constraints were also modeled to insure that release of any surplus Green Mountain HUP water was made only as power flow deliveries to the Orchard Mesa Power Plant. In two of the years analyzed (1991 and 1994), the existing capacity constraints restricted the release of surplus HUP water. To simulate the effect of delivering surplus water to other non-consumptive beneficial uses downstream from Cameo, two additional model runs were made for these years. Modeled hydropower capacities were increased by 200 cfs and then by 400 cfs, which resulted in partial and full utilization of the surplus HUP water, respectively.

In addition to historical records, the computer model uses several parameters that influence Green Mountain and Ruedi releases and flows in the Reach. These include the Green Mountain HUP drawdown rule curve, target flow for the 15-Mile Reach, and the hydropower capacity constraints discussed above.

Green Mountain Reservoir HUP Rule Curve

The rule curve determines the amount and timing of Green Mountain releases in the computer model. Rule curve configuration, and resulting release patterns affect the Cameo call, flows in the Reach, HUP use, Ruedi use, and water quality. The rule curves used in computer modeling were intended for example simulation purposes and are shown below. In all years except 1977 and 1989, the rule curves set the HUP volume to 66,000 acre feet on June 15, and set the minimum pool to 500 acre feet on October 31. In 1977 and 1989, historic HUP releases exceeded 66,000 acre-feet and the June 15 HUP volume was set accordingly.

Green Mountain HUP Rule Curves

	1977	1981	1988	1989	1990	1991	1994
Jun 15	66,750	66,000	66,000	71,750	66,000	66,000	66,000
Jun 30	66,000	66,000	66,000	71,750	66,000	66,000	65,000
Jul 15	65,000	66,000	66,000	71,750	66,000	66,000	64,000
Jul 31	60,000	63,000	61,000	71,750	64,800	60,000	58,000
Aug 15	42,423	47,000	53,000	70,000	55,200	51,000	51,000
Aug 31	34,190	30,000	37,600	63,000	36,200	39,000	40,000
Sep 15	17,697	20,000	22,500	43,000	12,900	29,000	30,000
Sep 30	4,089	10,000	18,500	30,000	4,900	15,000	20,000
Oct 15	2,500	7,000	11,000	12,000	2,300	7,000	8,000
Oct 31	500	500	500	500	500	500	500

15-Mile Reach Flow Targets

The computer model flow target for the Reach was in the 700 to 1,100 cfs range for all years analyzed except 1977, the driest year. The flow target set for each year was based on hydrologic conditions, not on the flow recommendations published in the May 1995 U.S. Fish and Wildlife Service report (*Relationships Between Flow and Rare Fish Habitat in the '15-Mile Reach of the Upper Colorado River'*). The target flow setting directly affects Ruedi fish releases in the model, and remains constant for the entire March through November period being modeled. If modeled flows in the Reach are lower than the target, the model attempts to release water for fish from Ruedi (limited by the release restrictions described below). If modeled flows in the Reach are higher than the target, the model does not make fish releases. The following flow targets were used for the model runs:

Year	15-Mile Reach Target Flows
1977	600 cfs
1981	800 cfs
1988	800 cfs
1989	800 cfs
1990	700 cfs
1991	1,100 and 1,110 cfs
1994	1,000 cfs

In the 1991 analysis with 400 cfs increased hydropower capacity, the flow target of 1,100 cfs resulted in the 20,000 acre-foot Ruedi pool not being fully utilized. Increasing the computer model target flow by 10 cfs (to 1,110 cfs) allowed use of the full supply of Ruedi water.

The model logic controlling Ruedi fish releases has many constraints and assumptions. These include a maximum flow below the reservoir of 250 cfs, a minimum flow of 110 cfs, and limiting total releases for the year to 20,000 acre-feet. At least 85,000 acre-feet must be kept in reservoir storage until Labor Day. The model assumes that a 20,000 acre-foot pool is available every year, that the reservoir is full on June 15, and does not calculate reservoir volume prior to June 15.

In the model, Ruedi fish releases are not restricted to the months of August, September, and October. This results in the model attempting to make Ruedi fish releases whenever flows in the Reach drop below the model target flow. In this study, this occurred most often in April, after irrigation diversions had begun, but before natural river flows increased due to runoff. In some of the drier years analyzed, the full 20,000 acre-foot pool was released before the end of October. In the 1977 analysis (the driest year), the full pool was released before August 15.

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1977 Flow in the 15-Mile Reach (cfs)

		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
March	Max:	1,430	1,430	1,430	1,430
	Min:	251	251	251	377
	Avg:	948	948	948	966
April	Max:	870	870	870	951
	Min:	148	148	148	229
	Avg:	435	435	435	524
May	Max:	2,198	2,198	2,198	2,198
	Min:	542	542	542	570
	Avg:	1,047	1,047	1,047	1,052
June	Max:	3,297	3,297	3,297	3,297
	Min:	170	170	170	282
	Avg:	1,487	1,487	1,501	1,534
July	Max:	829	829	829	913
	Min:	0	0	84	210
	Avg:	244	244	266	389
August	Max:	722	722	693	693
	Min:	33	33	107	114
	Avg:	227	227	212	240
September	Max:	752	752	722	722
	Min:	253	253	349	349
	Avg:	483	483	468	468
October	Max:	1,197	1,197	1,197	1,197
	Min:	228	228	188	188
	Avg:	577	577	563	563
November	Max:	1,528	1,528	1,528	1,528
	Min:	854	854	854	854
	Avg:	1,310	1,310	1,310	1,310

March through November		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
	Max:	3,297	3,297	3,297	3,297
	Min:	0	0	84	114
	Avg:	748	748	747	780

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1981 Flow in the 15-Mile Reach (cfs)

		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
March	Max:	1,303	1,303	1,303	1,303
	Min:	699	699	699	748
	Avg:	1,003	1,003	1,003	1,030
April	Max:	1,672	1,672	1,672	1,672
	Min:	228	228	228	354
	Avg:	779	779	779	853
May	Max:	5,512	5,512	5,512	5,512
	Min:	691	691	691	736
	Avg:	1,940	1,940	1,940	1,943
June	Max:	7,960	7,960	7,960	7,960
	Min:	1,325	1,325	1,325	1,325
	Avg:	4,040	4,040	4,040	4,040
July	Max:	1,787	1,787	1,787	1,787
	Min:	251	251	361	397
	Avg:	906	906	950	981
August	Max:	455	455	688	808
	Min:	28	28	213	339
	Avg:	240	240	603	728
September	Max:	843	843	843	843
	Min:	344	344	698	713
	Avg:	522	522	727	762
October	Max:	1,495	1,495	1,495	1,495
	Min:	257	257	716	716
	Avg:	813	813	899	899
November	Max:	1,878	1,878	1,878	1,878
	Min:	1,229	1,229	1,229	1,229
	Avg:	1,593	1,593	1,593	1,593

March through November		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
	Max:	7,960	7,960	7,960	7,960
	Min:	28	28	213	339
	Avg:	1,309	1,309	1,387	1,420

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1988 Flow in the 15-Mile Reach (cfs)

		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
March	Max:	2,392	2,392	2,392	2,392
	Min:	1,774	1,774	1,774	1,774
	Avg:	2,012	2,012	2,012	2,012
April	Max:	2,995	2,995	2,995	2,995
	Min:	1,767	1,767	1,767	1,767
	Avg:	2,270	2,270	2,270	2,270
May	Max:	9,987	9,987	9,987	9,987
	Min:	2,133	2,133	2,133	2,133
	Avg:	5,057	5,057	5,057	5,057
June	Max:	10,730	10,730	10,730	10,730
	Min:	3,729	3,729	3,729	3,729
	Avg:	6,282	6,282	6,282	6,282
July	Max:	4,105	4,105	4,105	4,105
	Min:	367	367	547	648
	Avg:	1,406	1,406	1,453	1,503
August	Max:	740	740	732	844
	Min:	397	397	503	629
	Avg:	557	557	602	726
September	Max:	1,647	1,647	1,406	1,456
	Min:	301	301	308	434
	Avg:	672	672	695	777
October	Max:	642	642	800	802
	Min:	330	330	539	549
	Avg:	476	476	692	735
November	Max:	2,061	2,061	2,061	2,061
	Min:	457	457	457	457
	Avg:	1,687	1,687	1,687	1,687

March through November		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
	Max:	10,730	10,730	10,730	10,730
	Min:	301	301	308	434
	Avg:	2,262	2,262	2,299	2,333

9/CW247

1989 Flow in the 15-Mile Reach (cfs)

		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
March	Max:	2,455	2,455	2,455	2,455
	Min:	1,412	1,412	1,412	1,412
	Avg:	1,964	1,964	1,964	1,964
April	Max:	4,032	4,032	4,032	4,032
	Min:	1,288	1,288	1,288	1,288
	Avg:	2,289	2,289	2,289	2,289
May	Max:	6,602	6,602	6,602	6,602
	Min:	1,322	1,322	1,322	1,322
	Avg:	3,862	3,862	3,862	3,862
June	Max:	5,867	5,867	5,867	5,867
	Min:	2,261	2,261	2,261	2,261
	Avg:	3,809	3,809	3,809	3,809
July	Max:	2,124	2,124	2,124	2,124
	Min:	579	579	384	493
	Avg:	1,236	1,236	1,199	1,220
August	Max:	1,177	1,177	1,177	1,177
	Min:	543	518	430	520
	Avg:	867	864	723	811
September	Max:	935	863	765	831
	Min:	404	320	473	599
	Avg:	662	575	639	734
October	Max:	825	825	705	803
	Min:	391	271	312	438
	Avg:	550	491	593	686
November	Max:	1,749	1,749	1,747	1,747
	Min:	1,053	1,053	1,049	1,049
	Avg:	1,596	1,596	1,594	1,594

March through November		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
	Max:	6,602	6,602	6,602	6,602
	Min:	391	271	312	438
	Avg:	1,867	1,851	1,849	1,882

9/CW247

1990 Flow in the 15-Mile Reach (cfs)

		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
March	Max:	1,562	1,562	1,562	1,562
	Min:	664	664	664	664
	Avg:	1,311	1,311	1,309	1,309
April	Max:	720	720	718	812
	Min:	147	147	147	224
	Avg:	489	489	488	566
May	Max:	4,911	4,911	4,911	4,911
	Min:	179	179	179	295
	Avg:	1,517	1,517	1,517	1,555
June	Max:	9,293	9,293	9,293	9,293
	Min:	2,090	2,090	2,090	2,090
	Avg:	4,966	4,966	4,966	4,966
July	Max:	2,231	2,231	2,231	2,231
	Min:	476	476	556	556
	Avg:	1,347	1,347	1,348	1,351
August	Max:	733	733	600	708
	Min:	348	260	82	208
	Avg:	498	456	494	616
September	Max:	690	645	694	748
	Min:	271	201	89	215
	Avg:	475	411	411	468
October	Max:	1,136	1,116	1,084	1,084
	Min:	344	300	333	333
	Avg:	589	549	573	573
November	Max:	1,780	1,780	1,776	1,776
	Min:	647	610	606	606
	Avg:	1,479	1,475	1,471	1,471

March through November		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
	Max:	9,293	9,293	9,293	9,293
	Min:	147	147	82	208
	Avg:	1,401	1,385	1,391	1,424

9/AW247

1991 Flow in the 15-Mile Reach (cfs)

existing hydropower capacity

		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
March	Max:	1,693	1,693	1,693	1,693
	Min:	1,319	1,319	1,319	1,319
	Avg:	1,454	1,454	1,453	1,453
April	Max:	2,347	2,347	2,347	2,347
	Min:	671	671	667	757
	Avg:	1,323	1,323	1,321	1,360
May	Max:	10,004	10,004	10,004	10,004
	Min:	948	948	944	954
	Avg:	5,209	5,209	5,208	5,217
June	Max:	11,971	11,971	11,971	11,971
	Min:	4,268	4,268	4,268	4,268
	Avg:	8,430	8,430	8,430	8,430
July	Max:	4,525	4,525	4,525	4,525
	Min:	1,188	1,188	1,188	1,188
	Avg:	2,377	2,377	2,377	2,377
August	Max:	1,168	1,168	1,168	1,168
	Min:	506	371	560	686
	Avg:	804	735	758	855
September	Max:	1,678	1,558	1,466	1,547
	Min:	579	444	570	696
	Avg:	991	909	919	996
October	Max:	1,490	1,445	1,413	1,413
	Min:	446	275	728	800
	Avg:	713	571	808	885
November	Max:	2,289	2,289	2,287	2,287
	Min:	1,248	1,248	1,246	1,246
	Avg:	1,938	1,936	1,934	1,934

March through November		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
	Max:	11,971	11,971	11,971	11,971
	Min:	446	275	560	686
	Avg:	2,574	2,541	2,570	2,604

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1991 Flow in the 15-Mile Reach (cfs)

+200 cfs hydropower capacity

		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
March	Max:	1,693	1,693	1,693	1,693
	Min:	1,319	1,319	1,319	1,319
	Avg:	1,454	1,454	1,453	1,453
April	Max:	2,347	2,347	2,347	2,347
	Min:	671	671	667	757
	Avg:	1,323	1,323	1,321	1,360
May	Max:	10,004	10,004	10,004	10,004
	Min:	948	948	944	954
	Avg:	5,209	5,209	5,208	5,217
June	Max:	11,971	11,971	11,971	11,971
	Min:	4,268	4,268	4,268	4,268
	Avg:	8,430	8,430	8,430	8,430
July	Max:	4,525	4,525	4,525	4,525
	Min:	1,188	1,188	1,188	1,188
	Avg:	2,377	2,377	2,377	2,377
August	Max:	1,168	1,168	1,168	1,168
	Min:	506	371	760	850
	Avg:	804	735	841	939
September	Max:	1,678	1,558	1,466	1,547
	Min:	579	444	770	896
	Avg:	991	909	1,019	1,096
October	Max:	1,490	1,445	1,413	1,413
	Min:	446	275	928	1,000
	Avg:	713	571	976	1,052
November	Max:	2,289	2,289	2,287	2,287
	Min:	1,248	1,248	1,246	1,246
	Avg:	1,938	1,936	1,934	1,934

March through November		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
	Max:	11,971	11,971	11,971	11,971
	Min:	446	275	667	757
	Avg:	2,574	2,541	2,610	2,643

9/AW247

1991 Flow in the 15-Mile Reach (cfs)

+400 cfs hydropower capacity

		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
March	Max:	1,693	1,693	1,693	1,693
	Min:	1,319	1,319	1,319	1,319
	Avg:	1,454	1,454	1,453	1,453
April	Max:	2,347	2,347	2,347	2,347
	Min:	671	671	667	757
	Avg:	1,323	1,323	1,321	1,363
May	Max:	10,004	10,004	10,004	10,004
	Min:	948	948	944	964
	Avg:	5,209	5,209	5,208	5,220
June	Max:	11,971	11,971	11,971	11,971
	Min:	4,268	4,268	4,268	4,268
	Avg:	8,430	8,430	8,430	8,430
July	Max:	4,525	4,525	4,525	4,525
	Min:	1,188	1,188	1,188	1,188
	Avg:	2,377	2,377	2,377	2,377
August	Max:	1,168	1,168	1,168	1,168
	Min:	506	371	960	968
	Avg:	804	735	981	1,079
September	Max:	1,678	1,558	1,466	1,542
	Min:	579	444	708	753
	Avg:	991	909	1,116	1,157
October	Max:	1,490	1,445	1,413	1,413
	Min:	446	275	539	665
	Avg:	713	571	837	939
November	Max:	2,289	2,289	2,287	2,287
	Min:	1,248	1,248	1,246	1,246
	Avg:	1,938	1,936	1,934	1,934

March through November		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
	Max:	11,971	11,971	11,971	11,971
	Min:	446	275	539	665
	Avg:	2,574	2,541	2,620	2,653

91CW247

1994 Flow in the 15-Mile Reach (cfs)

existing hydropower capacity

		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
March	Max:	2,342	2,342	2,342	2,342
	Min:	1,603	1,603	1,603	1,603
	Avg:	2,167	2,167	2,167	2,167
April	Max:	3,990	3,990	3,990	3,990
	Min:	850	850	850	895
	Avg:	1,958	1,958	1,948	1,953
May	Max:	7,715	7,715	7,715	7,715
	Min:	1,886	1,886	1,886	1,886
	Avg:	5,140	5,140	5,140	5,140
June	Max:	9,933	9,933	9,933	9,933
	Min:	1,794	1,794	1,794	1,794
	Avg:	4,797	4,797	4,797	4,797
July	Max:	1,620	1,620	1,620	1,620
	Min:	522	471	626	752
	Avg:	855	850	838	925
August	Max:	1,100	965	687	813
	Min:	541	478	643	769
	Avg:	817	722	667	793
September	Max:	1,176	1,018	888	1,014
	Min:	586	428	685	699
	Avg:	888	721	713	792
October	Max:	1,170	1,170	1,020	1,020
	Min:	537	537	708	708
	Avg:	779	747	750	750
November	Max:	1,802	1,802	1,802	1,802
	Min:	1,048	1,048	1,048	1,048
	Avg:	1,568	1,568	1,568	1,568

March through November		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
	Max:	9,933	9,933	9,933	9,933
	Min:	522	428	626	699
	Avg:	2,105	2,072	2,062	2,096

91CW247

1994 Flow in the 15-Mile Reach (cfs)

+200 cfs hydropower capacity

		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
March	Max:	2,342	2,342	2,342	2,342
	Min:	1,603	1,603	1,603	1,603
	Avg:	2,167	2,167	2,167	2,167
April	Max:	3,990	3,990	3,990	3,990
	Min:	850	850	850	895
	Avg:	1,958	1,958	1,948	1,953
May	Max:	7,715	7,715	7,715	7,715
	Min:	1,886	1,886	1,886	1,886
	Avg:	5,140	5,140	5,140	5,140
June	Max:	9,933	9,933	9,933	9,933
	Min:	1,794	1,794	1,794	1,794
	Avg:	4,797	4,797	4,797	4,797
July	Max:	1,620	1,620	1,620	1,620
	Min:	522	471	433	559
	Avg:	855	850	879	966
August	Max:	1,100	965	885	1,011
	Min:	541	478	489	615
	Avg:	817	722	724	849
September	Max:	1,176	1,018	900	1,011
	Min:	586	428	572	572
	Avg:	888	721	860	940
October	Max:	1,170	1,170	1,020	1,020
	Min:	537	537	759	759
	Avg:	779	747	924	924
November	Max:	1,802	1,802	1,802	1,802
	Min:	1,048	1,048	1,048	1,048
	Avg:	1,568	1,568	1,568	1,568

March through November		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
	Max:	9,933	9,933	9,933	9,933
	Min:	522	428	433	559
	Avg:	2,105	2,072	2,109	2,142

91 CW 247

1994 Flow in the 15-Mile Reach (cfs)

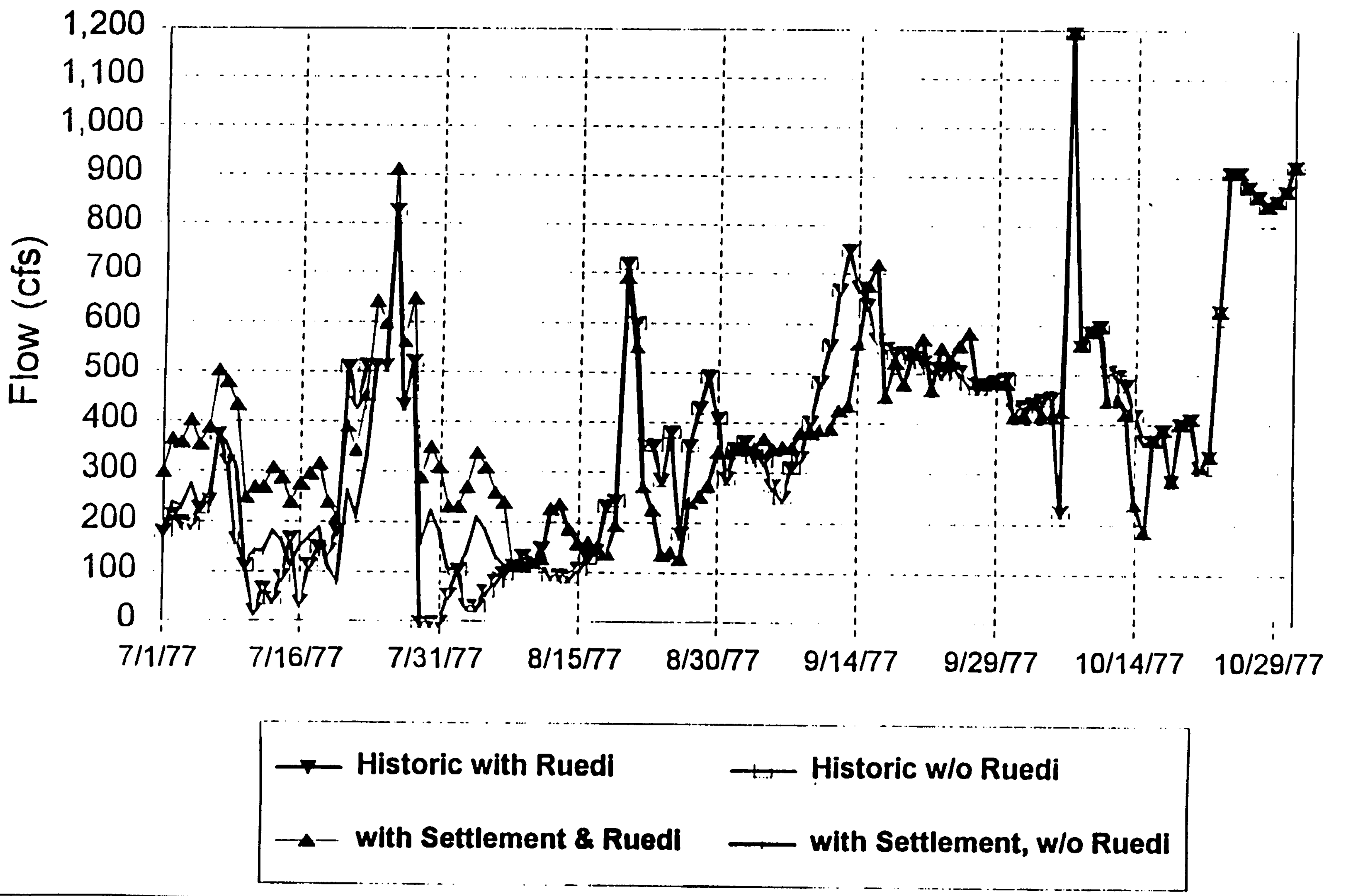
+400 cfs hydropower capacity

		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
March	Max:	2,342	2,342	2,342	2,342
	Min:	1,603	1,603	1,603	1,603
	Avg:	2,167	2,167	2,167	2,167
April	Max:	3,990	3,990	3,990	3,990
	Min:	850	850	850	895
	Avg:	1,958	1,958	1,948	1,953
May	Max:	7,715	7,715	7,715	7,715
	Min:	1,886	1,886	1,886	1,886
	Avg:	5,140	5,140	5,140	5,140
June	Max:	9,933	9,933	9,933	9,933
	Min:	1,794	1,794	1,794	1,794
	Avg:	4,797	4,797	4,797	4,797
July	Max:	1,620	1,620	1,620	1,620
	Min:	522	471	432	558
	Avg:	855	850	879	956
August	Max:	1,100	965	998	1,124
	Min:	541	478	489	615
	Avg:	817	722	728	846
September	Max:	1,176	1,018	1,090	1,139
	Min:	586	428	572	628
	Avg:	888	721	856	925
October	Max:	1,170	1,170	1,200	1,200
	Min:	537	537	662	662
	Avg:	779	747	926	955
November	Max:	1,802	1,802	1,802	1,802
	Min:	1,048	1,048	1,048	1,048
	Avg:	1,568	1,568	1,568	1,568

March through November		Historic	Historic w/o Ruedi	with Settlement w/o Ruedi	with Settlement and Ruedi
	Max:	9,933	9,933	9,933	9,933
	Min:	522	428	432	558
	Avg:	2,105	2,072	2,110	2,143

1977 Flow in the 15-Mile Reach

Target flow 600 cfs



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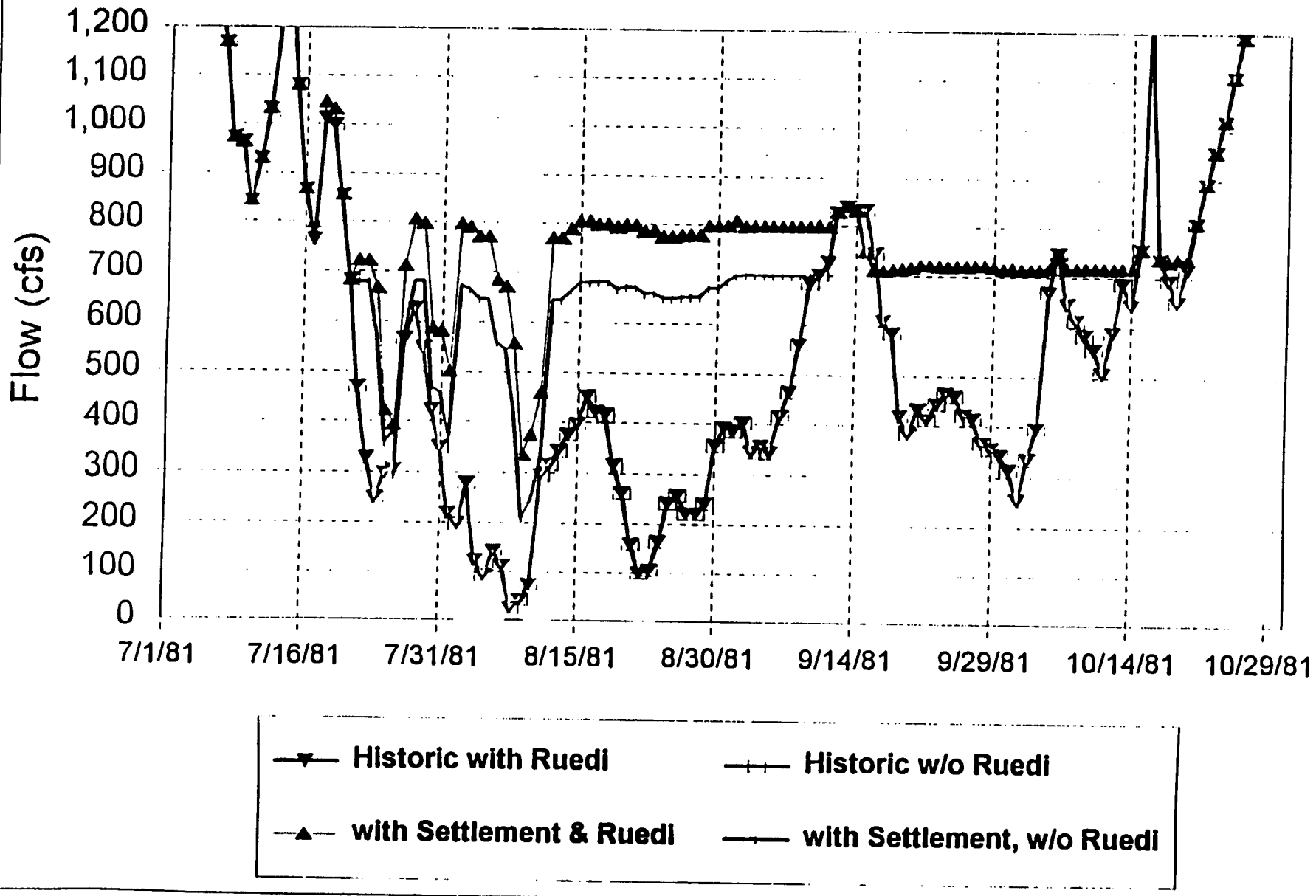
July 16, 1996

1981 Flow in the 15-Mile Reach

Target flow 800 cfs

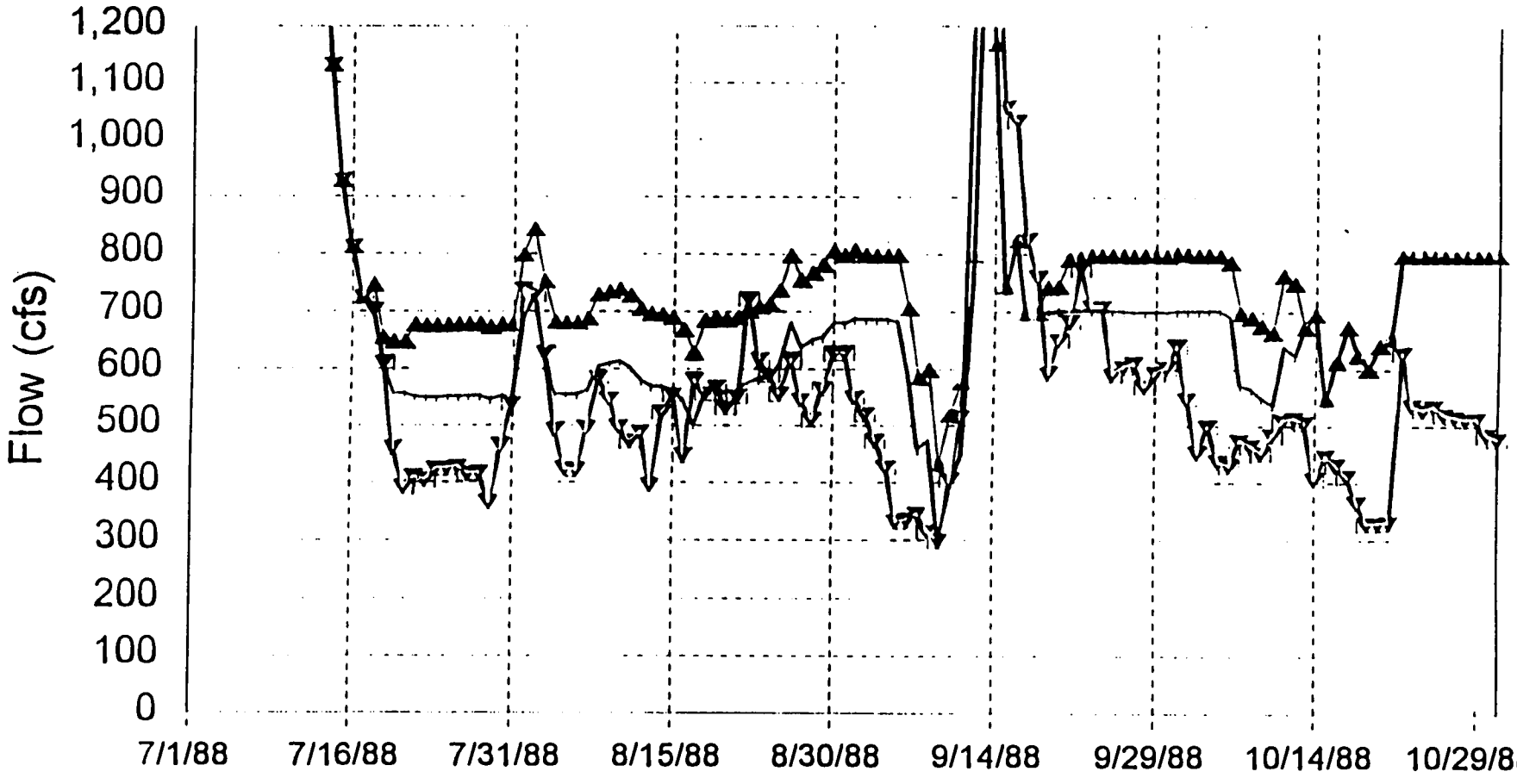


91 dw 347

July 16, 1996

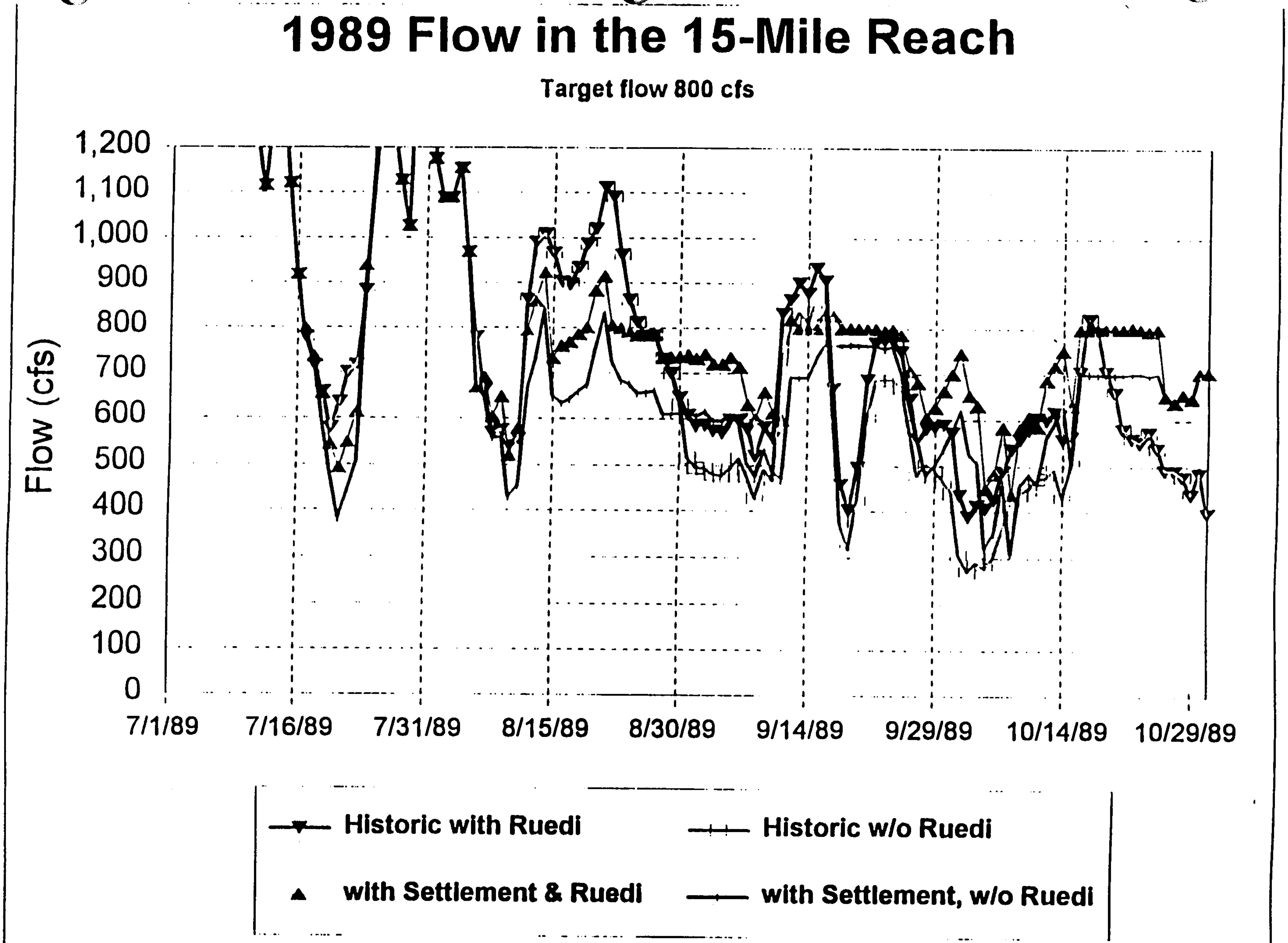
1988 Flow in the 15-Mile Reach

Target flow 800 cfs



July 16, 1996

91aw247

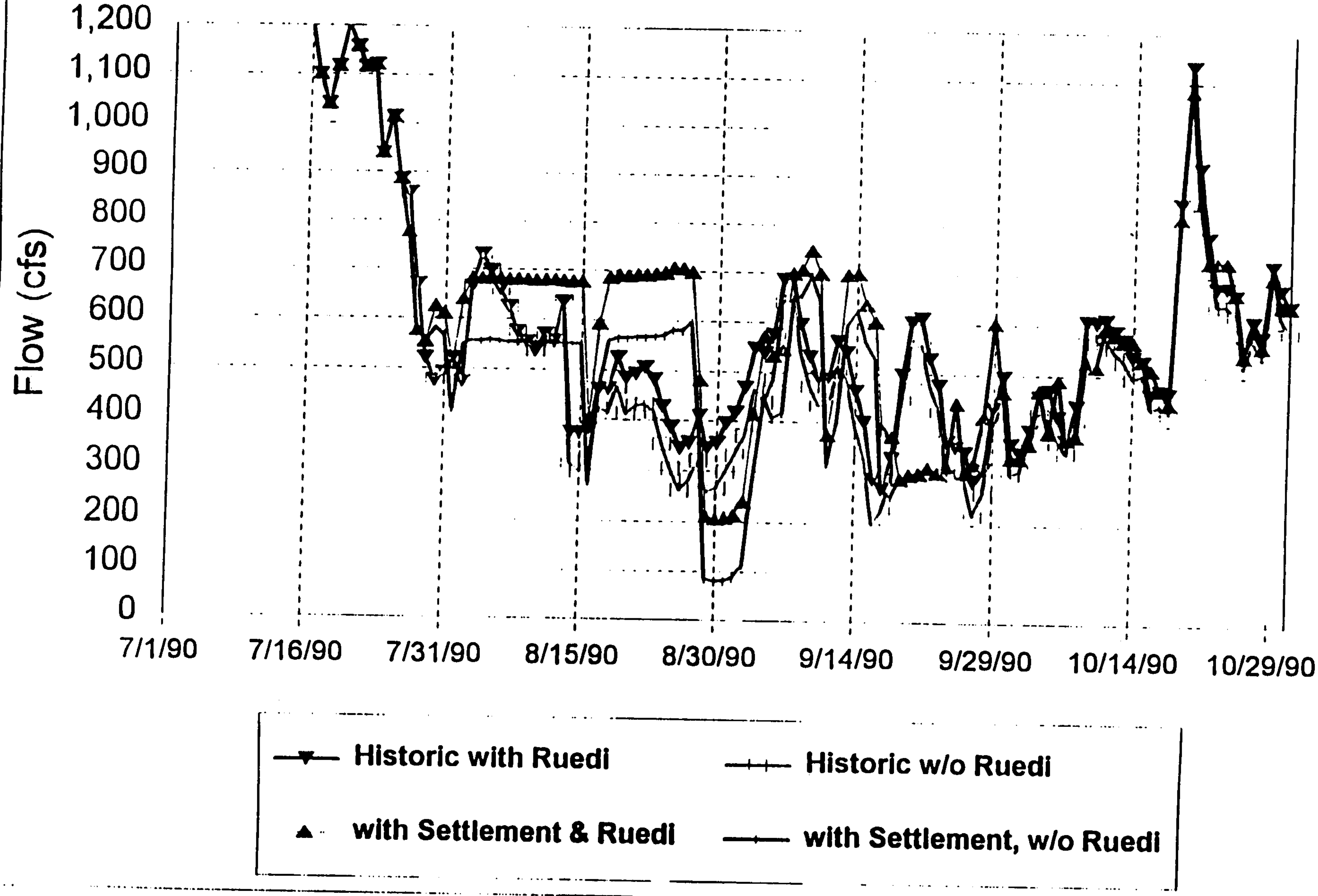


91CW247

July 16, 1996

1990 Flow in the 15-Mile Reach

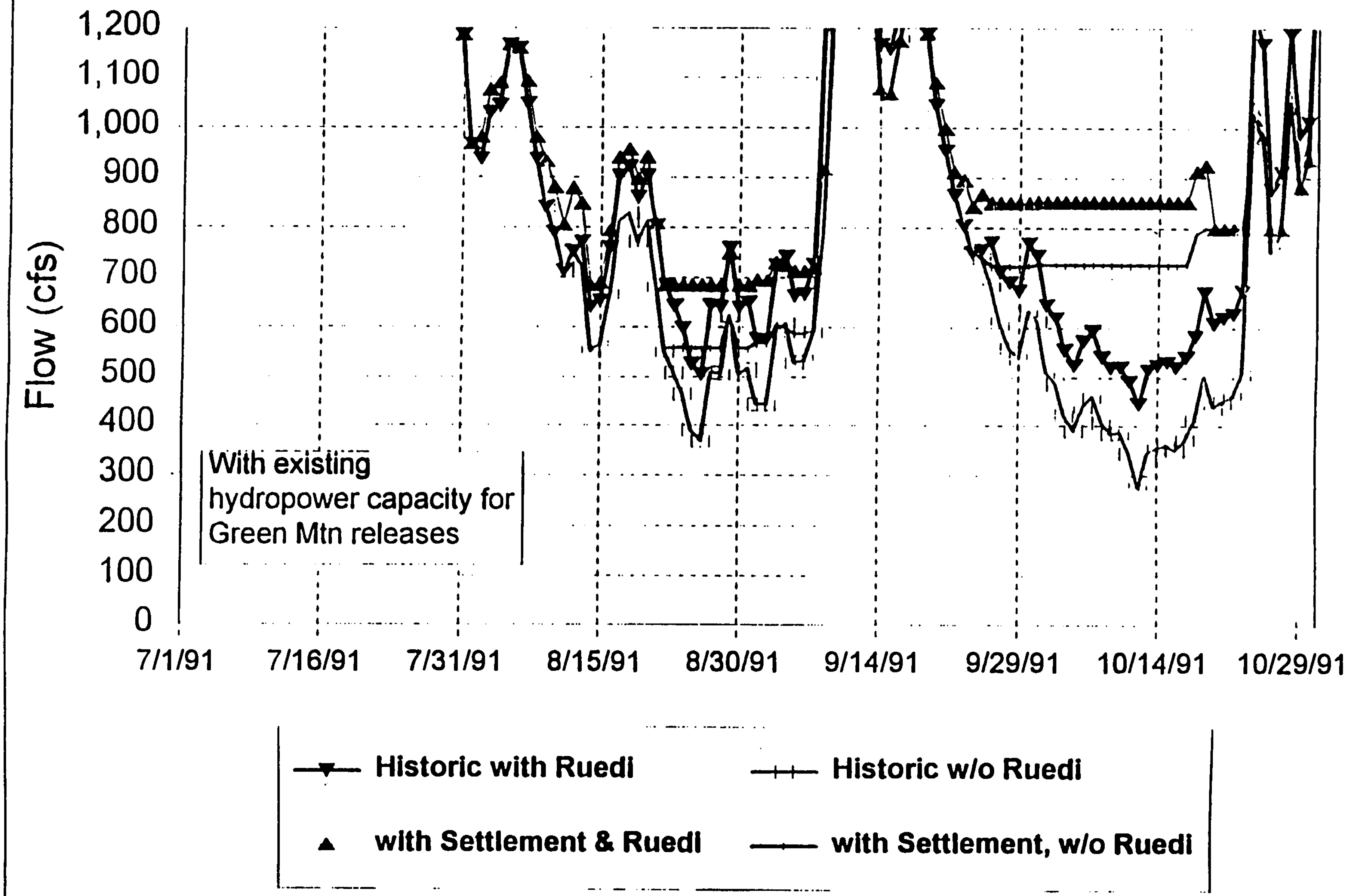
Target flow 700 cfs



July 16, 1996

1991 Flow in the 15-Mile Reach

Target flow 1,100 cfs



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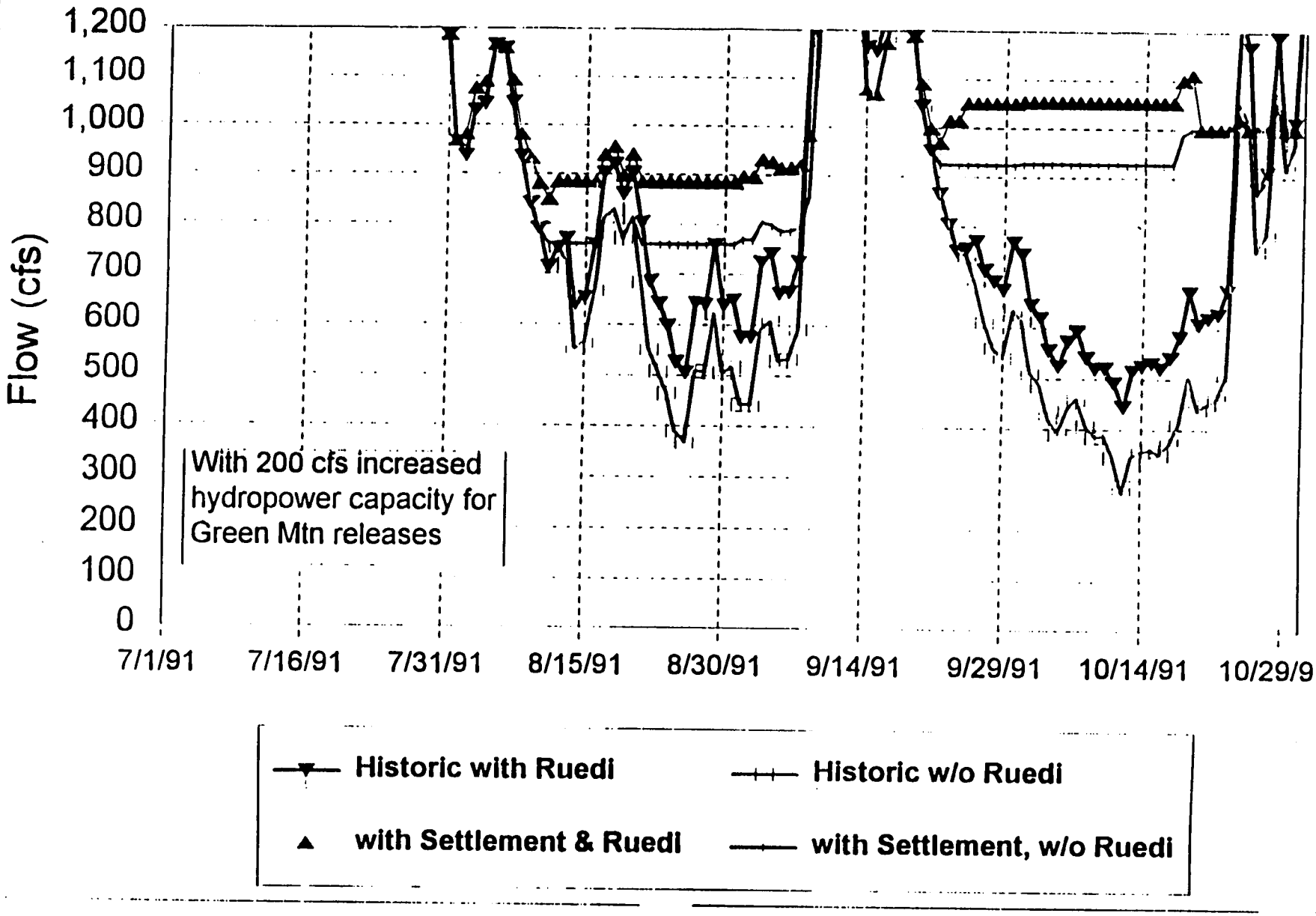
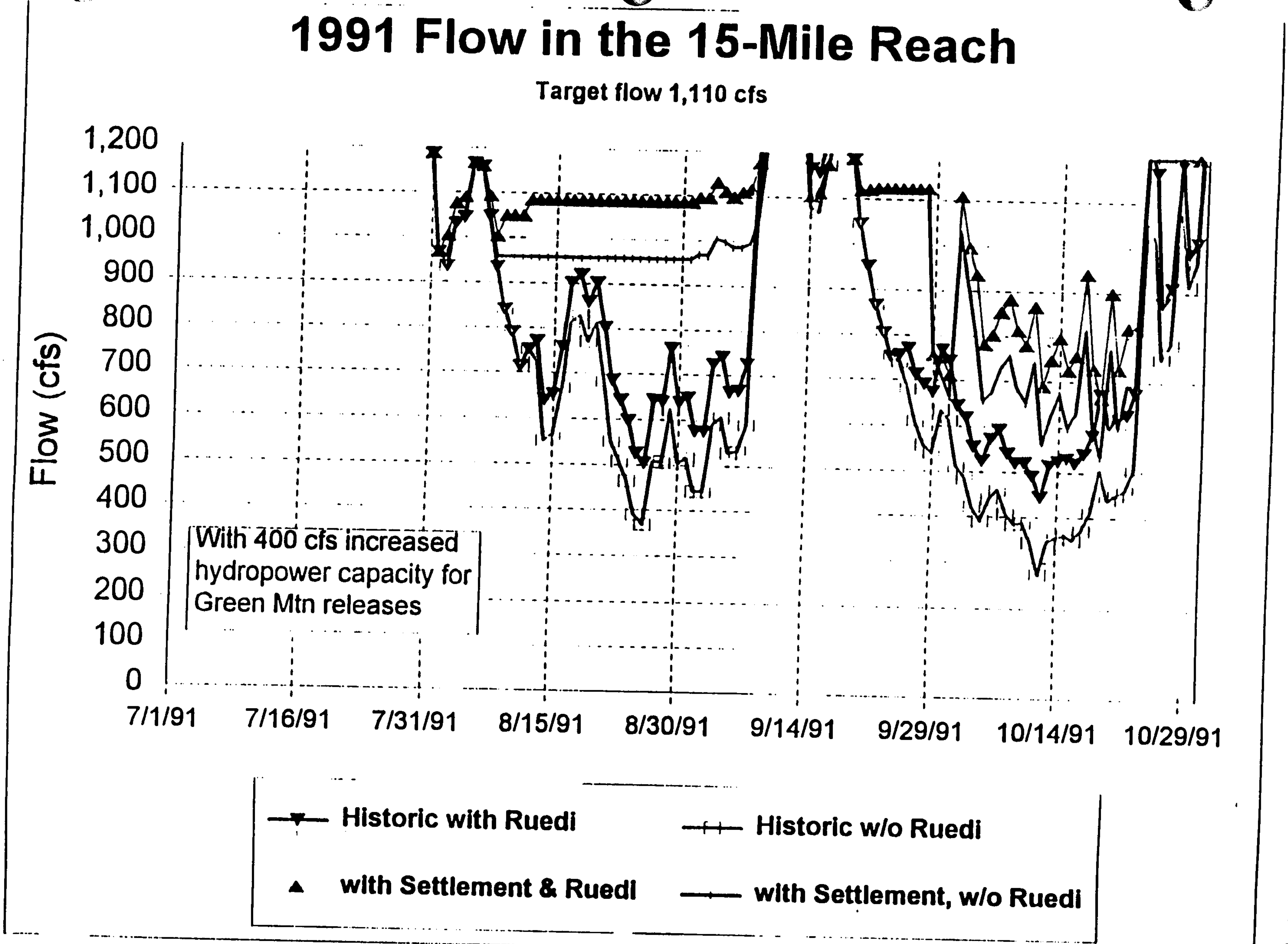
July 16, 1996

1991 Flow in the 15-Mile Reach

Target flow 1,100 cfs



July 16, 1996

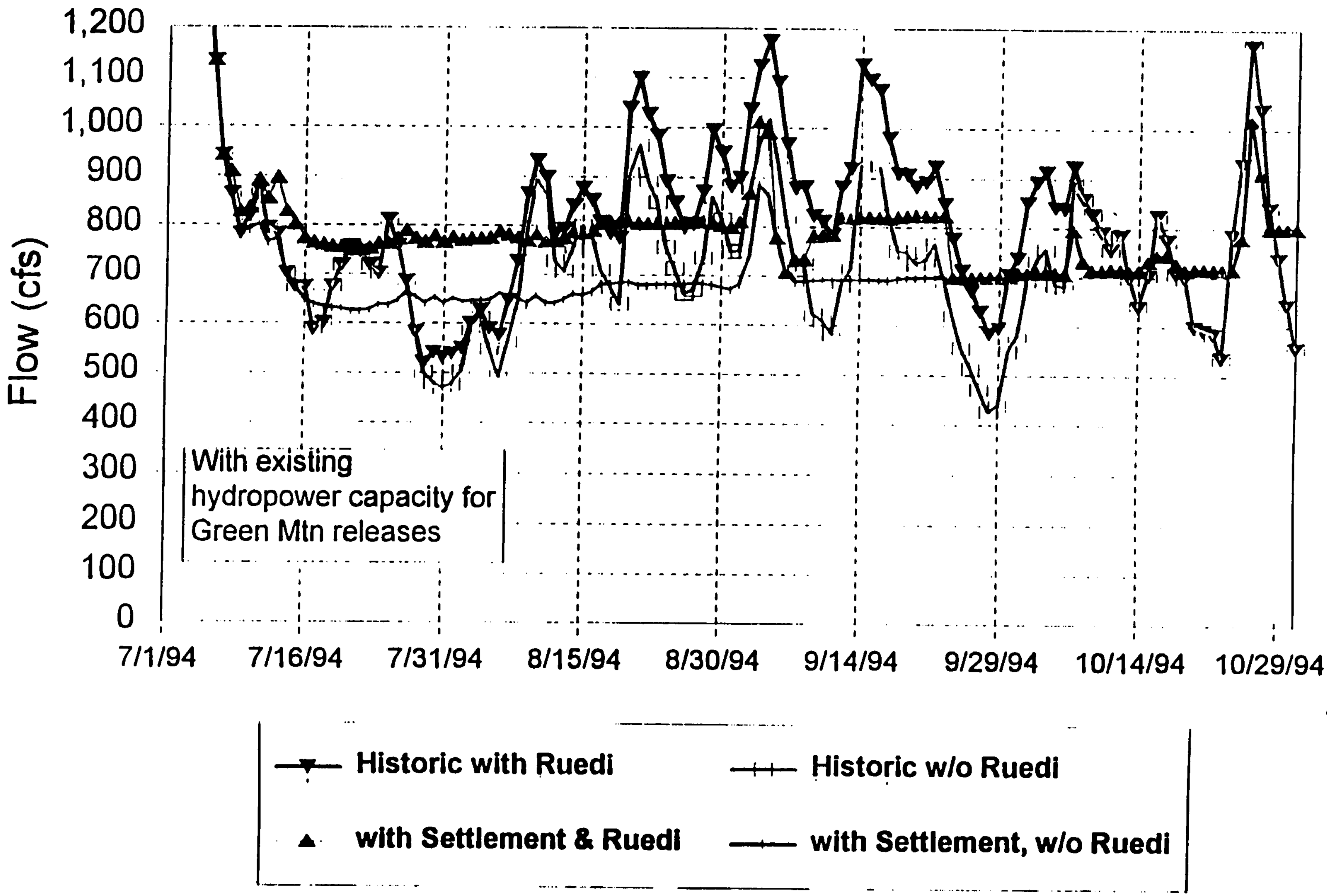


9/W247

July 16, 1996

1994 Flow in the 15-Mile Reach

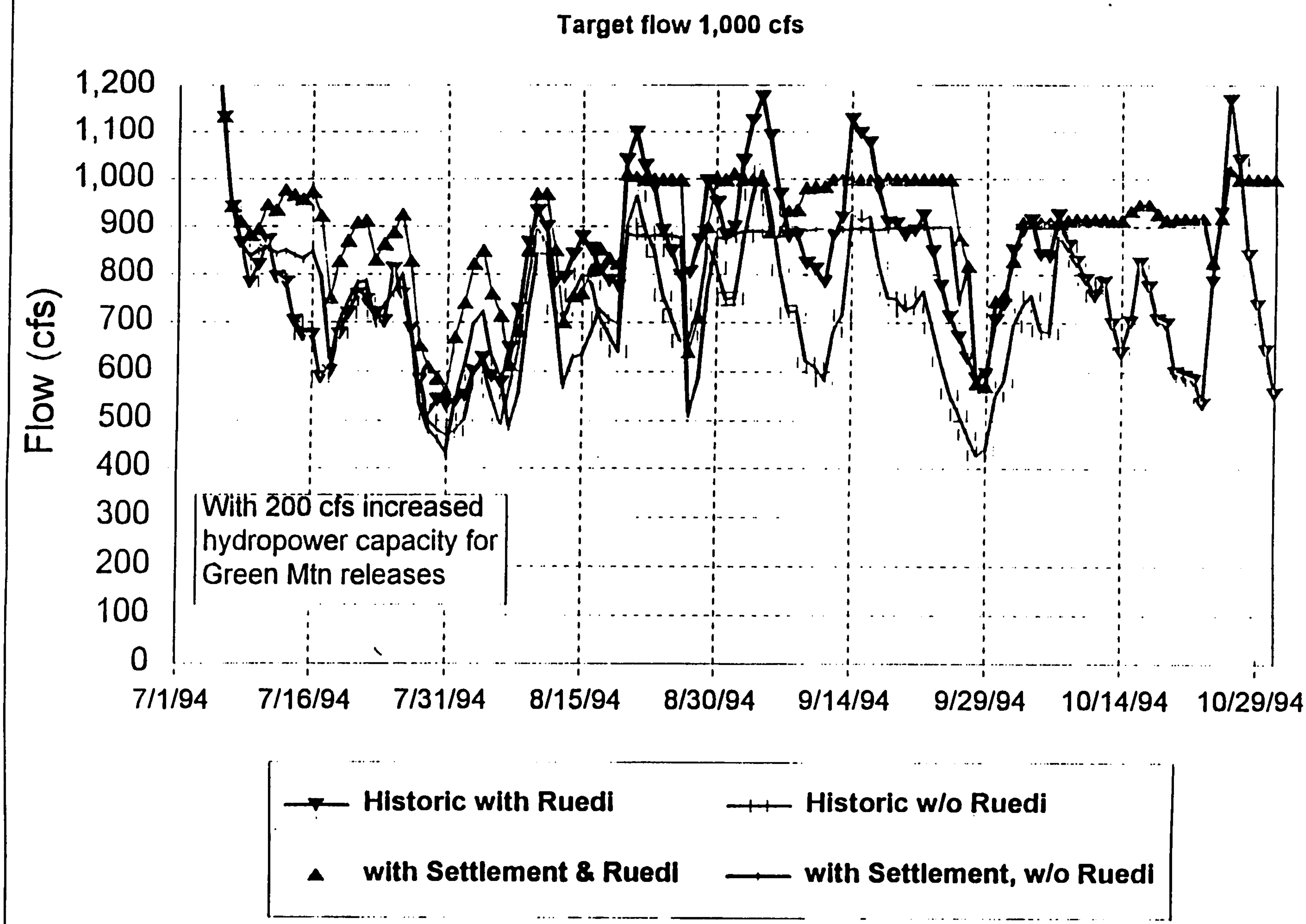
Target flow 1,000 cfs



9/00347

July 16, 1996

1994 Flow in the 15-Mile Reach



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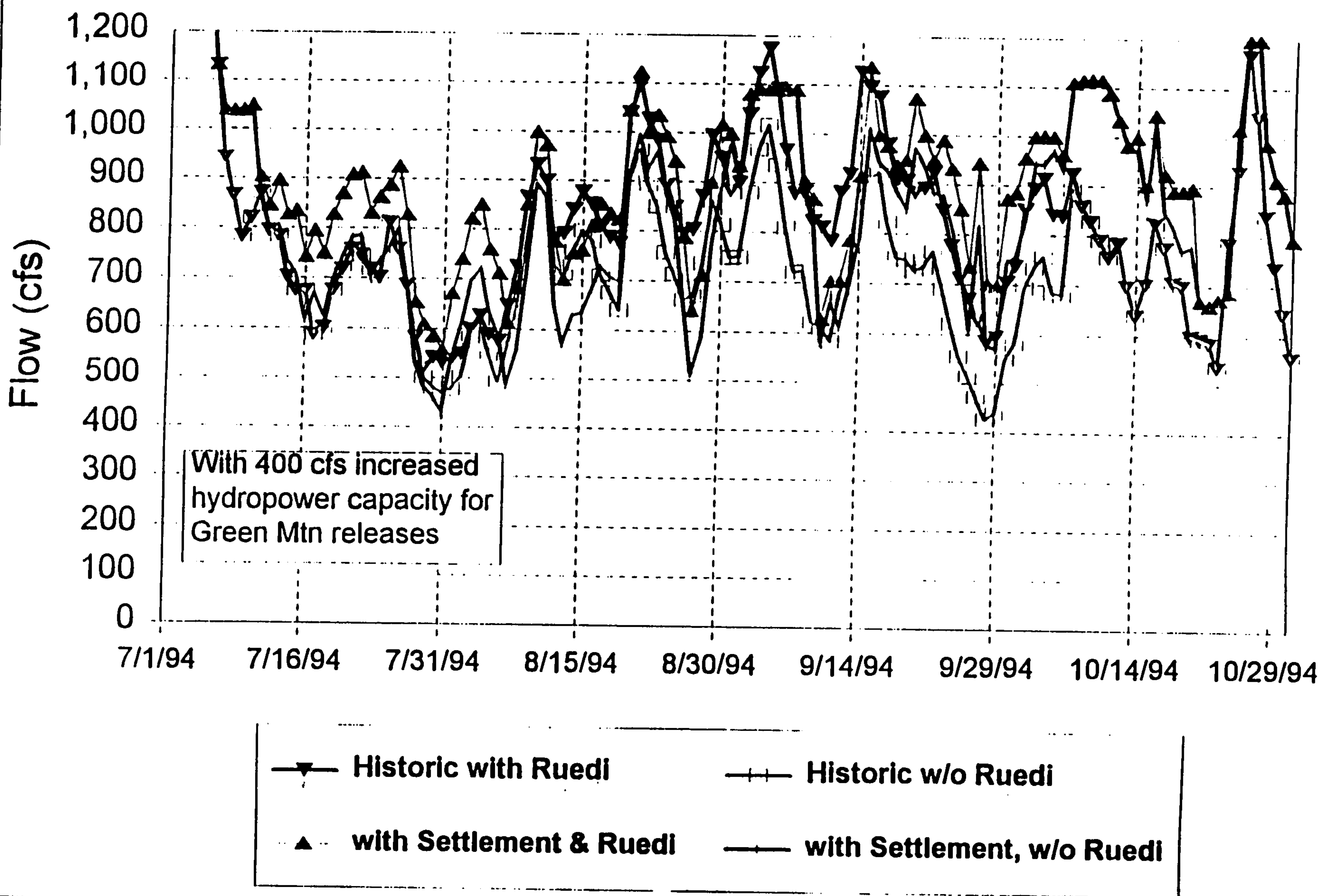
July 16, 1996

1994 Flow in the 15-Mile Reach

Target flow 1,000 cfs



9/ew2447

July 16, 1996

Exhibit E

Orchard Mesa Check Exchange
Water Division No. 5 - Case 91CW247

Applicant	Counsel	Firm and Address
United States of America	Bruce D. Bernard, Esquire Stephen G. Bartell, Esquire	U.S. Department of Justice Environment and Natural Resources Division General Litigation Section 999 18th Street, Suite 945 Denver, Colorado 80202
Grand Valley Water Users Association	Mark Hermundstad, Esquire	Williams, Turner & Holmes, P.C. 200 North 6th Street, #103 P.O. Box 338 Grand Junction, Colorado 81502
Orchard Mesa Irrigation District	Flint B. Ogle, Esquire	Dufford, Waldeck, Milburn & Krohn, L.L.P. 744 Horizon Court, Suite 300 Grand Junction, Colorado 81506
Objector	**Counsel**	**Firm and Address**
City of Aurora, Colorado, acting by and through its Utility Enterprise	John M. Dingess, Esquire	Duncan, Ostrander & Dingess, P.C. 7800 East Union Avenue, #200 Denver, Colorado 80237
Basalt, Town of New Castle, Town of Mid-Valley Metropolitan District Rifle, City of	Loyal E. Leavenworth, Esquire	Leavenworth & Associates, P.C. P.O. Drawer 2030 Glenwood Springs, Colorado 81602

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Exhibit E

Orchard High Ditch Exhibits
Water Division No. 5 - Case 91CW247

Basalt Water Conservancy District Copper Mountain, Inc. Copper Mountain Consolidated Metropolitan District Mobil Mining & Minerals Company	Scott Balcomb, Esquire Lori Satterfield, Esquire	Delaney & Balcomb, P.C. 818 Colorado Avenue P.O. Drawer 790 Glenwood Springs, Colorado 81602
Carbondale, Town of Debeque, Town of Eagle, Town of Palisade, Town of	Sherry A. Caloia, Esquire	Caloia, Houpt & Light, P.C. 1204 Grand Avenue Glenwood Springs, Colorado 81601
Frisco, Town of Glenwood Springs, City of North Barton Creek, LLC Parachute, Town of Rifle Land Associates, Ltd. Silverthorne, Town of Spruce Valley Ranch Foundation	David W. Robbins, Esquire Mark J. Wagner, Esquire	Hill & Robbins, P.C. 1441 18th Street, #100 Denver, Colorado 80202
Colorado Division of Wildlife Colorado State Engineer Colorado Water Conservation Board Division Engineer, Water Division No. 5	Gale A. Norton, Attorney General Stephen K. Erkenbrack, Chief Deputy Attorney General Timothy M. Tymkovich, Solicitor General Jennifer L. Gimbel, Deputy Attorney General Wendy Weiss, First Assistant Attorney General	Natural Resources Section 1525 Sherman, 5th Floor Denver, Colorado 80203

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Exhibit E

Orchard Mesa Check Exchange
Water Division No. 1 - Case 91CW247

Colorado River Water Conservation District	David C. Hallford, Esquire	201 Centennial Street, #204 (81601) P.O. Box 1120 Glenwood Springs, Colorado 81602
Colorado Springs, City of	Mark T. Pifher, Esquire Wm Kelly Dude, Esquire	Dude, Pifher & Lebel, P.C. 104 South CascadeAvenue, Suite 204 Colorado Springs, Colorado 80903
Cyprus Climax Metals Company	Brian M. Nazarenus, Esquire	Gorsuch, Kirgis, L.L.C. 1401 17th Street, #1100 Denver, Colorado 80202
Exxon Company, U.S.A. Board of County Commissioners of Summit County, Colorado Vail Associates, Inc. Vail Valley Consolidated Water District Upper Eagle Regional Water Authority	Glenn E. Porzak, Esquire Steven Bushong, Esquire	Porzak, Browning & Johnson, L.L.P. 1300 Walnut Street, Suite 100 Boulder, Colorado 80302
Grand County Water & Sanitation District No. 1 Middle Park Water Conservancy District	Stanley W. Cazier, Esquire	Baker, Cazier & McGowan 62495 U.S. Highway 40, E P.O. Box 500 Granby, Colorado 80446
Grand Valley Irrigation Company	Frederick G. Aldrich, Esquire John T. Howe, Esquire	Hoskin, Farina, Aldrich & Kampf, P.C. 200 Grand Avenue, Suite 400 P.O. Box 40 Grand Junction, Colorado 81502
Pueblo, Colorado, Board of Water Works of	William F. Mattoon, Esquire William A. Paddock, Esquire Peter C. Fleming, Esquire	Peterson, Fonda, Farley, Mattoon Crockenberg & Garcia, P.C. 650 Thatcher Building P.O. Box 35 Pueblo, Colorado 81002 Carlson, Hammond & Paddock, L.L.C. 1700 Lincoln Street, Suite 3900 Denver, Colorado 80203

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Exhibit E

Orchard Mesa Check Exchange
Water Division No. 1 - Case 91CW247

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Windy Gap Firming Project Intergovernmental Agreement (WGFP IGA)

The Municipal Subdistrict, Northern Colorado Water Conservancy District and its Windy Gap Firming Project Water Activity Enterprise, Board of County Commissioners of Grand County, Colorado, Middle Park Water Conservancy District, Colorado River Water Conservation District and Northwest Colorado Council of Governments enter into this Windy Gap Firming Project Intergovernmental Agreement ("WGFP IGA") as of the latest date of execution of this WGFP IGA by the Parties.

I) Definitions.

A. "1980 and 1985 Agreements" are the April 30, 1980 "Agreement Concerning the Windy Gap Project and the Azure Reservoir and Power Project" ("1980 Agreement") and the March 29, 1985 "Supplement to Agreement of April 30, 1980" ("1985 Agreement").

B. "Accounting Year" for the Middle Park Water Apportionment will begin on August 1st and end on July 31st the following calendar year. Middle Park's Accounting Year shall become effective on August 1 following execution of this WGFP IGA.

C. "Active Storage" for Chimney Hollow Reservoir is that reservoir capacity contained between the invert of the reservoir outlet works and the normal high water line in Chimney Hollow Reservoir, or in the case of Alternative Reservoirs, the total capacity available for storage and release for the benefit of the WGFP.

D. "Amendatory Contract" is the Amendatory Contract for the Introduction, Storage, Carriage, and Delivery of Water for Municipal Subdistrict, Northern Colorado Water Conservancy District, Colorado-Big Thompson Project, Colorado dated March 1, 1990 among Reclamation, the Subdistrict and Northern Water and any amendments, replacements, or supplements thereto necessary to implement the WGFP.

E. "Carryover Balance" is a portion of a Water Apportionment that is available for use pursuant to this WGFP IGA that can be stored for multiple years.

F. "Carryover Balance Limitation" is the maximum total Carryover Balance that can be credited to Middle Park or Grand County at any point in time.

G. Chimney Hollow Reservoir ("Chimney Hollow Reservoir") is that reservoir located on the East Slope identified in the Final Environmental Impact Statement for the Windy Gap Firming Project as the proposed action and any reservoir or reservoirs on the East Slope that are constructed as an alternative or in addition to the reservoir identified in the Final

Environmental Impact Statement ("Alternative Reservoir"), provided that the cumulative active storage capacity of Chimney Hollow Reservoir and any Alternative Reservoirs does not exceed 90,000 acre feet.

H. Colorado River Water Conservation District, ("River District") is a political subdivision of and a body corporate under the laws of Colorado, created by the provisions of C.R.S. §§ 37-46-101, et seq., for the purposes stated therein.

I. Grand County ("Grand County") is a county of the State of Colorado created by Article XIV of the Colorado Constitution and C.R.S. § 30-5-128, for the purposes stated therein.

J. Middle Park Water Conservancy District ("Middle Park") is a political subdivision of the State of Colorado, created under the provisions of C.R.S. §§ 37-45-101, et seq., for the purposes stated therein.

K. Municipal Subdistrict, Northern Colorado Water Conservancy District, ("Subdistrict") is a political subdivision of the State of Colorado, and formed under the provisions of C.R.S. §§ 37-45-101, et seq., for the purposes stated therein and as created by the Decree dated July 6, 1970, Weld County District Court, State of Colorado.

L. Municipal Subdistrict, Northern Colorado Water Conservancy District, Windy Gap Firming Project Water Activity Enterprise ("WGFP Enterprise") is a water activity enterprise of the Subdistrict organized under and pursuant to Article X, Section 20, of the Colorado Constitution and C.R.S. §§ 37-45.1-101 et seq.

M. "Net Credited Storage," is the amount of Windy Gap Project Water pumped at the Windy Gap Pumping Plant and conveyed to Granby Reservoir less any losses charged pursuant to the Amendatory Contract.

N. Northern Colorado Water Conservancy District ("Northern Water") is a political subdivision of the State of Colorado, created under the provisions of C.R.S. §§ 37-45-101, et seq., for the purposes stated therein, and is referenced in but not a party to this WGFP IGA.

O. Northwest Colorado Council of Governments ("NWCCOG") is a regional planning commission organized pursuant to C.R.S. § 30-28-105, and an association of local governments contracting pursuant to Article XIV, Section 18 of the Colorado Constitution and C.R.S. §§ 29-1-201, et seq., comprising municipalities and counties within the geographic boundaries of the Colorado counties of Grand, Eagle, Summit, Jackson, Routt, and Pitkin.

P. "Prepositioning" is the manner of integrated operations of the Colorado-Big Thompson Project and WGFP described in the Final Environmental Impact Statement for the WGFP and as may be authorized by Reclamation in the Amendatory Contract and/or Reclamation's Record of Decision for the WGFP.

Q. "Pumping Costs" incurred by Middle Park or Grand County pursuant to this WGFP IGA are 110% of the average electrical power costs of pumping for the Windy Gap Project for that year on a per acre-foot basis for Net Credited Storage.

R. United States Army Corps of Engineers ("USACE") is referenced in but not a party to this WGFP IGA.

S. United States Bureau of Reclamation, Department of the Interior ("Reclamation") is referenced in but not a party to this WGFP IGA.

T. "Water Apportionment" is Windy Gap Project Water that is made available for use by West Slope Parties pursuant to this WGFP IGA.

U. "West Slope Parties" are Grand County, Middle Park, the River District, and NWCCOG.

V. Windy Gap Firming Project ("WGFP") is a proposed project that will use the Windy Gap Water Rights and that is described in the Final Environmental Impact Statement and Record(s) of Decision.

W. "WGFP Completion" is the first time that the combined volume of Windy Gap Project Water stored in Chimney Hollow Reservoir and Windy Gap Project Water stored on behalf of WGFP Participants in Granby Reservoir is equal to 32% of the Active Storage of the constructed capacity of Chimney Hollow Reservoir.

X. WGFP Participants ("WGFP Participants") are those entities identified in the Final Environmental Impact Statement for the Windy Gap Firming Project, and also their successors and assigns, that hold a water allotment contract for the Windy Gap Project and own or are otherwise allocated a portion of the storage capacity of Chimney Hollow Reservoir.

Y. "Windy Gap Project" is an existing water supply system defined in Part II.A. of the 1980 Agreement.

Z. "Windy Gap Project Participants" are those entities that hold a water allotment contract for the Windy Gap Project.

AA. "Windy Gap Project Water" is any water stored or diverted pursuant to the Windy Gap Water Rights. Both the Windy Gap Project and the Windy Gap Firming Project will divert and store Windy Gap Project Water. Windy Gap Project Water will be diverted under the Grand County 2012 WGFP ("1041") Permit unless the Subdistrict notifies Grand County that it will divert under the original 1980 Windy Gap Project Permit. Only Windy Gap Project Water diverted under the terms and conditions of the 2012 WGFP ("1041") Permit may be stored in Chimney Hollow Reservoir.

BB. "WG Volumetric Limits" shall be those limitations set forth in Paragraph 34 of the 1980 Agreement, as modified by Paragraph 2 of the 1985 Supplemental Agreement. The WG Volumetric Limits are not affected or modified by this WGFP IGA.

CC. "Windy Gap Water Rights" are defined in the Decrees entered on October 27, 1980 in Civil Action No. 1768, District Court, Grand County, State of Colorado and Case Nos. W-4001, 80CW108, and 85CW135, District Court, Water Division No. 5; the Decree entered on February 6, 1989 in Case No. 88CW169, District Court, Water Division No. 5, State of Colorado; and the Decree entered on July 19, 1990, in Case No. 89CW298, District Court, Water Division No. 5, State of Colorado ("Windy Gap Decrees") and any subsequent diligence or other related decrees or amendments thereto.

II) Relationship to 1980 and 1985 Agreements.

This WGFP IGA supplements and partially amends the 1980 Agreement and the 1985 Agreement. The 1980 Agreement, as amended and supplemented by the 1985 Agreement, and the 1985 Agreement, remain valid and enforceable except as explicitly modified by this WGFP IGA. In the event of a termination of this WGFP IGA for any reason the 1980 and 1985 Agreements shall be enforceable according to their terms as if this WGFP IGA did not exist. While there are several signatories to the 1980 Agreement in addition to the undersigned parties, the rights of those additional signatories under the 1980 Agreement are not altered by this WGFP IGA.

III) Terms of the Agreement

A. Enhancements. The benefits provided in this WGFP IGA are in addition to and are not a substitute for the mitigation required by governmental agencies with jurisdiction over the WGFP.

B. Notification of Intent to Proceed with Windy Gap Firming Project.

1) The Subdistrict will proceed as expeditiously as reasonably possible using its best efforts to cause the construction of Chimney Hollow Reservoir. The Subdistrict shall notify the West Slope Parties in writing whether or not it intends to proceed with the Windy Gap Firming Project within 10

years of the issuance of the 404 Permit for the WGFP by the United States Army Corps of Engineers ("USACE") or upon execution of construction contracts for Chimney Hollow Reservoir, whichever occurs first.

2) This WGFP IGA shall terminate upon written notice to the West Slope Parties that the Subdistrict does not intend to proceed with the WGFP.

3) If the Subdistrict notifies the West Slope Parties that it intends to proceed with the WGFP, then it shall have the right under this WGFP IGA, but not the obligation, to construct and operate a total of 90,000 acre feet of storage on the Front Range. If the Subdistrict proceeds with the WGFP, then it shall provide all of the West Slope mitigation required by the Records of Decision for the WGFP and satisfy all of the obligations set forth in this WGFP IGA, regardless of the storage capacity that is authorized by the 404 Permit issued by the USACE, or the storage capacity that is ultimately constructed or utilized for the WGFP.

C. Except as necessary to ensure compliance with this WGFP IGA, all parties agree not to take any official action that results in a restriction of the right of the Subdistrict to construct, operate and use the full 90,000 acre feet of storage capacity of the Chimney Hollow Reservoir or Alternative Reservoir.

1) In the event of a breach of this obligation by Grand County, Paragraph IV. H. 2) of this WGFP IGA shall terminate and be of no further force or effect and the benefits provided to Grand County pursuant to Paragraph III.F. of this WGFP IGA and to Middle Park pursuant to Paragraph III.E. of this WGFP IGA shall be subject to the proportional reduction determined using the methods described in III.D.1.

2) In the event of a breach of this obligation by the River District, Paragraph IV. H. 2) of this WGFP IGA shall terminate and be of no further force or effect and the benefits provided to Grand County pursuant to Paragraph III.F. of this WGFP IGA and to Middle Park pursuant to Paragraph III.E. of this WGFP IGA shall be subject to the proportional reduction determined using the methods described in III.D.1.

3) In the event of a breach of this obligation by Middle Park, Paragraph III.E. of this WGFP IGA shall terminate and Middle Park shall receive water pursuant to the 1980 and 1985 Agreements, and the benefits provided to Grand County pursuant to Paragraph III.F. of this WGFP IGA shall be subject to the proportional reduction determined using the methods described in III.D.1 .

4) In the event of a breach of this obligation by NWCOG, Paragraph IV. H. 2) of this WGFP IGA shall terminate and be of no further force or affect and the benefits provided to Grand County pursuant to Paragraph III.F. of

this WGFP IGA and to Middle Park pursuant to Paragraph III.E. of this WGFP IGA shall be subject to the proportional reduction determined using the methods described in III.D.1.

5) The consequences provided for in Paragraphs III.C.1), III.C.2), III.C.3), and III.C.4) shall be suspended in the event that the Subdistrict later obtains the right to construct, operate, and use the full 90,000 acre feet of storage capacity of the Chimney Hollow Reservoir or Alternative Reservoir.

D. Proportional Reduction.

1) If a binding regulatory event, judicial determination, other implementation of existing or future legal requirements or restrictions, or other formal action of any entity causes or results in a permanent reduction in firm yield of the WGFP, other than a prohibition on prepositioning, then the West Slope Parties agree that the amount of water they receive pursuant to Paragraph III of this WGFP IGA will be subject to proportional reduction. The Parties agree to jointly determine the amount of said proportional reduction at the time the event takes effect or, as an alternative to the proportional reduction, identify measures that can be implemented to mitigate the reduction in firm yield of the WGFP. A proportional reduction shall be made to the Middle Park Water Apportionment and to the Grand County Water Apportionment under this WGFP IGA. In the event that the Parties cannot jointly determine what the proportional reduction should be, the issue of what constitutes a proportional reduction shall be resolved by a panel of three experts, one selected by the West Slope Parties, one selected by the WGFP Enterprise, and the third selected by the experts selected by the West Slope Parties and the WGFP Enterprise. If the determination of the expert panel is not acceptable, any Party may pursue any available judicial remedies.

2) If a binding regulatory event, judicial determination, other implementation of existing or future legal requirements or restrictions, or other formal action of any entity causes or results in a prohibition of prepositioning , then the West Slope Parties agree that the amount of water they receive pursuant to Paragraph III of this WGFP IGA shall be reduced in accordance with this Paragraph III.D.2).

(a) Middle Park Variable Water Supply will be reduced by reducing the 700 acre feet option in spill years in proportion to the amount of Windy Gap Project Water stored on August 1 in Chimney Hollow and Granby Reservoir, combined, as compared to the full storage capacity of Chimney Hollow Reservoir. If Middle Park elects to receive its portion of pumping in spill years, there shall be no reductions.

(b) Grand County Variable Water Supply shall not be subject to reductions.

(c) Middle Park Annual Water Supply shall not be subject to reductions.

(d) Grand County annual amount of Transfer Water shall be reduced by 15%.

E. Middle Park Water Apportionment.

1) Middle Park Election to Receive Water.

The provisions of the 1980 and 1985 Agreements which relate to the operation of the Windy Gap Project and the rights and interests of Middle Park shall remain in place until such time as WGFP Completion, and the approval of this WGFP IGA by the Water Court, Water Division No. 5 by Decree not subject to appeal.

(a)

Middle Park shall have the right, within 1 year of WGFP Completion, to make a one-time and irrevocable election as to whether it will receive water pursuant to this WGFP IGA or receive water pursuant to the 1980 and 1985 Agreements.

(b) If a binding regulatory event, judicial determination, or other implementation of existing or future legal requirements or restrictions occurs as provided in Paragraph III. D. then Middle Park shall have the right to make an election as to whether it will receive water pursuant to this WGFP IGA, or receive water pursuant to the 1980 and 1985 Agreements. Subdistrict shall notify Middle Park within 60 days of each regulatory event, judicial determination, or other implementation of existing or future legal requirements or restrictions and shall explain to Middle Park the effect(s) of the event, determination, or implementation on water available to Middle Park pursuant to this WGFP IGA. If Middle Park has not made this election pursuant to a previous event, this election will be made by Middle Park within one year after written notification of each event.

(c) In the event that Middle Park elects to continue to receive water pursuant to the 1980 and 1985 Agreements following WGFP Completion, such water shall be available for use on August 1 of the Accounting Year immediately following pumping (except that any water pumped in August will be credited to the current Accounting Year), and any such water, which is unused on July 31st of that Accounting Year shall be transferred to Grand County on August 1st for use in accordance with Paragraph III. F. 2) and Paragraph III.F.4).

2) If Middle Park elects to receive water in accordance with this WGFP IGA, its apportionment will consist of the Middle Park Annual Water Supply and the Middle Park Variable Water Supply.

3) Middle Park Annual Water Supply.

(a) For the purposes of this WGFP IGA, Middle Park's Annual Water Supply is the combination of the 850 acre feet of Water defined in Section III.E.3)(b) and the 1,450 acre feet of Water defined in Section III.E.3)(c). Middle Park Annual Water Supply is not eligible to become a part of or contribute to the Middle Park Carryover Balance.

(b) 850 acre feet of Water. The Subdistrict and WGFP Enterprise will dedicate and set aside annually, but not cumulatively, at no cost to Middle Park, 850 acre feet of Windy Gap Project Water, which shall be available each and every year.

(c) 1,450 acre feet of Water.

(i) If the combined amount of Windy Gap Project Water stored in Chimney Hollow Reservoir and Windy Gap Project Water stored on behalf of WGFP Participants in Granby Reservoir at any time between the start of pumping of the Windy Gap Project and August 1st of any year is equal to or greater than 32% of the constructed capacity of Chimney Hollow Reservoir, the Subdistrict and WGFP Enterprise will dedicate and set aside at no cost 1,450 acre feet of water for Middle Park.

(ii) If the combined amount of Windy Gap Project Water stored in Chimney Hollow Reservoir and Windy Gap Project Water stored on behalf of WGFP Participants in Granby Reservoir at any time between the start of pumping of the Windy Gap Project and August 1st of any year does not equal or exceed 32% of the constructed capacity of Chimney Hollow Reservoir, the 1,450 acre feet of water will be reduced at the same proportion as the maximum amount of storage of Windy Gap Project Water stored in Chimney Hollow Reservoir and Windy Gap Project Water stored on behalf of the WGFP Participants in Granby Reservoir during the period between the start of pumping and August 1 is to 32% of the constructed capacity of Chimney Hollow Reservoir.

(iii) The Subdistrict and WGFP Enterprise shall provide Middle Park with the April 1st water supply forecast and any subsequent forecasts, which shall be used for planning

purposes to estimate the amount, if any, of the reduction in the 1,450 acre feet of water.

(iv) In the event that Middle Park receives less than 1450 acre feet of water pursuant to paragraph III.E.3)(c)(ii), Middle Park may retain and use any unused Annual Water Supply from the prior Accounting Year to make up the difference between the amount which it receives pursuant to paragraph III.E.3)(c)(ii) and 1450 acre feet of water.

(d) The Middle Park Annual Water Supply is available to Middle Park during the Accounting Year. Unused water from the Middle Park Annual Water Supply from the prior Accounting Year will transfer on August 1st to Grand County pursuant to Paragraph III.F.2) unless some portion of the water from the prior year is required to make up for the reduction in the 1450 acre feet of Water pursuant to Paragraph III.E.3)(c)(iv). Grand County shall, subject to the limitations in Paragraph III.F.4), have the right to use Middle Park Annual Water Supply transferred from Middle Park to Grand County in accordance with this Paragraph III.E.3)(d).

(e) Middle Park's Annual Water Supply will not be reduced by any losses charged pursuant to the Amendatory Contract.

4) Middle Park Variable Water Supply.

(a) Middle Park's Variable Water Supply is the water supply defined in this Paragraph III.E.4). Only Middle Park's Variable Water Supply is eligible to become part of or contribute to Middle Park's Carryover Balance and will be credited immediately upon pumping.

(b) The Subdistrict and WGFP Enterprise will provide a water supply forecast to Middle Park on April 1st.

(c) If the April 1st forecast does not anticipate a spill of Windy Gap Project Water, Middle Park may, on May 1st of that year, elect to receive 3.8% of the Windy Gap Project Water that will be diverted in the current water year in excess of 15,000 acre feet Net Credited Storage, up to a maximum of 1,500 acre feet Net Credited Storage as further limited by Middle Park's Carryover Balance Limitation. If the Windy Gap Project Participants have a need for additional water but do not wish to pay for the costs of additional pumping prior to such time as Middle Park has received 1,500 acre feet of Variable Water Supply, and the Windy Gap Water Rights are still in priority, Middle Park may request that the Subdistrict continue diversions of Windy

Gap Project Water up to the 1,500 acre feet maximum, as limited by Middle Park's available Carryover Balance Limitation.

(d) If the April 1st forecast anticipates a spill of Windy Gap Project Water or if a spill has actually occurred, Middle Park shall, by May 1st, elect whether it will:

(i) Receive 3.8% of the Windy Gap Project Water diverted and stored in the current water year in excess of 15,000 acre feet Net Credited Storage, up to a maximum of 1,500 acre feet of Net Credited Storage, and as further limited by Middle Park's available Carryover Balance Limitation. If the Windy Gap Project Participants have a need for additional water but do not wish to pay for the costs of additional pumping prior to such time as Middle Park has received 1,500 acre feet of Variable Water Supply, and the Windy Gap Water Rights are still in priority, Middle Park may request that the Subdistrict continue diversions of Windy Gap Project Water up to 1,500 acre feet maximum, as limited by Middle Park's Carryover Balance Limitation; or

(ii) Receive from the Subdistrict and WGFP Enterprise by substitution such additional amount of Windy Gap Project Water stored in Chimney Hollow Reservoir as is required to result in a total Carryover Balance of 700 acre feet of Middle Park Variable Water Supply, which 700 acre feet shall not be subject to spill; or

(iii) Middle Park may elect to not receive any Middle Park Variable Water Supply.

(e) Middle Park shall pay to the Subdistrict the Pumping Costs for pumping the Middle Park Variable Water Supply which it elects to receive pursuant to Paragraph III.E.4).

5) The Subdistrict will release Middle Park Annual Water Supply and Middle Park Variable Water Supply at the request of Middle Park for all beneficial uses allowed by the 1980 Agreement and 1985 Agreement. Such uses shall include direct use or use by substitution, augmentation, or exchange, including but not limited to, exchange into Wolford Mountain Reservoir or replacement to Denver Water by entities that have Middle Park Contracts, and any other use authorized in a subsequent written agreement between Middle Park, the Subdistrict, and WGFP Enterprise.

F. Grand County Water Apportionment.

1) For the purposes of this WGFP IGA, the Grand County Water Apportionment consists of the Grand County Transfer Water, the Grand County Interim Transfer Water, and the Grand County Variable Water Supply described in this Paragraph III.F. The Grand County Water Apportionment shall be used as directed by Grand County and consistent with this WGFP IGA.

2) Grand County Interim Transfer Water and Grand County Transfer Water.

(a) Grand County Transfer Water is any of the Middle Park Water Apportionment received by Middle Park which is transferred to Grand County on August 1st of each year pursuant to Paragraph III.E.1)(c) and Paragraph III.E.3)(d).

(b) Commencing on the first day of August, but no less than 12 months after the execution of this WGFP IGA, the Subdistrict shall make available for Grand County's use 50% of any of the Middle Park Water Apportionment that is unused from the previous year (the "Grand County Interim Transfer Water"). Upon WGFP Completion, the Grand County Interim Transfer Water shall vest as 100% of the water provided by Paragraph III.E.1)(c) and Paragraph III.E.3)(d). In the alternative, the Subdistrict's provision of the Grand County Interim Transfer Water will cease upon notice pursuant to III.B.2) that the Municipal Subdistrict does not intend to proceed with the WGFP.

(c) Grand County Transfer Water must be either: (1) used between August 1st and October 15th of the then current water year, or (2) on October 15th become Grand County Carryover Balance, as limited by Grand County's available Carryover Balance Limitation.

(d) Grand County's Transfer Water shall not be subject to any losses charged pursuant to the Amendatory Contract until such water is transferred to Grand County's Carryover Balance, at which time it will be assessed the appropriate losses, if any, specified in the Amendatory Contract.

3) Grand County Variable Water Supply shall include the following elements:

(a) Concurrent Pumping.

(i) Grand County Concurrent Pumping shall become available at WGFP Completion.

(ii) Grand County may, by May 1st of each year, elect to receive 3.8% of the Windy Gap Project Water diverted and stored in the current water year in excess of 15,000 acre feet Net Credited Storage, up to a maximum of 1,500 acre feet Net Credited Storage, and as further limited by Grand County's available Carryover Balance Limitation.

(b) Additional Pumping.

(i) Grand County Additional Pumping shall become available at WGFP Completion.

(ii) If Windy Gap Project Participants and WGFP Participants have a need for additional water but do not wish to pay for the costs of additional pumping prior to such time as Grand County has received 1,500 acre feet of water from Concurrent Pumping and the Windy Gap Water Rights are still in priority, Grand County may request that the Subdistrict continue Windy Gap Project Water diversions up to a combined maximum of 1,500 acre feet of Concurrent and Additional Pumping, as further limited by the available Grand County Carryover Balance Limitation. The Subdistrict and WGFP Enterprise will make best efforts to provide five (5) days advance notice of the anticipated end of pumping for Windy Gap Project Participants and WGFP Participants.

(c) End of Year Pumping.

(i) Prior to WGFP Completion, Grand County may request that the Subdistrict continue Windy Gap Project Water diversions if the Windy Gap Project Participants have a need for additional water but do not wish to pay for the costs of additional pumping and the Windy Gap Project Water Rights are in priority, as limited by the Grand County Carryover Balance Limitation.

(ii) After WGFP Completion, Grand County may request that the Subdistrict continue Windy Gap Project Water diversions if the Windy Gap Project Participants, WGFP Participants, and Middle Park have a need for additional water but do not wish to pay for the costs of additional pumping and the Windy Gap Project Water Rights are in priority, as limited by the Grand County Carryover Balance Limitation.

(d) Grand County's Variable Water Supply shall be credited to Grand County's Carryover Balance immediately upon pumping.

(e) Grand County shall pay pumping costs for the Grand County Variable Water Supply provided pursuant to Paragraph III.F.3).

4) The Subdistrict will release the Grand County Water Apportionment from Granby Reservoir at the request of Grand County or its designee for diversion for irrigation, domestic, municipal or industrial uses on the West Slope that do not require a change of the Windy Gap Water Rights. The Parties will use their best efforts to effectuate the purposes of the Grand County Water Apportionment in a manner that does not require a change of the Windy Gap Water Rights. The Parties acknowledge that Grand County intends to time such releases for beneficial use in a manner that results in optimizing the benefits to aquatic and recreation resources within the County and furthering the goals of the Learning by Doing Cooperative Effort (Exhibit 1). The Parties intend that the Grand County Water Apportionment not be diverted for irrigation, domestic, municipal or industrial uses upstream of the confluence of the Colorado River and Blue River by any person or any entity.

(a) The Parties intend for the reservoir releases of the Grand County Water Apportionment to increase the flow of water through the County above flows that would otherwise exist. To accomplish these objectives, the River District will make good faith efforts to arrange for the delivery of the Grand County Water Apportionment for diversion and beneficial use for irrigation, domestic, municipal or industrial uses on the Colorado River or its tributaries, below the confluence of the Blue and Colorado Rivers. Unless otherwise directed by Grand County, the River District's efforts will be focused on diversion and beneficial use downstream of the confluence of the Colorado and Roaring Fork Rivers but upstream of the Utah State Line.

(b) Grand County and the Subdistrict may request annual reports of the beneficial use made of the Grand County Water Apportionment. Any dispute regarding such use will be resolved in accordance with the Conflict Resolution provisions of this WGFP IGA (Paragraph VI.O.). Regardless of the outcome of any dispute regarding this paragraph, the Parties agree that the River District shall not bear any liability regarding the beneficial use of, or the failure to arrange for the beneficial use any of, the Grand County Water Apportionment.

(i) Following is a list of representative, but not exclusive, beneficial uses that the Parties agree satisfy the intent of this paragraph III.F.4):

Diversion for irrigation (including agriculture, lawn watering, parks, and stock-water), domestic, municipal, or industrial uses by: the Grand Valley Irrigation Company (irrigation, including uses incident of irrigation); Grand Valley Water Users Association (including irrigation, power generation, and uses incident to those uses); Orchard Mesa Irrigation District (irrigation, irrigation lift/pumping, power generation, and exchanges incident to such uses); Palisade Irrigation District (irrigation); Mesa County Irrigation District (irrigation); Ute Water Conservancy District (including municipal); Town of Clifton (municipal); Silt Water Conservancy District (irrigation and domestic); Town of Silt (municipal); Town of New Castle (municipal); City of Rifle (municipal); Battlement Mesa (municipal); diversions at the Bluestone or Town of Debeque intakes (municipal, irrigation, and industrial); substitutions in lieu of releases from Wolford Mountain Reservoir or Ruedi Reservoir for municipal, irrigation or industrial uses under the River District's water marketing program; substitutions in lieu of releases from, or exchanges into, Williams Fork Reservoir to increase the amount of, or flexibility of use, of water in Grand County's account in Williams Fork Reservoir; transit losses attributable to such uses as may be assessed by the State Engineer.

5) The Parties agree that, if Grand County determines then-current stream flow conditions in the County are sufficient to satisfy the purposes of the releases of water as described in Paragraph III.F.4), including downstream of the confluence of the Colorado and Blue Rivers, then the Grand County Water Apportionment may be exchanged or substituted for water that otherwise would be released from Wolford Mountain Reservoir, Green Mountain Reservoir or Williams Fork Reservoir in order to assist Front Range and West Slope water users in managing limited water supplies for use in the upper Colorado River basin.

G. Priority of Pumping. The right of Middle Park and Grand County to pump additional water pursuant to Paragraphs III.E.4)(c), III.E.4)(d)(i) and III.F.3)(b)(ii) shall be shared on an equal basis between Middle Park and Grand County.

H. Middle Park and Grand County Water Apportionments, Carryover Balances, and Carryover Balance Limitations.

1) Subject to the provisions of this Paragraph III.H., Middle Park and Grand County may each have a Carryover Balance derived from Water Apportionments made available pursuant to Paragraphs III.E.4), III.F.2) and III.F.3). The maximum Carryover Balance available to Middle Park

and Grand County shall not exceed their respective Carryover Balance Limitation.

2) Middle Park shall have the right to a Carryover Balance Limitation of 3,000 acre feet for its Variable Water Supply for use in the then current or subsequent water years.

3) Grand County Carryover Balance Limitations.

   (a) Upon execution of this WGFP IGA and until WGFP Completion, Grand County shall have the right to accrue a maximum of 7,500 acre feet of Carryover Balance for use in the then current or subsequent water years.

   (b) Upon WGFP Completion Grand County's Carryover Balance Limitation shall be reduced to 6,000 acre feet until at such time as the Windy Gap Project Water stored in Chimney Hollow Reservoir has reached, at any point in time, 85% of the constructed active storage capacity of Chimney Hollow Reservoir .

   (c) At such time as the Windy Gap Project Water stored in Chimney Hollow Reservoir has reached, at any point in time, 85% of the constructed active storage capacity of Chimney Hollow Reservoir, Grand County's Carryover Balance Limitation shall be reduced to 4,500 acre feet

   (d) The permanent Grand County Carryover Balance Limitation shall be 4,500 acre feet. If Chimney Hollow Reservoir construction begins but is not completed as a result of actions by the West Slope Parties, any water stored in this account will revert to the Subdistrict.

4) Except during the first fill of Chimney Hollow, during which Paragraphs III.H.3) controls, Middle Park and Grand County can share a combined Carryover Balance Limitation of 7,500 acre feet. Middle Park and Grand County shall notify the Subdistrict before or during pumping of their intent to share the Carryover Balances and the respective amounts of water to be stored for each.

5) Any Carryover Balance of Middle Park or Grand County shall be reduced by any losses, if any, charged pursuant to the Amendatory Contract. Middle Park and Grand County shall be provided with documentation of such charges before any such reductions.

6) Any Variable Water Apportionment and any Carryover Balance made available to Middle Park or Grand County pursuant to this WGFP IGA shall be subject to a pro rata share of monetary charges, payable by Middle

Park or Grand County as applicable, for storage of Windy Gap Project Water in Granby Reservoir, if any, assessed pursuant to the Amendatory Contract. The Parties will advocate to Reclamation that no monetary charges be assessed for storage of Windy Gap Project Water in Granby Reservoir.

7) The Parties will advocate that Reclamation adopt specific and different shrink charges for introduction and storage of Windy Gap Project Water on the West Slope and conveyance and delivery of Windy Gap Project Water to the east slope.

8) All Carryover Balances referred to in this paragraph III.H. shall be Net Credited Storage.

I. Spill Criteria:

1) 1st to spill - Grand County Carryover Balance over 1,500 acre feet.

2) 2nd to spill - Any remaining Grand County Carryover Balance, any Middle Park Carryover Balance, and any Windy Gap Project Water stored on behalf of the WGFP Participants proportionally, based on Carryover Balances and Windy Gap Project Water in storage on behalf of the WGFP Participants as of the date(s) of spill.

3) 3rd to spill – Windy Gap Project Water stored on behalf of Windy Gap Project Participants that are not WGFP Participants.

J. No Paper Spills. In the event that Middle Park or Grand County have a Carryover Balance and the total amount of Colorado-Big Thompson Project water in active storage in Granby Reservoir and Chimney Hollow Reservoir, combined, reaches 465,568 acre feet, Middle Park's and Grand County's Water Apportionments will only spill in the event of a physical spill from Granby Reservoir. Any physical spill of Windy Gap Project Water will be allocated between WGFP Participants, Middle Park, and Grand County in accordance with Paragraph III.I.

K. Minimum Pumping. If Windy Gap Project Water is not already being pumped, the Subdistrict shall not be required to pump Variable Water Supply for any party unless the Subdistrict's water supply forecasts predict that there will be a minimum of 1,000 acre feet of water available for diversion and storage under the Windy Gap Water Rights at the time of the proposed pumping during the current pumping season.

L. Pumping Costs. Pumping Costs shall be payable 30 days after the submission of an invoice by the Subdistrict at the end of the then current pumping season to the appropriate entity. The invoice shall include the actual bills from the

power provider. In the event of a delinquency or failure to pay Pumping Costs by Middle Park or Grand County, the Subdistrict shall suspend release of any Variable Water Supply held by the Subdistrict for that entity and all future pumping for the delinquent Party pursuant to this WGFP IGA until any delinquent payments have been made in full.

IV) Additional Provisions

A. Wolford Protection. The Subdistrict, and the WGFP Enterprise agree that the Windy Gap Project and the WGFP will be operated in a manner that does not diminish the ability of the Colorado River Water Conservation District to capture the natural flow of Muddy Creek up to a maximum of 65,998 acre feet pursuant to the water rights, applicable permits, and operating criteria for Wolford Mountain Reservoir.

B. Future Uses. The Subdistrict and WGFP Enterprise agree to not place a call under the Windy Gap Decrees on any present or future water rights on the Colorado and Fraser Rivers and their tributaries above Windy Gap Reservoir; Provided, however, the Windy Gap Project and WGFP may divert any water which can be diverted in priority at the decreed point of diversion without placing a call as described above except for water provided as described in paragraph IV. M. of this WGFP IGA.

C. Open Space. Upon execution of this WGFP IGA, the Subdistrict agrees to impose a deed restriction on the sale of any parcel that requires subsequent development of the parcel to be approved subject to the existing Grand County Rural Land Use Process in conformance with C.R.S. § 30-28-403, as it exists now or may be amended in the future; provided, however, that nothing in this WGFP IGA or in the deed restriction shall affect or preclude the sale or development of such parcel(s) pursuant to provisions of existing or future law that allow the sale or development of lands in a manner that is not within the definition of a "subdivision" or "subdivided land".

D. Public Access. Upon execution of this WGFP IGA, the Subdistrict will make arrangements with Northern Water to provide public access to that portion of Willow Creek located on Northern Water's lands for as long as Northern Water owns the lands adjacent to Willow Creek, if and to the extent that the public access will be managed by the Colorado Division of Parks and Wildlife or other entity acceptable to Northern Water.

E. Jasper Reservoir Conditional Water right. The Subdistrict will abandon the conditional water right for Jasper Reservoir upon WGFP Completion.

F. Recording and Telemetry Devices. Recording and telemetry devices for flow measuring devices approved by the Colorado State Engineer will be acquired, installed, operated, maintained and replaced by and at the expense of the

WGFP Enterprise if it is able to obtain permanent access agreements allowing the WGFP Enterprise to install, operate, maintain, and replace such devices.

G. Water Accounting. The Subdistrict agrees to submit detailed daily water accounting to the State of Colorado Division Engineer as required by the Division Engineer and provide copies to the West Slope Parties.

H. Future Water Development.

1) Compact Curtailment Plan. The Signatories agree to cooperate in good faith toward the development of a plan to avoid and address a potential curtailment of existing Colorado water rights under the provisions of the 1922 Colorado River Compact and the 1948 Upper Colorado River Compact. The Signatories agree to meet and confer before the Municipal Subdistrict or WGFP Enterprise take any action pursuant to Paragraph IV.H.3. of this WGFP IGA.

2) The Subdistrict and WGFP Enterprise agree that, without the prior express written consent of Grand County and the Colorado River Water Conservation District, they will not (a) acquire any existing water rights in Grand County; (b) construct additional water supply facilities in Grand County, (c) appropriate new water rights in Grand County; or (d) appropriate any new water rights in Water Division No. 5 that will result in depletions of water from Grand County.

3) Compact Curtailment Actions.

(a) To the extent, and during such time that the operation of the Windy Gap Project or WGFP, or the exercise of the Windy Gap Project Water Rights, is or may in the future be curtailed, limited, or otherwise restricted as the result of, or for the purpose of, compliance with the 1922 Colorado River Compact or 1948 Upper Colorado River Compact ("Compact Curtailment"), the Municipal Subdistrict or WGFP Enterprise may take any actions or use any existing or future facilities as may be required to provide a water supply to the Municipal Subdistrict or WGFP Enterprise, as limited by and subject to the WG Volumetric Limits ("Compact Curtailment Actions") and the express obligations of the Subdistrict and WGFP Enterprise under this WGFP IGA. The Municipal Subdistrict or WGFP Enterprise may undertake such Compact Curtailment Actions as may be necessary to prudently plan and prepare in advance of any potential Compact Curtailment; Provided however, that any such advance Compact Curtailment Actions will be implemented only during such time that the quantity of water that would otherwise be diverted under the Windy Gap Water Rights is reduced as the result of a Compact

Curtailment. The West Slope Parties may oppose any Compact Curtailment Actions in any forum.

(b) Nothing in this WGFP IGA, including without limitation Paragraphs IV.H.1) and IV.H.2) above, shall affect, limit, or otherwise restrict the right of the Municipal Subdistrict or WGFP Enterprise to take any actions or to use any existing or future facilities as required to provide a water supply to the Municipal Subdistrict or WGFP Enterprise, as limited by and subject to the WG Volumetric Limits, in the event, to the extent, and during such time that the operation of the Windy Gap Project or WGFP, or the exercise of the Windy Gap Project Water Rights, is or may in the future be curtailed, limited, or otherwise restricted as the result of or for the purpose of compliance with the 1922 Colorado River Compact or 1948 Upper Colorado River Compact. Nothing in this WGFP IGA shall limit or restrict the right of West Slope Parties to oppose any such actions or use of any such existing or future facilities.

(c) Nothing in this Paragraph IV.H.3 shall be construed to 1) allow the Subdistrict or WGFP Enterprise to increase the yield of the WG Project or WGFP at times other than when the quantity of water that would otherwise be diverted under the Windy Gap Water Rights is reduced as the result of the enforcement of the 1922 Colorado River Compact or 1948 Upper Colorado River Compact, or 2) use any banked or stored water in a manner that causes an increase in the yield of the Windy Gap Project or WGFP at times other than when the quantity of water that would otherwise be diverted under the Windy Gap Water Rights is reduced as the result of the enforcement of the 1922 Colorado River Compact or 1948 Upper Colorado River Compact.

(d) Nothing in this Paragraph IV.H.3) shall affect the obligations of the Subdistrict and WGFP Enterprise under Paragraph III. of this WGFP IGA.

4) Nothing in this WGFP IGA shall affect, limit, or otherwise restrict the right of the Municipal Subdistrict to fully utilize the Windy Gap Water Rights and associated existing facilities in Grand County or any existing or future facilities on the East Slope, or existing or future water rights in Water Division No. 1 in a manner that will not exceed the WG Volumetric Limits. The West Slope Parties reserve the right to oppose any actions taken by the Subdistrict intended to achieve the WG Volumetric Limits using existing or future facilities or water rights that are not expressly authorized by the 1980 Agreement, the 1985 Supplemental Agreement, and this WGFP IGA.

5) Any consent of Grand County under Paragraph IV.H.2) shall not be construed as a limitation on or waiver of any review, approval, or permit authority, or a predetermination of any action to be taken thereunder by Grand County.

6) Nothing in this WGFP IGA shall affect, limit, or otherwise restrict the maintenance, repair, replacement or rehabilitation of the existing Windy Gap Project facilities, replacement facilities, or rehabilitated facilities located in Grand County.

I. CWCB Instream Flow. The Subdistrict and WGFP Enterprise will support the entry of a decree in accordance with applicable law for a CWCB instream flow on the Colorado River mainstem from the confluence of the Blue and Colorado Rivers to a point immediately upstream of the confluence of the Eagle and Colorado Rivers if a) the CWCB instream flow is not used as a basis for imposing restrictions or limitations on the WGFP, b) the West Slope Parties agree that they will never assert in any forum that the CWCB Instream flow be used as a basis for restrictions or limitations on the WGP or WGFP, and c) the right is subject to substantively the same terms and conditions as are set forth in the Findings of the CWCB in declaring its intent to appropriate dated _____, 2011.

J. Grand County RICD. Subdistrict and WGFP Enterprise will not oppose the entry of a decree in Case No. 10CW298 consistent with the draft decree dated September 20, 2012 and stipulation attached as Exhibit 2 to this WGFP IGA.

K. Shoshone Outage Protocol.

1) For purposes of this WGFP IGA, the Shoshone Outage Protocol means that the Windy Gap Project and WGFP will operate as described in this paragraph IV.K.1), IV.K.2), and IV.K.3) during periods when the Shoshone Power Plant is shutdown or otherwise not able to divert the full amount of its 1,250 cfs senior water right due to repair, maintenance, or other reasons ("Shoshone Outage"). When the Windy Gap Project's participation in the Shoshone Outage Protocol is in effect pursuant to this WGFP IGA, the Windy Gap Project and WGFP will bypass the amount of water that the Windy Gap Project and WGFP would have been required to bypass if the Senior Shoshone Call had been in effect in order to result in a flow of not more than 1,250 cfs at the Dotsero gage on the Colorado River (not including any water released for endangered fish species purposes). For purposes of this WGFP IGA, a Shoshone Outage does not include a shutdown of the Shoshone Power Plant for regularly scheduled maintenance for a cumulative period of 17-days during the period of November 1 through March 15.

2) The Windy Gap Project and WGFP will operate in accordance with the Shoshone Outage Protocol from July 16-April 14 of each year. Prior to WGFP Completion, the Windy Gap Project and WGFP may operate in accordance with the Shoshone Outage Protocol during the period of April 15-July 15 on a voluntary cooperative basis. Following WGFP Completion, the Windy Gap Project and WGFP will operate in accordance with the Shoshone Outage Protocol during the period April 15 – July 15 at any time during this period when the combined amount of Windy Gap Project Water stored in Chimney Hollow Reservoir and Windy Gap Project Water stored on behalf of WGFP Participants in Granby Reservoir is greater than 50% of the Active Capacity of Chimney Hollow Reservoir.

3) Participation in the Shoshone Outage Protocol by the Windy Gap Project and WGFP during the period of April 15-July 15 will be limited to a total maximum volume of foregone pumping equal to 10,000 acre feet (30 days with one pump running) in one year, a total of 20,000 acre feet (60 days with one pump running) in any 3 consecutive year period, and a total of 30,000 acre feet (90 days with one pump running) in any 5 consecutive year period.

4) The Subdistrict agrees that it will participate in good faith in negotiations to achieve permanent management of the flow of the Colorado River to address certain flow changes that result during a Shoshone Outage.

L. Cooperative Effort for Aquatic Environment. The Subdistrict and the WGFP Enterprise, Grand County, Middle Park, and the River District agree to participate in the Learning by Doing Cooperative Agreement ("Cooperative Agreement") as defined in the Intergovernmental Agreement for The Learning by, Doing Cooperative Effort which is attached as Exhibit 1 but which is not a part of or incorporated within this WGFP IGA. Any amendments to the Cooperative Agreement shall not require amendment or modification of this WGFP IGA.

M. Colorado River Cooperative Agreement. The Subdistrict and the WGFP Enterprise agree not to oppose or otherwise interfere with the efforts to obtain such court decrees and approvals as are necessary for the Colorado River Cooperative Agreement to the extent that the court decrees and approvals do not adversely affect the WGFP or Windy Gap Project. The Subdistrict further agrees that it will not divert water that would not have been available but for the actions of the Management Committee or Grand County pursuant to the Learning by Doing process.

N. Wild and Scenic. Within one year of issuance of an acceptable permit for the WGFP, the Subdistrict shall pay $50,000 and the River District shall pay $25,000 to the Endowment Fund of the Upper Colorado River Wild and Scenic Stakeholder Group for use to protect Wild and Scenic resources

identified in the Colorado River from Kremmling downstream to No Name. The Subdistrict's contribution provided herein shall satisfy the obligation of the Subdistrict and WGFP Enterprise to contribute endowment funds for Wild and Scenic purposes under this WGFP IGA. The Subdistrict agrees that the River District's contribution provided herein shall satisfy the obligation of the River District to contribute endowment funds for Wild and Scenic purposes under the WGFP IGA. The Subdistrict will contribute 20% of the amount contributed by the River District, not to exceed $5,000 annually adjusted annually by the Denver-Boulder-Greely CPI-U, for annual operating costs of the Upper Colorado River Wild and Scenic Stakeholder Group.

O. Windy Gap Water Right Diversion at Granby Reservoir. Absent the express written consent of Grand County and the River District, the Subdistrict and WGFP Enterprise agree that neither will divert water at Granby Reservoir under the priority of the Windy Gap Decrees or during free-river conditions.

P. Bypass of Windy Gap Reservoir. The Subdistrict will enter into an agreement with Colorado Division of Parks and Wildlife to provide up to $250,000 to study methods for bypass of flows, sediment, and/or fish around or through Windy Gap Reservoir and identify potential modifications that would provide tangible benefits to aquatic resources below Windy Gap Reservoir. The implementation of recommendations resulting from the study will not constitute a violation of or require amendment of this WGFP IGA or the 1980 and 1985 Agreements.

V) West Slope Parties' Commitments

A. No Opposition to WGFP. The West Slope Parties will not oppose final state and federal approvals of the WGFP, subject to performance of this WGFP IGA by the Subdistrict and WGFP Enterprise and the performance of such mitigation, requirements, and conditions as are required in those approvals, including but not limited to the Records of Decision by Reclamation and USACE, the Amendatory Contract, 401 Certification, or the 404 Permit. Nothing herein shall affect any 1041 authority of Grand County.

B. Reopen Approvals or Authorizations. The West Slope Parties will not request that any governmental approval or authorization of the Windy Gap Project or the WGFP be subject to provisions that have the effect of reopening the governmental approval or authorization. For a period of five years from the date of the first diversions into the constructed Chimney Hollow Reservoir, no party will unilaterally request, or cause others to request, that the United States Army Corps of Engineers or other regulatory agency with jurisdiction and authority over the WGFP, reopen a permit or license for the Windy Gap Project or WGFP for any reason except as may be necessary to preserve any right to undertake such action prior to expiration of any applicable legal deadline or statute of limitation. Each party reserves the right to oppose any

such efforts to reopen the permits or licenses for the Windy Gap Project or WGFP. This Paragraph V.B. is not intended to prevent the West Slope Parties from commencing any legal action to enforce this WGFP IGA or to request enforcement of specific terms of federal permits.

C. Windy Gap Reservoir Conditional Storage Right. The West Slope Parties will not oppose future applications to make the remaining conditional portion (1,101.14 acre feet) of the existing Windy Gap Reservoir storage right absolute.

D. Modification of Windy Gap Decree. The West Slope Parties will consent to the entry of a decree modifying the existing Windy Gap Decrees to incorporate this WGFP IGA and will not assert that a change of the Windy Gap Water Rights is required for the operations of the Windy Gap Project or WGFP in a manner consistent with this WGFP IGA.

VI) Further Agreements of the Parties

A. Reform of Invalid Provisions. Wherever possible each provision of this Agreement shall be interpreted and implemented to be effective and valid under applicable law. If any provision or portion of this WGFP IGA is determined to be invalid or unenforceable by a final, non-appealable order or decision of any judicial or administrative body with jurisdiction, the Parties agree to reform this WGFP IGA to replace any such invalid or unenforceable provision with a valid and enforceable provision that comes as close as possible to the intention of the invalid or unenforceable provision. The provisions of this WGFP IGA shall be reasonably and liberally construed to achieve the intent of the Parties.

B. No Party will oppose final state, local and federal approvals of the WGFP, subject to performance of this WGFP IGA by the Subdistrict and WGFP Enterprise and the performance of such mitigation, requirements, and conditions as are required in those approvals, including but not limited to the Records of Decision by Reclamation and USACE, the WGFP Amendatory Contract, 401 Certification, or the 404 Permit. Nothing herein shall affect any 1041 authority of Grand County.

C. The Subdistrict agrees that conditions of the federal authorization for the WGFP will include provisions that substantially conform to the following:

1) the total volume of Colorado-Big Thompson Project water stored in the combination of Granby and Chimney Hollow Reservoirs will not exceed 465,568 acre feet. For the purposes of this Paragraph of the WGFP IGA, the amount of Colorado-Big Thompson Project water in storage in Granby Reservoir shall be the amount of Colorado-Big Thompson Project water

stored above the invert of the Farr Pumping Plant Intake and below the normal high water line; and

2) in any year in which the April 1st or subsequent projection by Northern Water anticipates a spill at Granby Reservoir, Colorado-Big Thompson Project water then in storage in Chimney Hollow Reservoir shall not be released to satisfy delivery requirements to Colorado-Big Thompson Project Allottees if such release would allow the capture and storage of additional Colorado-Big Thompson Project water in Granby Reservoir.

D. Nothing in this WGFP IGA shall be construed to limit the discretion of the Northern Colorado Water Conservancy District or Reclamation regarding the operation of the Colorado-Big Thompson Project, including, without limitation the pre-emptive release of Windy Gap Project water from Granby Reservoir that may increase the risk of or result in a spill of water provided to Middle Park or Grand County (any such spill in accordance with Paragraph III.I of this WGFP IGA).

E. Except as necessary to comply with the express terms of this WGFP IGA, nothing in this WGFP IGA shall be construed to limit the discretion of the Subdistrict or WGFP Enterprise regarding the operation of the Windy Gap Project or Windy Gap Firming Project, including, without limitation, the pre-emptive release of Windy Gap Project Water from Granby Reservoir that may increase the risk of or result in a spill of water provided to Middle Park or Grand County in accordance with Paragraph III.I of this WGFP IGA (any such spill in accordance with Paragraph III.I of this WGFP IGA).

F. The Parties agree that performance of this WGFP IGA, compliance with any mitigation requirements for the WGFP imposed by a federal or state agency, and compliance with the requirements of a Grand County 2012 Windy Gap Firming Project ("1041") Permit for the WGFP shall constitute full and complete satisfaction of the obligations of the Subdistrict and WGFP Enterprise to set forth and complete a plan with respect to the WGFP which satisfies the requirements of C.R.S. § 37-45-118(1)(b)(II) of the Water Conservancy Act.

G. This WGFP IGA does not limit, change or expand the role of or protections afforded to all Parties with interests in the Colorado-Big Thompson Project as described in the Manner of Operation provisions of Senate Document No. 80, the 1961 Principles to Govern the Release of Water at Granby Dam To Provide Fishery Flows Immediately Downstream In The Colorado River ("1961 Principles"), and the Blue River Decrees. Water released from Granby Reservoir pursuant to this WGFP IGA shall be in addition to the then current bypass of water under the 1961 Principles.

H. The obligations of the Parties to this WGFP IGA shall exist upon execution of this WGFP IGA unless otherwise specified in this WGFP IGA.

I. Except to the extent and unless it is terminated, this WGFP IGA shall be incorporated within and be a non-severable part of the Windy Gap Decrees. The Subdistrict will not divert water into Chimney Hollow Reservoir unless this WGFP IGA is incorporated within the Windy Gap Water Rights.

J. The West Slope Parties agree to not assert that the WGFP and Moffat Collection System Project are interdependent or interrelated.

K. This WGFP IGA is an agreement between the Parties and does not bind or limit the authority or jurisdiction of agencies of the United States of America.

L. Performance of the portions of this WGFP IGA that require the expenditure of funds are subject to future budgeting and appropriation of funds by the governing bodies of the Subdistrict, WGFP Enterprise, Middle Park, Grand County, and the River District. The Parties agree to make good faith efforts to appropriate such funds.

M. The Parties agree that this WGFP IGA is an intergovernmental agreement pursuant to Article XIV, Sec. 18 of the Colorado Constitution and C.R.S. §§ 29-1-201 et. seq. inclusive, among all governmental entities hereto. In addition to any other remedy provided by law, the Parties further agree that the terms and conditions of this WGFP IGA are enforceable by specific performance and agree not to bring any defense to specific performance based on the doctrine of governmental immunity. The Parties also agree that a breach of this WGFP IGA will cause irreparable harm sufficient for injunctive relief.

N. The Parties agree to work cooperatively to implement a stipulated resolution of the Green Mountain Reservoir Administrative Fill dispute.

O. The Parties agree that if a dispute arises on any matter covered by this WGFP IGA, the Parties will confer in good faith and endeavor to resolve the concern. If the Parties reach an impasse, they will select a neutral third party mediator who would seek an acceptable voluntary solution to the conflict. For conflicts that involve a technical or scientific matter, the neutral third party mediator may select an independent technical or scientific expert, acceptable to the Parties involved in the mediation, to review and make a recommendation on the matter. If the conflict cannot be resolved through the efforts of the mediator, then the affected Parties may pursue any available legal or administrative recourse. Nothing herein shall preclude the commencement of any action that would otherwise be barred by a statute of limitations or the timely participation in any judicial or administrative process.

P. This WGFP IGA is the result of negotiations between the Parties and their respective counsel. These negotiations produced numerous drafts that were prepared by one or more of the Parties. The Parties agree that these drafts, including omissions, do not provide or represent evidence of intent of any Party and may not be relied upon for purposes of construction and enforcement of this WGFP IGA or for any other purpose.

Q. Suspension and Termination of 1041 Permits. The Subdistrict and WGFP Enterprise shall not be obligated to perform or comply with Paragraphs III. E. through L. or IV.K. (SHOP) of this WGFP IGA during any period of suspension of the WGFP 1041 Permit issued by Grand County. This WGFP IGA shall be terminated and of no further force or effect if the WGFP 1041 Permit issued by Grand County is terminated or revoked. During such time of suspension, or in the event of termination or revocation of the WGFP Permit (1041), the 1980 Agreement, as amended and supplemented by the 1985 Agreement, and the 1985 Agreement, shall be in full force and effect according to their terms.

1) Suspension of 1041 Permit. The Subdistrict and WGFP Enterprise shall not be obligated to perform or comply with Paragraphs III.E through L, or IV.K. (SHOP) of this WGFP IGA during any period of suspension of the WGFP 1041 Permit issued by Grand County.

   (a) During such time of suspension, the 1980 Agreement, as amended and supplemented by the 1985 Agreement, and the 1985 Agreement, shall be in full force and effect according to their terms.
   (b) Any water stored on behalf of Grand County or Middle Park pursuant to Paragraph III.H. at the time the WGFP Permit (1041) suspension is imposed shall not be available for use by Grand County or Middle Park during the time of the suspension, but will be available for use pursuant to Paragraph III.H. at such time as the suspension is not in effect. Any such water shall be subject to all reductions, charges, restrictions and requirements applicable to the storage of water under this WGFP IGA, the Amendatory Contract, and any other contracts or laws applicable to the storage of water on behalf of Middle Park and Grand County. Any such payments shall be made by Grand County or Middle Park, as appropriate, at such time as the suspension is not in effect and prior to the use of such water.

2) Termination or Revocation. In the event the WGFP Permit (1041) is revoked or terminated, any water stored on behalf of Grand County or Middle Park pursuant to Paragraph III.H. shall revert to the ownership and control of the Subdistrict. The Subdistrict will reimburse Grand County and Middle Park respectively for 91% of any pumping costs incurred by

the respective entity associated with the water stored on behalf of Grand County or Middle Park pursuant to Paragraph III.H.

VII) No Waiver

A. The Parties do not agree:

1) Whether amendment of the Blue River Decree or Senate Document No. 80 is required to authorize the storage of Colorado-Big Thompson Project water in Chimney Hollow Reservoir;

2) Whether a change of water right is required to allow the storage of Windy Gap Project Water in Chimney Hollow Reservoir; or

3) Whether the Section 390b(d) of the Water Supply Act of 1958 requires Congressional approval for the Windy Gap Firming Project.

4) Notwithstanding these disagreements, the West Slope Parties will not object to, litigate or otherwise dispute in any forum the storage of Colorado-Big Thompson Project water in Chimney Hollow Reservoir or the storage of Windy Gap Project Water in Chimney Hollow Reservoir in accordance with, and subject to the following provisions:

(a) The total volume of Colorado-Big Thompson Project water stored in the combination of Granby and Chimney Hollow Reservoirs will not exceed 465,568 acre feet. For the purposes of this Paragraph of the WGFP IGA, the amount of Colorado-Big Thompson Project water in storage in Granby Reservoir shall be the amount of Colorado-Big Thompson Project water stored above the invert of the Farr Pumping Plant Intake and below the normal high water line.

(b) In any year in which the April 1st or subsequent projection by Northern Water anticipates a spill at Granby Reservoir, Colorado-Big Thompson Project water then in storage in Chimney Hollow Reservoir shall not be released to satisfy delivery requirements to Colorado-Big Thompson Project beneficiaries if such release would allow the capture and storage of additional Colorado-Big Thompson Project water in Granby Reservoir.

(c) The implementation of this WGFP IGA.

(d) The Parties do not waive any rights regarding any other changes to the historical operations of the Colorado-Big Thompson Project or Windy Gap Project.

B. No Waiver – Colorado-Big Thompson. The Parties agree that the dispute concerning storage of Colorado-Big Thompson Project water in Chimney Hollow Reservoir has not been litigated. The Parties agree that, except as provided for in this WGFP IGA, in entering into the agreement and not litigating or otherwise objecting in any forum to the legal issues specified in Paragraph VII.A., above, that this WGFP IGA shall never give rise to any claim, defense, or theory of acquiescence, bar, merger, issue or claim preclusion, promissory estoppel, equitable estoppel, waiver, laches, unclean hands or any other similar position or defense concerning any factual or legal position regarding the Parties' respective positions regarding the storage of Colorado-Big Thompson Project water and the Parties' respective interpretations of Senate Document No. 80, the 1961 Principles, the 1938 Repayment Contract, Reclamation Law, the Blue River Decrees, or Colorado law. The Parties further agree that they do not intend this WGFP IGA to have the effect of precedent or preclusion on any factual or legal issue in any other matter. The Parties expressly reserve their rights to assert any legal or factual position or challenge the legal or factual position taken by any other party or entity on any other matter.

C. No Waiver – WGFP. The Parties agree that the dispute concerning storage of Windy Gap Project Water in Chimney Hollow Reservoir has not been litigated. The Parties agree that, except as provided for in this WGFP IGA, in entering into this WGFP IGA and not litigating or otherwise objecting in any forum to the legal issues specified in Paragraph VII.A, above, that this WGFP IGA shall never give rise to any claim, defense, or theory of acquiescence, bar, merger, issue or claim preclusion, promissory estoppel, equitable estoppel, waiver, laches, unclean hands or any other similar position or defense concerning any factual or legal position regarding the Parties' respective positions regarding the storage of Windy Gap Project Water in Chimney Hollow Reservoir and the Parties' respective interpretations of federal or Colorado law. The Parties further agree that they do not intend this WGFP IGA to have the effect of precedent or preclusion on any factual or legal issue in any other matter. The Parties expressly reserve their rights to assert any legal or factual position or challenge the legal or factual position taken by any other party on any other matter.

D. The Parties do not agree whether Grand County has the authority to regulate the WGFP pursuant to C.R.S. §§ 24-65.1-101, *et seq*.

1) Notwithstanding these disagreements, the Subdistrict will not object to, litigate, or otherwise dispute in any forum the authority of Grand County to require a permit for the WGFP issued by Grand County pursuant to C.R.S. §§ 24-65.1-101, *et seq*. (1041 Permit), including any terms and conditions thereof once said Permit has been accepted by the Subdistrict.

2) With the exception of a challenge to Grand County's authority to require a permit for the WGFP, the Subdistrict does not waive or relinquish its rights to raise any defense or assert in any forum that it has fully complied with and is not in violation of the WGFP 1041 Permit.

3) The Subdistrict does not waive or relinquish its rights to object to, litigate, or otherwise dispute in any forum the authority of Grand County to modify, amend or terminate the WGFP 1041 Permit or to require a 1041 Permit or other Grand County permit or authorization for any other existing or future project, action, or other activity of the Subdistrict.

E. Preservation of Governmental Powers. Except as specifically provided herein, nothing in this WGFP IGA shall be construed as a limitation on or waiver of any review, approval, or permit authority, or a predetermination of any action taken thereunder, by any governmental or quasi-municipal entity including, without limitation, the regulatory or quasi-judicial power or authority of Grand County.

F. No Third-Party Beneficiaries. This WGFP IGA does not and is not intended to confer any rights or remedies upon any person or entity other than the Parties.

MUNICIPAL SUBDISTRICT, NORTHERN COLORADO WATER CONSERVANCY DISTRICT

ATTEST:

Secretary

Date: 1/3/13

By: _____
President

WINDY GAP FIRMING PROJECT WATER ACTIVITY ENTERPRISE

ATTEST:

Secretary

Date: 1/3/13

By: _____
President

ATTEST:

R. Eric Kuhn
Secretary/General Manager

Date: 07/12/16

COLORADO RIVER WATER CONSERVATION DISTRICT

By: Jon Stavney
President

ATTEST:

Clerk and Recorder

Date: 12/4/2012

BOARD OF COUNTY COMMISSIONERS OF THE COUNTY OF GRAND, COLORADO

By: Nancy Stuart
Chairman

ATTEST:

Secretary

Date: 1/24/2013

NORTHWEST COLORADO COUNCIL OF GOVERNMENTS

By:
Chairman

ATTEST:

Secretary

Date: 2/1/13

MIDDLE PARK WATER CONSERVANCY DISTRICT

By: Duane Schell

President

Exhibit 3

List of Related Agreements

1. Intergovernmental Agreement between the Northern Colorado Water Conservancy District, Grand County, Middle Park Water Conservancy District and Colorado River Water Conservation District
2. Memorandum of Understanding, Grand Lake Clarity Project (Umbrella Agreement)
3. Clarity Supplement to the 1938 Repayment Contract
4. Windy Gap Bypass Funding Agreement
5. Processed Material Supply Agreement (Gravel Pit Agreement)
6. Windy Gap Decree
7. Grand County RICD Stipulation
8. Learning by Doing Cooperative Effort
9. Green Mountain Reservoir Administration
10. Contracts for Delivery of Water to Grand Valley
11. Amendatory Contract
12. Letter from Subdistrict to River District re: no opposition to use of WG water for uses incidental to irrigation such as fish screen, fish ladder, etc
13. Letter from NW to GC stating how the 5,412.5 will be made permanent

Municipal Subdistrict
Northern Colorado Water Conservancy District
220 Water Avenue • Berthoud, Colorado 80513
800-369-7246 • www.northernwater.org

May 14, 2020

Via Certified Mail

Andy Mueller, General Manager
Colorado River Water Conservation District
201 Centennial Street, Suite 200
Glenwood Springs, CO 81601

Dear Andy:

This letter is in reference to Paragraph VI.C.1 of the 2012 Windy Gap Firming Project Intergovernmental Agreement ("WGFP IGA") between the Municipal Subdistrict, Northern Colorado Water Conservancy District ("Subdistrict") and its Windy Gap Firming Project Water Activity Enterprise; the Board of County Commissioners of Grand County, Colorado; Middle Park Water Conservancy District; the Colorado River Water Conservation District; and the Northwest Colorado Council of Governments. That Paragraph states as follows:

> [T]he total volume of Colorado-Big Thompson water stored in the combination of Granby and Chimney Hollow Reservoirs will not exceed 465,568 acre-feet. For the purposes of this Paragraph of the WGFP IGA, the amount of Colorado-Big Thompson Project water in storage in Granby Reservoir shall be the amount of Colorado-Big Thompson Project water stored above the invert of the Farr Pumping Plant Intake and below the normal high water line;

By this letter, the Subdistrict wishes to clarify how the amount of Colorado–Big Thompson Project water in storage in Granby Reservoir is calculated under the WGFP IGA. For purposes of Paragraph VI.C.1, the invert of the Farr Pumping Plant Intake will be considered to be located at the actual minimum elevation required to deliver water through the Farr Pumping Plant Intake to the Plant's pumps. The U.S. Bureau of Reclamation's "Technical Record of Design and Construction" for the Colorado–Big Thompson Project, Volume II (April 1957), lists this level at an elevation of 8,186.0 feet above sea level. However, the elevation of this level may be calculated differently if a different survey datum is used. Reclamation calculates the active volume of storage in Granby Reservoir to be 465,568 acre-feet between the elevations of 8,186.0 feet and the high water line of 8,280.0 feet, and Northern Water uses this data to operate the project.

Please signify the River District's agreement with the clarification provided herein by counter-signing both copies of this letter mailed to you. Please then mail one of the two original copies back to me; the other signed original copy is for your records.

Sincerely,

Brad Wind, General Manager
Municipal Subdistrict, Northern Colorado Water Conservancy District

Andy Mueller, General Manager
Colorado River Water Conservation District

Date: 05/20/2020

Northern Water
Northern Colorado Water Conservancy District
220 Water Avenue • Berthoud, Colorado 80513
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MEMORANDUM

To: Trout Raley, PC (Lisa Thompson, Davis Wert, Bennett Raley)
From: Kyle Whitaker, P.E.
Date: August 4, 2025
Subject: Colorado River Basin Administration, Shoshone Representative Historical Use, and Northern Water and Municipal Subdistrict Overview

Introduction

This memorandum provides an overview of the three distinct periods of water administration on the Colorado River and describes the appropriate representative study period for the Shoshone Water Rights historical use evaluation. This memorandum then briefly describes the Northern Colorado Water Conservancy District (Northern Water) and Municipal Subdistrict water rights and operations and potential impacts to those water rights and operations under the proposal from the River District and Xcel for the Colorado Water Conservation Board (CWCB) to acquire an interest in the Shoshone Water Rights for instream flow use. Finally, the memorandum describes numerous agreements and governing documents that help to comprise the current administrative regime surrounding the Shoshone Water Rights, and that illustrate the importance of collaborative solutions to address major statewide issues affecting Colorado River flows and water users' critical water supplies.

I. Colorado River Administration

Water rights administration and the associated operation of water diversions and delivery systems in the Colorado River basin have occurred under three distinct water administration periods. The changes in water administration and operations were due to adoption of agreements and operating policies that required changes in administration, as follows:

- **1937- 1983:** Senate Document 80 – the agreement for the construction and operation of the Colorado-Big Thompson Project (1937);
- **1984 -1997:** Adoption of the Operating Policy for Green Mountain Reservoir (1984); and
- **1998 – present:** Orchard Mesa Check Case Settlement and Green Mountain Reservoir Historic User Pool Operating Criteria (1997).

Prior to the first period (1937-1983), historical documents indicate that the Glenwood Power Canal and Pipe Line, currently known as the Shoshone Power Plant, began generating electricity from flows in the Colorado River (known as the Grand River at the time) in 1909. Although the original developers of the plant had intentions of developing storage reservoirs upstream to maximize power production, the plant went into operation in 1909 as a "run of the river" hydropower plant with the ability to generate power on the actual flow of the Colorado River up to a diversion of 1,250 cfs. At some point in time prior to 1929, modifications to the diversion and conveyance system were completed and the system

was able to generate power on diversions up to 1,408 cfs. Although an additional 158 cfs was appropriated in 1929, the junior Shoshone water right was not adjudicated until 1956.

There is very little data or information available that describes the administration of water rights on the mainstem of the Colorado River during this early period of time. It is evident that at least irrigation water rights on the tributaries of the Colorado River mainstem were administered pursuant to the priority system during the irrigation season, but it is unclear how priority administration was applied vis-à-vis mainstem water rights such as the Shoshone Power Plant and for water rights diverting during the non-irrigation season (municipal and industrial use).

The early administration of water rights remained in place until an agreement was reached between the West Slope and the East Slope to construct the Colorado-Big Thompson Project. This agreement was memorialized in Senate Document 80 as described below.[1]

Senate Document 80 Era (1937-1984)

The foundation for the Colorado-Big Thompon Project (C-BT Project) was set forth in a document known as Senate Document No. 80 in 1937 (SD 80). SD 80 embodied a compromise reached between interests in northeastern Colorado, who were the proponents of the C-BT Project, and interests on the Western Slope of Colorado, who were concerned about the impacts of the C-BT's transmountain diversions on the Western Slope. SD 80 set forth the framework for the construction and the manner of operation of the C-BT Project. The intentions of parties on the West Slope and the East Slope, and ultimately the United States Congress in authorizing the Colorado-Big Thompson project was to provide additional supplemental water supplies for northeastern Colorado and to secure the availability of sufficient water for present and future needs on the Western Slope.

Water rights for Green Mountain Reservoir were decreed by a Judgment and Decree entered by the Federal District Court for the District of Colorado in 1955 in Consolidated Case Nos. 2782, 5016 and 5017, commonly referred to as the "Consolidated Cases" or the "Blue River Decrees". Numerous supplemental orders, judgments and decrees relating to Green Mountain Reservoir have been entered by the federal court in the Consolidated Cases since the original decree in 1955.

The history and purpose of the C-BT Project, including Green Mountain Reservoir, was succinctly summarized by the federal court in a 1977 Opinion and Order entered in the Consolidated Cases:

> *"The Colorado-Big Thompson project was conceived and executed to augment the supply of irrigation water available in northeastern Colorado by means of a transmountain diversion from the Colorado River Basin, while providing full protection for the present and future water requirements of western Colorado. The project was authorized in 1937 by Congress and became operational in 1943. One of the structures built as a part of the project was the Green Mountain Reservoir …"*

[1] For practical purposes, this era of water administration continued through 1943 when Green Mountain Reservoir construction was completed. However, Senate Document 80 was the driver behind the shift in administration.

"S. Doc. No. 80 explains the purposes and operations of the Colorado-Big Thompson project, including Green Mountain Reservoir … The purpose of the project is stated to be the diversion of surplus water from the headwaters of the Colorado River on the Pacific slope to areas of northeastern Colorado on the Atlantic slope in need of supplemental irrigation water. S. Doc. No. 80, p. 1. The inclusion of Green Mountain Reservoir in the project plans was intended to prevent interference with or encroachment upon present and future development in the Colorado River Basin within the state by the transmountain diversion part of the project."

The keystone of SD 80 to accomplish the above-described intentions of the West Slope was that Green Mountain Reservoir was to be constructed above the present site of the diversion dam of the Shoshone Power Plant with a capacity of 152,000 acre-feet, with a reasonable expectancy that it will fill annually. Of this capacity, 52,000 acre-feet is to be *"available as replacement in western Colorado, of the water which would be usable there if not withheld or diverted"* by the C-BT Project Collection System. The remaining 100,000 acre-feet shall be stored *"and the water released shall be available, without charge, to supply existing irrigation and domestic appropriations of water, including the Grand Valley reclamation project …. and for future use for domestic purposes and in the irrigation of lands thereafter to be brought under cultivation in western Colorado."*[2]

The administration and management of water supplies diverted under the C-BT Collection System for use on the East Slope utilized the 52,000 acre-ft Replacement Pool in the following manner: *"Whenever the flow in the Colorado River at the present site of said Shoshone diversion dam is less than 1,250 cubic feet per second, there shall, upon demand of the authorized irrigation division engineer or other State authority having charge of the distribution of the waters of this stream, be released from said reservoir as a part of said 52,000 acre-feet, the amount necessary with other waters available, to fill the vested appropriations of water up to the amount concurrently being diverted or withheld from such vested appropriations by the project for diversion to the eastern slope."*[2] In essence, the directive in SD 80 was that the C-BT Collection System provide an equal amount of replacement supplies from the Green Mountain Reservoir 52,000 acre-ft C-BT Replacement Pool for diversions made at times when the Shoshone Power Plant senior water right was being exercised and would be impacted by such diversions.

SD 80 provided that the 100,000 acre-ft Power Pool in Green Mountain Reservoir be utilized in the following manner: *"It shall be released within the period from April 15 to October 15 of each year as required to supply a sufficient quantity to maintain the specified flow of 1,250 cubic feet per second of water at the present site of said Shoshone diversion dam, provided this amount is not supplied from the 52,000 acre-feet heretofore specified. Water not required for the above purposes shall also be available for disposal to agencies for the development of the shale oil or other industries."*[2] The100,000 acre-ft West Slope Pool in Green Mountain Reservoir was used to supplement the flows at the Shoshone Power

[2] Senate Document No. 80, 75th Congress 1st Session (1937) Manner of Operation of Project Facilities and Auxiliary Features

Plant to satisfy the Shoshone Senior water right at a level of 1,250 cfs to avoid a call by the Shoshone Senior right that would curtail junior irrigation and domestic water rights that were in existence in 1937 or that would be developed in the future.

It should be noted that the Shoshone Power Plant's junior water right for an additional 158 cfs was appropriated in 1929 but it was not decreed until 1956. The Shoshone Junior water right was not included in the framework of SD 80 nor was it considered during the over 40 years of SD 80 operations at Green Mountain Reservoir.

Upon the completion of Green Mountain Reservoir in 1943 and pursuant to the terms of SD-80, operations and administration of water rights in the Colorado River basin transitioned into this SD 80 era that was significantly different than the prior decades. In order for the C-BT Project to not impair, or as the federal court described it, *"to prevent interference with or encroachment upon present and future development"* of the water needs of the West Slope, the operation of Green Mountain Reservoir maintained 1,250 cfs at the Shoshone Power Plant during the irrigation season and met the irrigation needs of the Grand Valley in a manner that avoided a call under the Shoshone Senior water right or the various water rights in the Grand Valley.

Operation and administration of water systems and water rights in the Colorado River Basin during this era can be described as "two-fold" with two distinctly different water administration and management systems. One administration/management system was applied to the major Transmountain Diversion Projects (TMDs), including the C-BT Project, Moffat Collection System, Continental-Hoosier System, Dillon Reservoir/Roberts Tunnel and the Homestake Project. The administration of the major TMDs required curtailment or strict replacement of diversions to meet the demand of the Shoshone Power Plant up to 1,250 cfs at times when the power plant was operational. A priority system based on each TMD system's underlying water rights was utilized and was only applied to the TMDs and did not incorporate West Slope water rights.

A separate and distinctly different water administration system was applied to West Slope water users. If the curtailment or strict replacement of all TMDs was not sufficient to maintain the flows at 1,250 cfs at the Shoshone Power Plant during the irrigation season, then releases were made from the Green Mountain Reservoir Power Pool (100,000 acre-feet) to supplement the flows up to 1,250 cfs to allow for continued diversion for existing and newly developed irrigation and domestic uses on the Western Slope. Simply stated, releases from the Green Mountain Reservoir Power Pool were operated in a manner that kept flows at the Shoshone Plant at 1,250 cfs, thereby satisfying the senior Shoshone Water Right and therefore allowing all West Slope irrigation and domestic water rights to continue diverting without curtailment because of the absence of a call from the Shoshone Senior water right. In addition to the Green Mountain Reservoir Power Pool meeting the needs and avoiding a call by the Shoshone Senior water right, releases were also made to meet the needs of West Slope water uses in the Grand Valley, thereby also avoiding the need for a call from senior Grand Valley water rights.

The administration of water rights pursuant to the terms of SD 80 and the two distinct approaches applied to TMDs and West Slope water users transitioned to a different approach after the Operating Policy for Green Mountain Reservoir was implemented in 1984, as discussed in the next section.

1984 Green Mountain Reservoir Operating Policy Era (1984-1997)

In the late 1970's and early 1980's, the United States Bureau of Reclamation and interested parties in Western Colorado began investigating and discussing the possibility of adopting an operating policy for Green Mountain Reservoir. These discussions ultimately culminated in the adoption of an Operating Policy for Green Mountain Reservoir published in the Federal Register on December 22, 1983[3].

The Operating Policy is clear that:

> *"Nothing herein contained shall be deemed to alter or change the duties and obligations of the Department of the Interior under the judgements and decrees entered in the Consolidated Cases, Senate Document 80, above referred to, the applicable provisions of the Constitution of the State of Colorado regarding water, and the State of Colorado laws regarding the adjudication and administration of water"*[3]

The Operating Policy's stated purposes are as follows:

> *"The purposes for adopting a policy for the operation of Green Mountain Reservoir at this time are to quantify the presently perfected uses of water dependent upon the reservoir and to provide an orderly means of disposition of the remaining water in the reservoir for beneficial consumptive uses in the geographic area of Colorado west of the Continental Divide (hereinafter referred to as western Colorado)."*[3]

While the language in the Operating Policy for Green Mountain Reservoir is clear that it is not intended to alter or change SD 80, it did "quantify" the needs of irrigation and domestic uses in western Colorado based upon the amount of water released from the Green Mountain Reservoir Power Pool in 1977. Stream flow conditions on the Colorado River in 1977 were significantly below average as they had been in numerous years since 1943 when Green Mountain Reservoir went into operation and the Power Pool was utilized for the benefit of West Slope water users pursuant to the terms of SD 80. The Background section of the Operating Policy states, *"The release of approximately 66,000 acre-feet of water from storage to supplement natural flow shortage in western Colorado was necessary in 1977"* and provides the rationale for the limit on releases from the Power Pool pursuant to the Operating Policy. The remainder of the 100,000 acre-ft Power Pool was made available for industrial use and other uses, as well as irrigation and domestic uses not in place in 1977 all of which are subject to obtaining a contract with the Bureau of Reclamation.

SD 80 described the West Slope benefit as *"the water released shall be available, without charge, to supply existing irrigation and domestic appropriations of water, including the Grand Valley reclamation project …. and for future use for domestic purposes and in the irrigation of lands thereafter to be brought*

[3] Operating Policy for Green Mountain Reservoir, Colorado-Big Thompson Project, Colorado, Federal Register (Vol. 48, No. 247) at pages 56657 - 56658

under cultivation in western Colorado." The Operating Policy limited the existing and future irrigation and domestic uses in western Colorado (SD 80) that would benefit "without charge" to those uses perfected prior to October 15,1977. Instead of allowing the release of up to 100,000 acre-ft to keep the Shoshone Senior right of 1,250 cfs satisfied, it limited the release to 66,000 acre-feet to avoid curtailment of irrigation and domestic water rights perfected prior to October 15, 1977 and this amount *"shall be deemed adequate to satisfy all such so perfected uses with a priority date senior to October 19, 1977"*. The specific language as contained in the Operating Policy for Green Mountain Reservoir is as follows:

> *"When the administration of water under the priority system established by the laws of the State of Colorado would result in curtailment in whole or in part of a water right for irrigation or domestic use (as hereinafter defined) within western Colorado, which was perfected by use on or before October 15, 1977, and the water need is not met by the foregoing [releases from the 52,000 acre foot pool], water will be released without charge from Green Mountain Reservoir from the 100,000 acre-foot power pool to the extent necessary to permit diversions to the full amount of said decrees; Provided, however, That releases from the power pool for these purposes shall not exceed 66,000 acre-feet of water per annum (measured at Green Mountain Dam), which quantity shall be deemed adequate to satisfy all such so perfected uses with a priority date senior to October 15, 1977. All such releases made pursuant to this paragraph shall be administered by the State Engineer under the priority system."*

Actual operations of Green Mountain Reservoir under the Operating Policy commenced in 1984 with the Power Pool partitioned into sub-pools, including a 66,000 acre-foot "Historic Users Pool" ("HUP") to supply irrigation and domestic appropriations perfected before October 15, 1977 and a "Contract Pool" for any other uses authorized by contract, and subject to water service charges, to be supplied from controllable releases from the reservoir. In addition to the HUP and the Contract Pool there is an additional 5,000 acre-ft sub-pool that is referred to as the "Silt Pool" that was allocated as part of the authorization of the Silt Project in the 1960s, which is a Bureau of Reclamation irrigation project in Garfield County near the towns of Silt, Rifle and New Castle.

The Operating Policy for Green Mountain Reservoir is less than two pages in length, and for all practical purposes, was intended to direct the State and Division Engineer to operate the 66,000 acre-ft HUP as an augmentation supply for thousands of irrigation and domestic/municipal water rights when those water rights would otherwise be curtailed by a downstream senior water right. In addition, the Operating Policy directed the Bureau of Reclamation to stand up a contracting process to enter into contracts, with varying water service charges, for industrial water uses and domestic and irrigation uses perfected after October 15, 1977 for the remainder of the 100,000 acre-ft Power Pool.

This was an enormous task for the State Engineer, Division Engineer, Water Commissioners and the Bureau of Reclamation. The simplicity of the language contained in the Operating Policy did not lend itself to immediate and consistent implementation. The simple and straightforward water management approach of utilizing the 100,000 acre-ft Green Mountain Reservoir Power Pool to supplement the flows in the Colorado River to satisfy the Shoshone Senior water right and the water needs of the Grand

Valley and remove the need for a call that had been in place from 1943-1984 instantly became complex water administration pursuant to strict application of the water rights priority system.

Water users throughout the basin had enjoyed diversion and use of their water rights without the threat of curtailment from a call at Shoshone or the Grand Valley for over 40 years. And now under the terms of the Operating Policy and the application of priority administration of all water rights in the basin, these water users were not only subject to a call from the Shoshone Senior right (1,250 cfs) and the water rights in the Grand Valley, but also the Shoshone Junior water right for an additional 158 cfs. This all led to years of work to find an acceptable approach to quantify the impacts of the diversions and use of thousands of water rights in the basin that had enjoyed the benefit under SD 80 operations of not being curtailed when a senior call was placed due to releases from the Green Mountain HUP. In addition, numerous water rights in the basin had been developed and perfected during the intervening period 1977 to 1984 and had enjoyed the benefit of not being curtailed because of Green Mountain Reservoir releasing to avoid a call. These water rights, often referred to as the "Slot Group," as well as all existing industrial water users, were expected to enter into contracts with the Bureau of Reclamation for releases from the Contract Pool, but a contracting process did not exist for a number of years after promulgation of the Operating Policy.

In addition to all of the work that needed to be done to allow junior water rights to not be curtailed by a call under the Shoshone and the Grand Valley water rights to prevent injury and stand up a contracting process, the water users and water administration officials had to determine how the portfolio of water rights decreed to the entities in the Grand Valley would be administered to avoid injury. In particular, one of the water rights in the Grand Valley is for power production at the Orchard Mesa Power Plant (Grand Valley Power Right). The Grand Valley Power Right has a water right for 800 cfs in the winter and 400 cfs during the irrigation season and is senior not only to the majority of the HUP beneficiaries upstream, but also senior to the enlargement of the Grand Valley Irrigation Canal. The relative priority of the Grand Valley Power Right created significant challenges with implementation of the Operating Policy.

With all of the challenges described above, it took years to arrive at an acceptable and documented approach for providing releases from the HUP in an amount and time that allowed the thousands of HUP beneficiaries to continue diverting at times when they would be curtailed otherwise. It also took years to stand up a contracting process, including complying with NEPA, all the while industrial water users and newly perfected irrigation and domestic/municipal users were in limbo as to water administration. The West Slope water users arriving at an amicable solution to the interplay of the Grand Valley Power Right with the irrigation rights in the Grand Valley, as well as the thousands of upstream HUP beneficiaries' water rights, also was a monumental task that was not resolved until 1997 (discussed in the next section).

All of these issues associated with the implementation of the 1984 Operating Policy for Green Mountain Reservoir led to varying and inconsistent water administration and releases from Green Mountain Reservoir which had a significant influence as to the flows available for diversion at the Shoshone Power Plant. The influence of Green Mountain Reservoir releases was oftentimes hundreds of cfs above the

natural flow of the Colorado River otherwise available under the exercise of the Shoshone water rights and therefore make the transitional period from 1984-1997 unreliable and not representative.

Check Case Settlement & HUP Operating Criteria Era (1998- Current)

As described above, the implementation of the Operating Policy for Green Mountain Reservoir was challenging. Water users, water officials, federal officials and many others came together in the years following the completion of the Operating Policy to obtain court decrees and enter into numerous other agreements to assist in providing clarity and direction as to the application and implementation of the Operating Policy while maintaining the intent of SD 80.

There are a few key documents that were completed during the 1984-1997 period and provide direction for consistent water administration pursuant to the Operating Policy. These documents include:

- A hydrology study to determine the marketable yield of the Green Mountain Reservoir Power Pool pursuant to the Operating Policy completed by the Bureau of Reclamation
- Decree in Consolidated Case Nos. 2782, 5016 and 5017 and Case No. 88CW382, Water Division 5
- Decree in Case No. 91CW247, Water Division 5

The hydrology study completed by the Bureau of Reclamation in the mid to late 1980s led to the ability for water users to begin contracting to receive releases from the Contract Pool. The study modeled the operations of Green Mountain Reservoir for the period of 1952-1983 and resulted in a 20,000 acre-ft marketable yield for the Contract Pool. At this level of marketable yield for the Contract Pool, the study found that the pool would fill and water would thereby be available in most years, and that at a 20,000 acre-ft level, the Contract Pool would not affect the availability of the 66,000 acre-ft HUP except in dry years. .

An application was filed in the Consolidated Cases in Federal District Court and in Case No. 88CW382 in Division 5 Water Court in 1988 to adjudicate the exchanges associated with the operations of Green Mountain Reservoir. The case was decreed in 1992 and, in part, established a methodology to determine the relative priority of the thousands of exchanges for West Slope beneficiaries of the Green Mountain Reservoir HUP, thereby providing a decreed administrative mechanism for the delivery and benefit of HUP releases pursuant to the priority system and the terms of the 1984 Operating Policy.

In 1991 The United States, the Grand Valley Water Users Association, and the Orchard Mesa Irrigation District filed Case No. 91CW247 in Division 5 Water Court to decree the operations of the Orchard Mesa Check structure. While there were a number of reasons for filing this case, a primary driver was the effects of the operations of the Orchard Mesa Check structure and the Grand Valley Power Right on the implementation of the Operating Policy for Green Mountain Reservoir. As part of the resolution of the case, numerous water users entered into a Stipulation and Agreement that not only describes the operations of both the Orchard Mesa Check structure and the Grand Valley Power Right, but also includes the Green Mountain Reservoir Historic User Pool Operating Criteria. A large group of water users, water officials and federal representative came together during the pendency of the case to

agree on a methodology and criteria for the operations of the HUP pursuant to the Operating Policy. The group analyzed the operation of thousands of water rights above the Shoshone Power Plant and for the period of 1989-1994. This analysis produced daily depletion amounts for each of the sub-basins above the Shoshone Power Plant for all water rights junior to the Shoshone Senior water right. This schedule of depletions provided guidance as to the amount of releases necessary from Green Mountain Reservoir from the HUP for the benefit of the beneficiaries. This effort was completed in 1996 and codified in the decree and accompanying stipulation in Case No. 91CW247 for implementation in mid-1997.

Through the efforts of many during the period from the completion and implementation of the Operating Policy in 1984 through 1997 when the Check Case was decreed and the Green Mountain Reservoir Historic User Pool Operating Criteria was codified, a consistent and reliable methodology and operating criteria for water rights administration in the Colorado River basin and operations of releases from Green Mountain Reservoir was finally in place. This methodology and criteria remains in place today with periodic updates and revisions to meet the needs of the Colorado River basin water users. It provides for the protection of natural flow available for diversion at the Shoshone Power Plant and allows for the shepherding of reservoir releases outside of the priority system to be available for power generation without interfering with the delivery of the reservoir release to the downstream use.

II. Shoshone Power Plant Diversions Representative Period

The changes in water management, water rights administration, collaborative agreements and the operation of facilities both upstream and downstream of the Shoshone Power Plant have altered the flow regime significantly at the Shoshone Power Plant over the life of the plant.

Very little is known about, and Water Commissioner Diversion Records generally do not exist for, diversions at the Shoshone Power Plant for the period prior to the construction of Green Mountain Reservoir in 1943. It is presumed that power generation at the plant was recorded, but that data is not publicly available. During this period the flow in the Colorado River available for diversion at the Shoshone Power Plant was primarily affected by upstream irrigation diversions and the flows were generally closer to the natural hydrograph. The natural hydrograph would have provided flows far more than the power plant's capacity during the runoff months and then decline to a base flow far below the plant's capacity. Water development upstream of the power plant has altered the flow so significantly that this pre-SD 80 and pre-Green Mountain Reservoir period is no longer applicable.

The flows available at the Shoshone Power Plant during the period from the construction and operation of Green Mountain Reservoir in 1943 through the implementation of the Operating Policy for Green Mountain Reservoir in 1984 also are not representative of the available flows currently or into the future. The flow regime was supplemented and retimed so significantly by Green Mountain Reservoir releases that the flow pattern available for diversion and power generation was increased significantly. With the adoption of the Operating Policy for Green Mountain Reservoir in 1984, the practice of Green Mountain Reservoir releasing water to supplement the natural flow of the river that the basin was producing up to 1,250 cfs was ended and has not been available since.

The period from 1984 through 1997 can be described as a period of transition for water administration and water management on the Colorado River. When the Operating Policy for Green Mountain Reservoir was implemented in 1984, there was significant ambiguity as to how the newly created Green Mountain Reservoir Historic Users Pool was to be administered, utilized, and to what extent and under what mechanisms were West Slope water users to benefit. This ambiguity, coupled with the uncertainty of the operations of the Orchard Mesa Check structure and associated water rights, caused numerous changes in water administration and reservoir operations. The criteria for operating Green Mountain Reservoir for the benefit of the West Slope, the amount of flow that could be called for in the Grand Valley, and the ability to utilize the Green Mountain Reservoir West Slope Pool for Endangered Species Act (ESA) Upper Colorado River Endangered Fish Recovery Program (Recovery Program) purposes, all of which have significant effects on the flow at the Shoshone Power Plant, were not resolved until 1997. For these reasons, the flows available for diversion at the Shoshone Power Plant during the period of 1984-1997 were not consistently administered nor are they indicative of the flows since 1997 and into the future.

Starting in 1998 and continuing to the present, water administration by the Division of Water Resources has been consistent and aligned with Senate Document 80, the 1984 Operating Policy for Green Mountain Reservoir, the 1997 Check Case Settlement and the associated Green Mountain Reservoir Historic Users Pool Operating Criteria. Water administration has become accustomed to shepherding and accounting for releases from reservoirs upstream of the Shoshone Power Plant for use downstream while protecting the natural flow of the river. Shepherded releases are administered outside of the priority system and include releases for replacement of depletions, supplemental irrigation water for the Grand Valley, and for the ESA Recovery Program.

For the reasons stated, the period of time from 1998-current is the only period that the flows available for diversion at the Shoshone Power Plant are consistent with the water administration and system operations that are in place today and that are representative of the conditions the exercise of the Shoshone water rights will be subjected to in the foreseeable future.

1998-2024 Representative Study Period

The diversion records for the Shoshone Power Plant (WDID 5300584) were obtained from the State of Colorado's CDSS (Colorado's Decision Support Systems) website for the period of 1998-2024. The average daily diversion for each day for the period 1998-2024 is included in Figure 1. The analysis of the diversions at the Shoshone Power Plant demonstrates that the average daily diversion of the Shoshone Power Plant is 731 cfs. Table 1 illustrates the range of average daily diversions for the power plant with the maximum average day being 811 cfs and the minimum average day as 611 cfs.

It should be noted that the analysis performed did not reduce the diversions available at the Shoshone Power Plant by the amount of upstream reservoir releases that are being shepherded to a downstream use and therefore are not available by the exercise of the Shoshone water rights. The amount of shepherded releases varies by year and generally ranges between 40,000 – 75,000 acre-feet, with the majority of the releases occurring in the August – October period. If the amount of upstream reservoir

releases were properly factored out of the analysis, then the average daily diversion of the Shoshone Power Plant would be reduced.

Figure 1

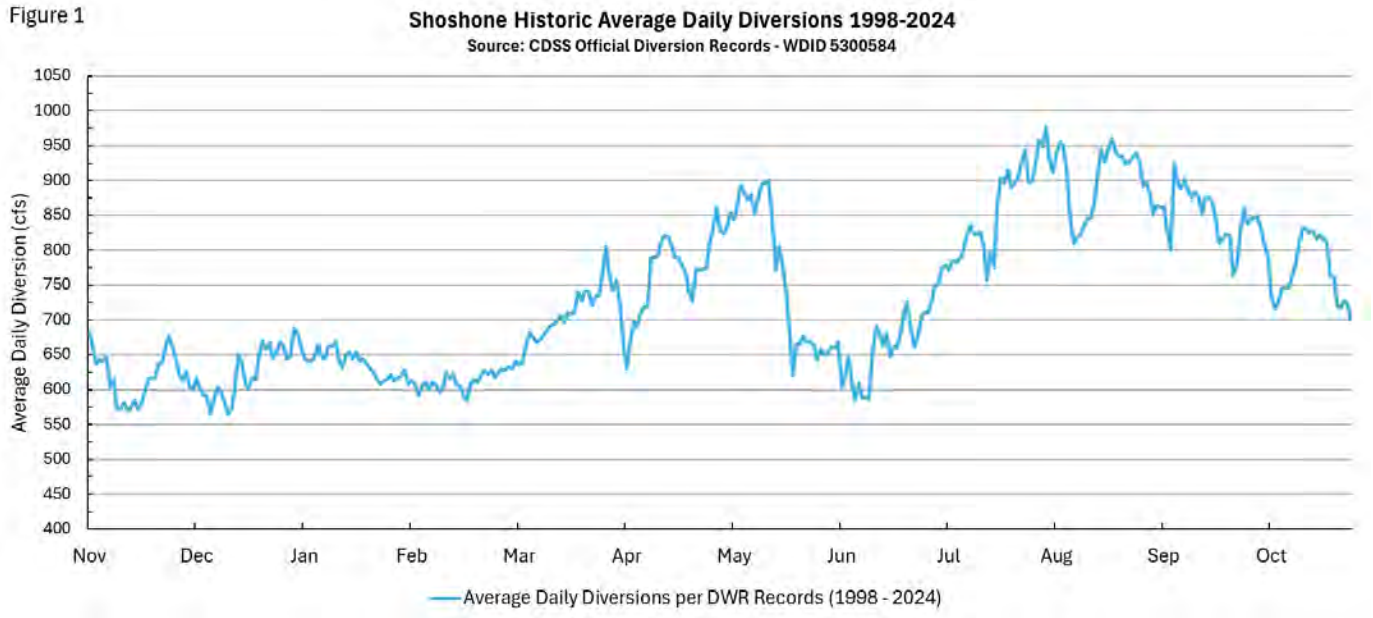


Table 1

Average Daily Diversions of Shoshone Power Plant

WDID 5300584 - Total Diversions Through Structure

	November	December	January	February	March	April	May	June	July	August	September	October
Min Average Day (cfs)	570	565	609	583	627	629	620	583	711	811	764	699
Max Average Day (cfs)	682	688	669	630	806	829	901	727	944	977	925	848
Average (cfs)	619	624	638	611	698	756	787	654	827	912	856	783

III. Northern Water and Municipal Subdistrict Water Rights and Injury Concerns

Northern Water and the Municipal Subdistrict have a perpetual right to use and own numerous water rights in the Colorado River basin as listed below in Table 2.

Table 2

WATER RIGHTS ASSOCIATED WITH THE COLORADO-BIG THOMPSON PROJECT IN THE COLORADO RIVER BASIN FOR WHICH THE NORTHERN COLORADO WATER CONSERVANCY DISTRICT HAS PERPETUAL RIGHT OF USE

Name of Right	Decree Amounts (af or cfs)				Approp. Date	Adjudic. Date	Administ. Number
	Total	Absolute	Cond	Unit			
Alva Adams Tunnel	550	550	0	cfs	8/1/1935	10/12/1955	31258.0000
Lake Granby	543,758.00	543,758.00	0	af	8/1/1935	10/12/1955	31258.0000
Granby Pump Canal	1,100.00	1,100.00	0	cfs	8/1/1935	10/12/1955	31258.0000
Willow Creek Reservoir	10,653.00	10,653.00	0	af	8/1/1935	10/12/1955	31258.0000
Willow Creek Feeder Canal	400	400	0	cfs	8/1/1935	10/12/1955	31258.0000
Shadow Mtn and Grand Lake	19,669.00	19,669.00	0	af	8/1/1935	10/12/1955	31258.0000
Green Mountain Reservoir	154,645.00	154,645.00	0	af	8/1/1935	10/12/1955	31258.0000
Green Mtn Res C-BT Exch	52,000.00	52,000.00	0	af	8/1/1935	10/12/1955	31258.0000
Green Mtn Res C-BT Exch	100,000.00	100,000.00	0	af	Varies	11/10/1992	Varies
Green Mtn Res Power Right	1,726.00	1,726.00	0	cfs	8/1/1935	10/12/1955	31258.0000
Elliott Creek Feeder	90	90	0	cfs	8/1/1935	10/12/1955	31258.0000
Green Mtn Reservoir Refill	6,316.00	6,316.00	0	af	8/1/1935	10/12/1955	31258.0000
Green Mtn Reservoir Refill	154,645.00	3856	150789	af	1/1/1985	12/31/1988	50403.49309*

NORTHERN COLORADO WATER CONSERVANCY DISTRICT WATER RIGHTS ASSOCIATED WITH THE COLORADO-BIG THOMPSON PROJECT IN THE COLORADO RIVER BASIN

Name of Right	Decree Amounts (af or cfs)				Approp. Date	Adjudic. Date	Administ. Number
	Total	Absolute	Cond	Unit			
Red Top Ditch	150	150	0	cfs	11/10/2001	8/11/2006	18941.00000
Red Top Ditch	10	10	0	cfs	11/10/2001	8/11/2006	18941.00000
Bunte Highline Ditch	17.82	17.82	0	cfs	5/31/1887	8/3/1911	20676.13665
Bunte Highline Ditch, First Enlargement	14.14	14.14	0	cfs	10/31/1914	11/7/1952	34241.23679
Bunte Highline Ditch, Second Enlargement	8.04	8.04	0	cfs	9/15/1941	11/7/1952	34241.33495
Bunte No. 2 Ditch	3.25	3.25	0	cfs	5/15/1886	8/3/1911	20676.13284
Good Yew Ditch	2.8	2.8	0	cfs	6/5/1943	6/13/1960	34241.34123

MUNICIPAL SUBDISTRICT OF NORTHERN COLORADO WATER CONSERVANCY DISTRICT WATER RIGHTS ASSOCIATED WITH THE WINDY GAP PROJECT IN THE COLORADO RIVER BASIN

Name of Right	Decree Amounts (af or cfs)				Approp. Date	Adjudic. Date	Administ. Number
	Total	Absolute	Cond	Unit			
Windy Gap Pump, Pipeline, and Canal	300	300	0	cfs	6/22/1967	10/27/1980	43621.42906
Windy Gap Reservoir	445.00	445	0	af	6/22/1967	10/27/1980	43621.42906
Windy Gap Pump, Pipeline, and Canal, First Enlargement	100	100	0	cfs	7/9/1976	10/27/1980	43621.42906
Windy Gap Pump, Pipeline, and Canal, Second Enlargement	200	200	0	cfs	4/30/1980	10/27/1980	43621.42906

As described above, water management and the regulatory administrative system have changed significantly over the period of time from 1943 - Present. If a historical use analysis is adopted based on an inflated utilization of natural flow of the Colorado River by the Shoshone Power Plant, it will have impacts on vested water rights throughout the basin. Quantifying the exact amount of impacts and injury to other water rights is difficult to determine, but the direction of the impacts and the effects can be easily described.

The C-BT Collection System, pursuant to Senate Document 80, diverts and stores available water supplies for delivery to northeastern Colorado. When the water rights for the C-BT Collection System are in-priority, diversions are made without the need for replacement. At times when the C-BT Collection System water rights are out-of-priority, the diversions continue to occur, and an equal replacement release is made from the 52,000 acre-ft C-BT Replacement Pool in Green Mountain Reservoir. In over 70 years of operating the C-BT Collection System in the above-described manner, the 52,000 acre-ft in the C-BT Replacement Pool has been adequate to allow the continuation of out-of-priority diversions throughout each year without exhausting the available 52,000 acre-ft of replacement supplies. If an inflated historic use is utilized for the future operation and administration of the Shoshone water rights, then the 52,000 acre-ft C-BT Replacement Pool could be exhausted and require that the C-BT Collection System be curtailed and required to bypass inflows, thus reducing the yield of the C-BT project as compared to the historical yield of the project.

Under an inflated historical use applied to future operations, even in years when the 52,000 acre-ft C-BT Replacement Pool is not exhausted, additional replacement releases would be required and the impacts of such additional releases would be felt by the Silt, HUP and Contract Pools in Green Mountain Reservoir as it would require additional time and additional diversions to storage to refill Green Mountain Reservoir the following year. The C-BT Replacement Pool is the first to fill each year, followed by the various sub-pools for West Slope use. The effects and related injury of an increased risk of Green Mountain Reservoir not refilling will be borne first by the Contract Pool followed by the HUP.

History has proven that Green Mountain Reservoir does not fill in extremely dry years. Causing additional release requirements from the C-BT Replacement Pool, Silt Pool, HUP and Contract Pool will exaggerate the risk of Green Mountain Reservoir not filling. At times when the Contract Pool does not fill, the hundreds of West Slope water users that rely on the availability of releases for augmentation and exchange of junior water rights risk their water rights being curtailed and critical water needs not being met. If the amount needed to refill Green Mountain Reservoir is not available to fully refill the HUP, the thousands of West Slope water rights that rely on the HUP to avoid curtailment and provide supplemental irrigation supplies would be impacted and at significant risk of curtailment pursuant to the terms of the Check Case Settlement, the HUP Operating Criteria, and the Operating Policy for Green Mountain Reservoir. The utilization of the various pools in Green Mountain Reservoir in a manner similar to the past and the ability of the reservoir to fill as reliably as it has in the past is critically important to millions of people on both sides of the Continental Divide in Colorado.

The above-described impacts and injury from increased releases from the various pools in Green Mountain Reservoir would not only affect the beneficiaries of Green Mountain Reservoir but also every other reservoir and major diversion system within the Colorado River basin. Due to complex and

integrated operations of multiple diversion systems, the impacts would also be felt at Wolford Mountain Reservoir, Dillon Reservoir, Williams Fork Reservoir and Homestake Reservoir. Increased utilization of Green Mountain Reservoir to meet an inflated demand from the Shoshone Power Plant in the future will cause all of these reservoirs to be drawn-down to a greater extent, not only risking storage releases not being available for their intended purposes in a given year, but requiring a greater amount to be refilled in the next year, thus increasing the risk of not filling the reservoirs and jeopardizing the water uses that rely on these reservoirs for replacement and direct delivery purposes.

The need to refill a greater amount than historically needed at Green Mountain Reservoir and Wolford Mountain Reservoir will also have effects on the ESA Recovery Program in the 15-Mile Reach of the Colorado River in the Grand Valley. An increased utilization of these reservoirs jeopardizes not only the controllable water available in these reservoirs for enhancement of flows in the 15-Mile Reach, it also jeopardizes these reservoirs and all of the other reservoirs' potential to participate in Coordinated Reservoir Operations (CROs). CROs is a collaborative program among the major water users in the Colorado River basin to enhance the peak flows in the 15-Mile Reach to enhance channel maintenance functions. CROs is a component of the ESA Recovery Program that has occurred approximately 50% of the years since the start of Recovery Program flow management programs in 1998. Participation in CROs is voluntary and only occurs when a reservoir is not in jeopardy of achieving a fill in that year and yield is not affected. If all of the above mentioned reservoirs are utilized to a greater extent due to an inflated historic use applied to future operations of the Shoshone water rights, the reservoirs will certainly require additional water and additional time to refill the next year and the likelihood of participating in CROs will be reduced and eliminated in years with average and below average hydrologic conditions.

The Windy Gap Project relies on junior water rights and is a "run of the river" pumping plant. The Windy Gap water rights are only in-priority for a short time during the snow melt and runoff season each year. In below average years the yield of the Windy Gap project is limited. If the demand for the Shoshone water rights is based on an inflated amount for future operations, these water rights and diversions at the Windy Gap Project will be out-of-priority and curtailed more often. In addition, if the reservoirs in the Colorado River basin, as described above, are utilized to a greater extent, this will also reduce the amount of time the Windy Gap water rights are available for diversion due to the increased time and volume of water needed to refill the reservoirs. This will affect the yield of the Windy Gap Project and the 19 municipal water providers on the East Slope that rely on the yield of the Windy Gap Project.

IV. Negotiated and Collaborative Solutions

The history and use of the Shoshone Water Rights is important context to any negotiated agreement on the Shoshone ISF acquisition proposal, and as described above that history is quite lengthy, encompassing operations under Senate Document No. 80, a Tenth Circuit Court ruling regarding FERC "headwater benefits"[4] from the 1980s, the 1984 Operating Policy for Green Mountain Reservoir, creation of the Upper Colorado River Endangered Fish Recovery Program, and the challenges associated with drought conditions and increased plant outages. As the past three decades demonstrate, the major

[4] *Public Service Company of Colorado v. FERC*, 754 F.2d 1555 (10th Cir. 1985).

water users in the Colorado River basin have a proven track record of negotiating and collaborating to find cooperative working solutions to important issues affecting administration, flow regimes and water use in the basin. Much of this past work has resulted in the current administrative structure under which streamflow benefits from the Shoshone Water Rights are achieved without formal exercise of instream flow water rights. The following provide notable examples of currently existing agreements that enhance river flows while also protecting water users' critical water supplies:

- 1996 Orchard Mesa Check Case settlement is a landmark agreement between more than 35 parties that modified operations of both the Cameo Call and the Green Mountain Reservoir Historic Users Pool (HUP) in a manner that benefited all parties and found a creative way to enhance flows for ESA-listed fish species in the 15-Mile Reach.
- 2007 Agreement Concerning Reduction of Shoshone Call between Denver Water and Xcel represents an effort to address drought impacts to Denver Water's system.
- 2012 Windy Gap Firming Project Intergovernmental Agreement includes terms and conditions to operate the Windy Gap Project as if the Senior Shoshone Call was in effect during a Shoshone Outage. The parties to the agreement include: the Municipal Subdistrict, Grand County, Middle Park Water Conservancy District, River District and Northwest Colorado Council of Governments.
- 2013 Colorado River Cooperative Agreement includes terms under which Denver agreed to operational procedures during a "Shoshone Outage" to mitigate potential adverse effects of an outage, subject to certain "drought exceptions."
- 2013 Green Mountain Reservoir Administrative Protocol Agreement is a critical agreement for the administration of Green Mountain Reservoir agreed to by parties affected by the filling and releases from Green Mountain Reservoir and preserves the ability for operations pursuant to the Shoshone Outage Protocol.
- 2016 Shoshone Outage Protocol Agreement more widely implemented continuation of a "desire to keep the flow regime of the Colorado River as it has been historically influenced by the Senior Shoshone Call" during a Shoshone outage and balanced maintaining the flows in the river with protecting parties' critical water supplies. The parties to this existing agreement are: the River District, Northern Water, the Municipal Subdistrict, the U.S. Bureau of Reclamation, Denver Water, Middle Park Water Conservancy District, Grand Valley Water Users Association (GVWUA), Orchard Mesa Irrigation District (OMID), and Grand Valley Irrigation Company.
- 2018 Agreement and Intergovernmental Agreement between Aurora Water, Busk Ivanhoe, Inc., the River District, Basalt Water Conservancy District, Eagle County, Pitkin County, GVWUA, OMID, and Ute Water Conservancy District (Ute Water) to further expand the parties involved in addressing operations during a Shoshone Outage and to keep the flow regime of the Colorado River as it has been historically influenced by the Senior Shoshone Call.

- 2020 Upper Colorado River Wild and Scenic Stakeholder Group Management Plan where 25+ Stakeholders recognized the Shoshone water rights as a Long-Term Protection Measure for flows in the Colorado River and committed to evaluate cooperative measures during a Shoshone Outage.
- 2024 Settlement Agreement Concerning Water Rights between Colorado Springs Utilities, the River District, Summit County, the Twon of Breckenridge, GVWUA, OMID, and Ute Water to further expand the parties involved in addressing operations during a Shoshone Outage and to keep the flow regime of the Colorado River as it has been historically influenced by the Senior Shoshone Call.

Kyle Whitaker, P.E.
Northern Colorado Water Conservancy District
220 Water Avenue
Berthoud, CO 80513

Northern Water
Northern Colorado Water Conservancy District
220 Water Avenue • Berthoud, Colorado 80513
800-369-7246 • www.northernwater.org

Education:

- BS / Civil Engineering, Colorado State University/1994
- MS/Water Resource Engineering, Colorado State University/1997

Professional Registrations:

- Professional Engineer, State of Colorado

Experience Summary:

Water Rights Department Manager, Northern Colorado Water Conservancy District (8/2018 – Present)

Responsible for overseeing interstate, intrastate, local and stakeholder-led Colorado River and Platte River water resources related programs and the protection of District and Subdistrict water rights and water resources.

Assistant Division Engineer, Colorado Division of Water Resources, Division 5 (7/2006 – 8/2018)

Responsible for water resource administration and accounting in the Colorado River Basin in western Colorado, review and consultation on water court litigation, stream gauging, augmentation plan administration, and public assistance on water resource projects.

Augmentation Plan Coordinator, Colorado Division of Water Resources, Division 5 (9/2000 – 7/2006)

Responsible for water resource administration and accounting in the Colorado River Basin in western Colorado, review and consultation on water court litigation, stream gauging, augmentation plan administration, and public assistance on water resource projects.

Project Manager, Tuttle Applegate, Inc. (9/1997 – 9/2000)

Responsible for water rights engineering and analysis, irrigation and drainage design, hydraulic and hydrologic modeling, sewer design, prepared feasibility studies, prepared and presented mining permits, groundwater management, surveying, and water resource planning and management.

Project Engineer, JR Engineering, Ltd. (4/1996 – 9/1997)

Responsible for water rights engineering and analysis, ground water well design, groundwater modeling, hydraulic and hydrologic modeling, irrigation system design and construction, surveying, surface drainage design and infrastructure design.

Research Assistant, Colorado State University-Engineering Research Center (1/1991 – 4/1996)

Project leader on a US Army Corps of Engineers project to monitor hydraulic control structures throughout the country. Led the collection of field data including sediment sampling, stream gauging, topographic surveying for use in hydraulic and hydrologic modeling.

Northern Water

Colorado-Big Thompson Project

Northern Water Boundaries and Facilities

Northern Water
Northern Colorado Water Conservancy District

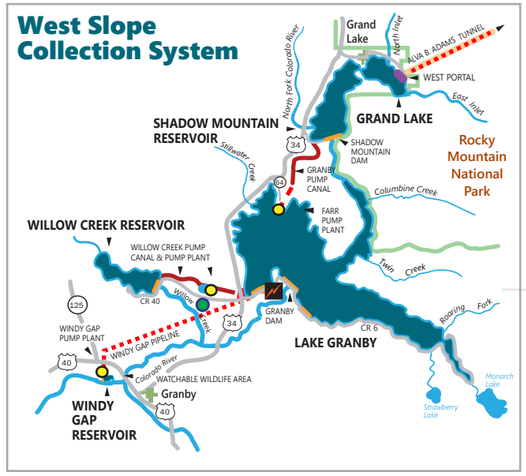
— BUREAU OF — RECLAMATION

Legend

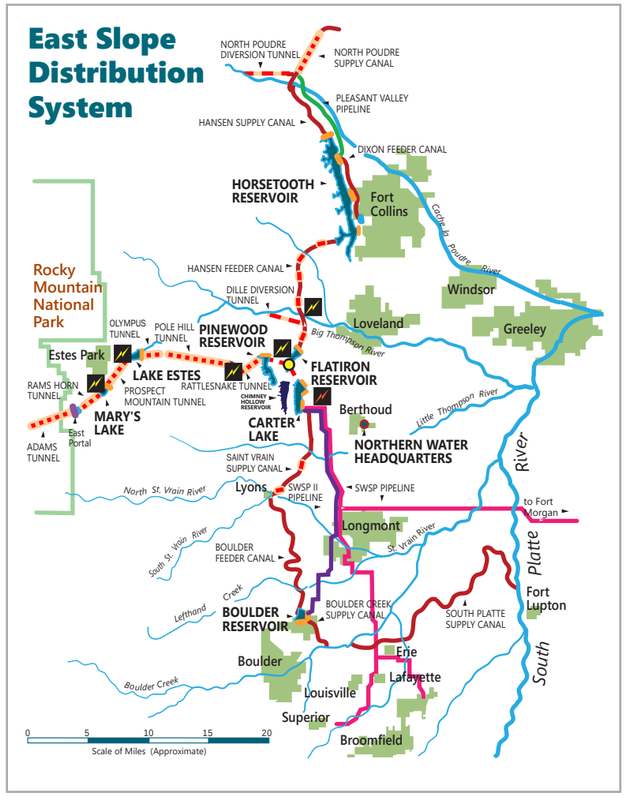
- Canal
- Pipeline/Conduit
- Tunnel
- Dam
- USBR Power Plant
- Northern Water Power Plant
- Pump Plant
- Colorado-Big Thompson Reservoirs
- City/Town
- Northern Water Boundaries
- Southern Water Supply Pipeline
- Southern Water Supply Pipeline II
- Pleasant Valley Pipeline
- Berthoud Headquarters
- West Slope - Willow Creek Campus

Scale of Miles (Approximate): 0 5 10 15 20

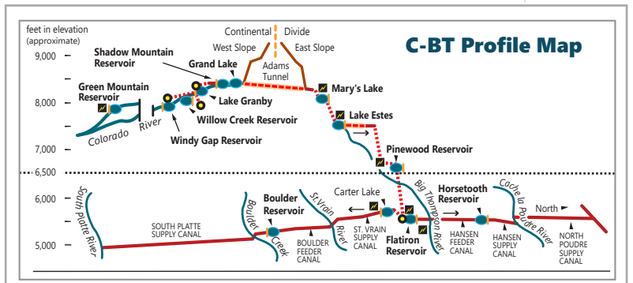
West Slope Collection System



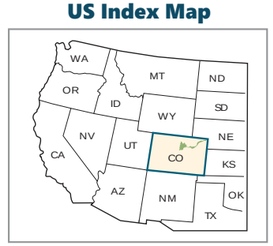
East Slope Distribution System



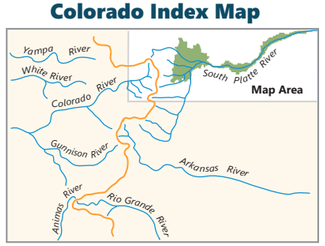
C-BT Profile Map



US Index Map



Colorado Index Map



Rev. 5-2025

WATER RIGHTS ASSOCIATED WITH THE COLORADO-BIG THOMPSON PROJECT IN THE COLORADO RIVER BASIN FOR WHICH THE NORTHERN COLORADO WATER CONSERVANCY DISTRICT HAS PERPETUAL RIGHT OF USE

Name of Right	Decree Amounts (af or cfs)				Approp. Date	Adjudic. Date	Administ. Number
	Total	Absolute	Cond	Unit			
Alva Adams Tunnel	550	550	0	cfs	8/1/1935	10/12/1955	31258.0000
Lake Granby	543,758.00	543,758.00	0	af	8/1/1935	10/12/1955	31258.0000
Granby Pump Canal	1,100.00	1,100.00	0	cfs	8/1/1935	10/12/1955	31258.0000
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Willow Creek Feeder Canal	400	400	0	cfs	8/1/1935	10/12/1955	31258.0000
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Green Mountain Reservoir	154,645.00	154,645.00	0	af	8/1/1935	10/12/1955	31258.0000
Green Mtn Res C-BT Exch	52,000.00	52,000.00	0	af	8/1/1935	10/12/1955	31258.0000
Green Mtn Res C-BT Exch	100,000.00	100,000.00	0	af	Varies	11/10/1992	Varies
Green Mtn Res Power Right	1,726.00	1,726.00	0	cfs	8/1/1935	10/12/1955	31258.0000
Elliott Creek Feeder	90	90	0	cfs	8/1/1935	10/12/1955	31258.0000
Green Mtn Reservoir Refill	6,316.00	6,316.00	0	af	8/1/1935	10/12/1955	31258.0000
Green Mtn Reservoir Refill	154,645.00	3856	150789	af	1/1/1985	12/31/1988	50403.49309*

NORTHERN COLORADO WATER CONSERVANCY DISTRICT
WATER RIGHTS ASSOCIATED WITH THE COLORADO-BIG THOMPSON PROJECT IN THE COLORADO RIVER BASIN

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Bunte No. 2 Ditch	3.25	3.25	0	cfs	5/15/1886	8/3/1911	20676.13284
Good Yew Ditch	2.8	2.8	0	cfs	6/5/1943	6/13/1960	34241.34123

MUNICIPAL SUBDISTRICT OF NORTHERN COLORADO WATER CONSERVANCY DISTRICT
WATER RIGHTS ASSOCIATED WITH THE WINDY GAP PROJECT IN THE COLORADO RIVER BASIN

Name of Right	Decree Amounts (af or cfs)				Approp. Date	Adjudic. Date	Administ. Number
	Total	Absolute	Cond	Unit			
Windy Gap Pump, Pipeline, and Canal	300	300	0	cfs	6/22/1967	10/27/1980	43621.42906
Windy Gap Reservoir	445.00	445	0	af	6/22/1967	10/27/1980	43621.42906
Windy Gap Pump, Pipeline, and Canal, First Enlargement	100	100	0	cfs	7/9/1976	10/27/1980	43621.42906
Windy Gap Pump, Pipeline, and Canal, Second Enlargement	200	200	0	cfs	4/30/1980	10/27/1980	43621.42906