

GLEN CANYON DAM INTERIM OPERATIONS

Estimated Net Expense
June 1993 Through November 1993

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January 1994

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Western
AREA POWER
ADMINISTRATION

ECO 1001-1194

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Estimated Net Expense

June 1993 Through November 1993

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GLEN CANYON DAM INTERIM OPERATIONS

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I. EXECUTIVE SUMMARY

Power Scheduling and Real-Time Operations

- In June, high generation levels at the Glen Canyon and the Aspinall units reduced onpeak purchase requirements, forcing Western to sell energy for a low of 3 mills/kWh.
- In early November, the economy energy market tightened due to operational problems with the Laramie River station and with the Palo Verde units, forcing Western to purchase energy at 33 mills/kWh.

Analysis of Ramping Events

- There were 102 deviations: "Control Area Regulation" accounted for most of the anomalies.

Expenses

- Net expense of interim releases:

June 1993	.....	\$618,118
July 1993	.....	\$680,830
August 1993	.....	\$552,370
September 1993	.....	\$446,771
October 1993	.....	\$387,899
November 1993	.....	\$464,447

Power Scheduling Concerns (Future)

- If the low snowpack trend continues across the Upper Colorado River basin, release from the Glen Canyon will be reduced to the 8.230 million acre feet (AF) minimum release requirement. If the entire 475,000 AF equilization releases are eliminated due to low runoff conditions, Western's purchase power requirements will increase approximately 250 GWH during the late Winter and Spring months.

II. INTRODUCTION

On August 1, 1991, former Interior Secretary Manual Lujan implemented interim flows at Glen Canyon Dam. These interim flows were a considerable departure from previous operation of the dam and have had a significant impact on the daily operation of Western Area Power Administration's (Western) Upper Colorado Control Area.

The impacts of this change in dam operations have required Western to implement new scheduling procedures for its customers, develop interim release guidelines for real-time operations, purchase higher-priced energy during onpeak periods, and increase the firm-power rates to its customers to cover the additional costs.

The following sections are a review of Power Operations for the reporting period.

III. SCHEDULING

A. Interim release restrictions have limited Western's ability to accommodate hourly changes in the preschedules. These restrictions have required Western to request customer prescheduling 3 days in advance in order to match firm loads to available project resources and substitute purchases for any hourly deficits. Hourly changes to preschedules have been restricted by the lack of system flexibility. The burden to adjust to changes in real-time load has shifted from the contractors' use of their SLCA/IP resources to the contractors' alternate resources. A majority of these other resources are thermal and have higher costs associated with their use.

B. Power Scheduling and Real-Time Operations

1. Power Scheduling and Purchases for June 1993

Scheduled water releases for Glen Canyon was 675,000 acre foot (AF) for the month. Due to low loads and the lack of an economy sale market the actual release for June was 617,986 AF. The water not released in June will be moved into future months. The daily maximum fluctuation rate was 6,000 cfs. Offpeak generation was scheduled at approximately 7,000 cfs (578 MW) ramping to approximately 13,000 cfs (1074 MW) during onpeak hours. High generation levels at Glen Canyon and the Aspinall units greatly reduced onpeak purchased power requirements. However, the same high generation levels forced dump energy sales during the offpeak hours. Prices for offpeak dump energy sales got as low as 3 mills.

Runoff for the entire month was moderately heavy. Water was bypassed and spilled over the top at Crystal during June. Flaming Gorge releases were high the first 3 weeks of June to accommodate the Endangered Fish Studies spring release request. Flows at Flaming Gorge were gradually reduced to a constant 800 cfs (26 MW) by the end of June. Glen Canyon elevation for the end of June was 3,666' or approximately 34' from full.

2. Power Scheduling and Purchases for July 1993

Scheduled water releases for Glen Canyon was 910,000 AF for the month. The daily maximum fluctuation rate was 8,000 cfs. Offpeak generation was scheduled at approximately 10,800 (427 MW) ramping to approximately 19,500 cfs (770 MW) during onpeak hours. Most firming purchase requirements were met through long term and seasonal purchase agreements with Rocky Mountain Generation

Cooperative, Inc. (RMGC), and Plains Electric Generation & Transmission Cooperative, Inc. (PG&T).

Runoff declined throughout the month. Releases from Crystal were reduced and the by-pass was closed. Inflows and outflows from Blue Mesa were equalized. A special release at Flaming Gorge powerplant, to assist the State of Utah Department of Fish & Wildlife fish survey, was completed. Glen Canyon elevation for the end of July was 3,668 feet or approximately 32 feet from full.

3. Power Scheduling and Purchases for August 1993

Scheduled water releases for Glen Canyon was 910,100 AF for the month. The daily maximum fluctuation rate was 8,000 cfs. Offpeak generation was scheduled at approximately 9,500 cfs (373 MW) ramping to approximately 17,500 cfs (688 MW) during onpeak hours. Most firming purchase requirements were met through long term and seasonal purchase agreements with RMGC and PGT.

Runoff continued to decline throughout the month. A gradual draw down to meet calendar year end carryover requirements was begun at Blue Mesa. A special release at Flaming Gorge powerplant, to assist aerial photography, was completed. Glen Canyon elevation for the end of August was 3,664 feet or approximately 36 feet from full.

4. Power Scheduling and Purchases for September 1993

Scheduled water releases for Glen Canyon was 666,000 AF for the month of September. The daily maximum fluctuation rate was 6,000 cfs. Offpeak generation was scheduled at approximately 8,250 cfs (323 MW) ramping to approximately 14,250 cfs (558 MW) during onpeak hours.

Several special releases at Flaming Gorge were completed during the month. Glen Canyon elevation for the end of September was 3,663 feet or approximately 37 feet from full. Most firming purchase requirements were met through long term and seasonal purchase agreements with RMGC and PGT.

5. Power Scheduling and Purchases for October 1993

Scheduled water releases for Glen Canyon was 550,000 AF for the month of October. The daily maximum fluctuation rate was 5,000 cfs. Offpeak generation was scheduled at approximately 6,000 cfs (235 MW) ramping to approximately 11,000 cfs (430 MW) during onpeak hours.

Irrigation requirements through Gunnison tunnel were slowly reduced through the month. Glen Canyon elevation for the end of October was 3,662 feet or approximately 38 feet from full. Most firming purchase requirements were met through the long term purchase agreement with RMGC.

6. Power Scheduling and Purchases for November 1993

Scheduled water releases for Glen Canyon was initially scheduled at 550,000 AF for the month of November. This was revised upward to 600,000 AF due to the unavailability of spot market purchase power, requiring the use of water that had been held back for anticipated spring 1994 spike releases at Glen Canyon. The maximum daily fluctuation was 6,000 cfs. Offpeak generation was scheduled at approximately 8,250 cfs (323 MW). Ramping to approximately 14,250 (558 MW) during onpeak hours.

In early November 1993, the economy energy market tightened due to operational problems with the Laramie River Station and the Palo Verde units. RMGC had no energy to preschedule for 2 days, indicative of the energy market in which no utility (apparently) had any energy at any price. This "energy shortage" was alleviated when the Power Control Staff was given permission from Reclamation to move additional water into November, thereby, increasing Glen Canyon Dam releases (From: Secretary's Report, November 5, 1993).

Irrigation through the Gunnison tunnel was reduced to zero in November. A special release at Crystal was requested to allow work on the tunnel shut-off valve. The valve would not close completely. Glen Canyon elevation for the end of November was 3,662 feet or approximately 38 feet from full. Most firming purchase requirements were met through the long term purchase agreement with RMGC.

7. Power Scheduling and Purchases for December 1993

Scheduled water releases for Glen Canyon was 801,000 AF for the month of December. The maximum daily fluctuation was 8,000 cfs. Offpeak generation was scheduled at approximately 9,000 cfs (351 MW). Ramping to approximately 17,000 cfs (662 MW) during onpeak hours. Glen Canyon elevation for the end of December was 3,654 feet or approximately 41 feet from full. Most firming purchase requirements were met the long term purchase agreement with RMGC.

C. Future Scheduling Concerns for Winter/Spring Operations

The December, 1993, USBR Annual Operating Plan for water year 1994, lists annual releases from Glen Canyon powerplant to be 8.705 million AF. This equates to 475,000 AF of equalization releases into Lake Mead. At the present time, snowpack across the Upper Colorado River basin is below normal. If the low snowpack trends continue, releases from Glen Canyon will be reduced to the 8.230 million AF minimum release requirement. If the entire 475,000 AF equalization releases are eliminated due to low runoff conditions, the Salt Lake City Area (SLCA) purchase power requirements will increase approximately 250 GWH. With increased purchase requirements, the SLCA will loose powerplant capacity in months where water reductions decrease monthly fluctuation amounts below 8,000 cfs and below 6,000 cfs.

Low snowpack conditions exist in the upper Green River Basin. As of January 10, releases from Flaming Gorge have been cut back the equivalent of 300 MWh per day, necessitating the lost energy to be recovered through Western purchases. This reduction equates to a loss of 25 MW of generating capacity across peak periods due to existing ramping procedures in place for the on going winter endangered fish studies. If below normal snow conditions continue, Flaming Gorge releases will be maintained at lower than anticipated levels through spring. This leaves a big concern over the magnitude of the spring release for endangered fish studies. High spring releases equate to lower fall and winter releases impacting Western's purchase needs.

Snowpack conditions in the Gunnison Basin are about 75 percent of normal. Releases from Crystal powerplant will be cut from 1,400 cfs to approximately 800 cfs the week of January 10. This is a loss of approximately 800 MWh of generation on a daily basis and reduces the number of hours the Aspinal units can be made available for peaking purposes. Due to the limited number of hours the Aspinal units will be available for generation, Glen Canyon will be maintained on regulation control for the remainder of the winter season.

The winter season energy market appears to be healthy; energy availability should remain stable. Before the reduction in water releases, Western's system generation has been high enough to meet most of Western's firming requirements in conjunction with seasonal energy purchase contracts.

Because generating capability will be reduced, Western will be purchasing more energy from a volatile economy energy market exposing Power Control Operations to potential emergency conditions.

Water releases for the upcoming summer season are unknown and difficult to plan for. Western has three long-term purchase agreements that will provide for most energy requirements should any emergencies develop.

IV. ANALYSIS OF RAMPING EVENTS

A study was made to analyze hourly release rates which appeared to deviate from interim flow criteria. Operational records and logs kept during the study period, June 1, 1993, through November 30, 1993 were reviewed.

The operational records and logs are contained within the packet Glen Canyon Dam Interim Flows—Glen Canyon Power Plant Operations, for June 1993 through November 1993 and provide specific explanations for each ramping event.

Each page within the packet contains (1) a strip chart of real-time Glen Canyon Dam operations during the ramping event, (2) a graph of the USGS Lees Ferry Gauge showing river elevation during the ramping event, (3) a graph of hourly integrated Glen Canyon Dam generation during the ramping event, and (4) a brief written explanation of the ramping event.

For the study period, 102 instances of deviations were found. Most of the conditions were caused by more than one factor: for example, control area regulation and imports/exports different than preschedule; therefore, multiple variations can be explained by one anomaly.

The following table summarizes the causes and frequency of the 102 deviations:

<u>Primary Cause(s) of Deviation</u>	<u>Number Of Instances</u>	<u>Percent Of Events</u>
Control Area Regulation	39/102	38
CRSP Resource Availability	14/102	14
Aspinall Operations	1/102	1
Morrow Point Operations	4/102	4
Blue Mesa Operations	2/102	2
Imports/Exports Different than Preschedule	18/102	18
Glen Canyon Operations	5/102	5
Other	19/102	19

V. **Expenses**

A. **Net Expense**

The estimated net expense of interim releases for June through November 1993 are summarized below:

	<u>Net Expense</u>
June 1993	\$618,118
July 1993	\$680,830
August 1993	\$552,370
September 1993	\$446,771
October 1993	\$387,899
November 1993	\$464,447

Attached are Tables 1 through 6 detailing the net expense analysis by component for June 1993, July 1993, August 1993, September 1993, October 1993, and November 1993.

B. Purchases

A comparison of Base Case purchases to Actual purchases are summarized below:

Energy Purchase Comparison			
Months	Simulated Base Case Purchases	Actual Purchases	Differences
June 1993	9,661 MWh	34,704 MWh	(25,043) MWh
July 1993	51,107 MWh	55,475 MWh	(4,368)MWh
August 1993	64,660 MWh	66,309 MWh	(1,649) MWh
September 1993	83,788 MWh	68,124 MWh	15,664 MWh
October 1993	117,645 MWh	115,149 MWh	2,496 MWh
November 1993	90,452 MWh	58,594 MWh	31,858 MWh

For June, July, and August, actual purchases were greater than projected for Base Case conditions. However, for September, October, and November, actual purchases were less than projected for Base Case conditions. This is due to a shift in deficits from onpeak to offpeak hours in the Base Case, resulting in higher purchases during offpeak hours.

C. Economy Energy Sales (Surplus)

For the exception of July and August, actual nonfirm energy sales were less than projected for Base Case conditions. Revenues foregone are estimated below:

ENERGY SALES AND REVENUES FOREGONE			
Months	Base Case	Actual	Revenues Foregone
June 1993	\$796,224	\$772,299	\$23,925
July 1993	579,793	598,368	(18,575)
August 1993	589,793	624,095	(34,302)
September 1993	418,279	55,452	362,827
October 1993	83,402	27,442	55,960
November 1993	739,834	33,883	705,951

D. Average Purchase Prices—Base Case and Actual

The average monthly purchase price estimates are derived from the actual nonfirm energy purchase prices. With the help of the Power Control staff (Montrose), some of the higher purchase prices for June, September, October, and November that are associated directly with interim release constraints, were excluded. There were no changes in the purchase prices for July and August because it reflected market purchase prices if restrictions were not in place at the Glen Canyon Dam, according to Montrose. An adjusted weighted average of remaining purchase amounts and prices are rendered to calculate the base case offpeak and onpeak purchase prices.

Average Base Case monthly purchase prices are estimated as follows:

ENERGY PURCHASE PRICES				
	Base Case		Actual	
Months	Offpeak	Onpeak	Offpeak	Onpeak
June 1993	\$13.06/MWh	\$20.98/MWh	\$13.65/MWh	\$20.98/MWh
July 1993	10.03/MWh	22.11/MWh	10.03/MWh	22.11/MWh
August 1993	13.25/MWh	22.09/MWh	13.25/MWh	22.09/MWh
September 1993	15.79/MWh	22.78/MWh	15.82/MWh	23.03/MWh
October 1993	14.87/MWh	24.27/MWh	15.18/MWh	23.29/MWh
November 1993	16.00/MWh	24.56/MWh	16.02/MWh	25.58/MWh

E. Economy Energy Sales Prices—Base Case and Actual

The sales price for the Base Case is determined with the help of the Montrose Power Control Staff (Montrose). The estimate of economy energy sales prices involve three steps:

1. Identification of the range of market prices through review of Montrose District Office Power Control staff's summaries of then-current weekly market prices, as reflected in Western's Weekly Reports to the Secretary.
2. Review of the actual monthly economy energy sales summary and, with the help of the Power Control staff, identification of those forced sales directly associated with interim release constraints.
3. Assumption of expected sales price based on then-current market conditions for that portion of sales identified in step 2.

In most instances, Western would have had the flexibility of making all or most of the nonfirm energy sales during periods

when the value is greatest. For October and November, the economy energy sales prices under the Base Case is the same as the actual sales price, reflecting no forced sales within this period. However, during the Summer months, (June, July, August) and September there were significant price difference between Base Case and actual sales prices. This is due to high releases that occurred during the Summer months and in September.

A comparison of average monthly economy energy sales, for Base Case prices to Actual prices, and depicting the range of forced sales that occurred during the summer and winter months are presented below:

ECONOMY ENERGY SALES PRICES BASE CASE & ACTUAL			
Months	Base Case Prices	Actual Prices	Differences Between Base Case Prices and Actual Prices
June 1993	\$17.16/MWh	\$10.81/MWh	\$6.35/MWh
July 1993	18.29/MWh	16.59/MWh	1.70/MWh
August 1993	21.16/MWh	21.14/MWh	0.02/MWh
September 1993	23.08/MWh	22.56/MWh	0.52/MWh
October 1993	22.42/MWh	22.42/MWh	0.00/MWh
November 1993	22.16/MWh	22.16/MWh	0.00/MWh

Table 1
 Glen Canyon Dam Interim Release
 for June 1993
 Net Expense Analysis

<u>Base Case (Without Interim Release)</u>		<u>Actual (With Interim Release)</u>	
Firm Load & Losses:	511,835 MWh	Firm Load & Losses:	511,835 MWh
GC Generation:	288,767 MWh	GC Generation:	288,767 MWh
Other CRSP/IP Generation:	259,807 MWh	Other CRSP/IP Generation:	259,807 MWh
Total Generation:	548,574 MWh	Total Generation:	548,574 MWh
Purchases:	9,661 MWh	Purchases:	34,704 MWh
Off Peak:	8,856 MWh	Off Peak:	184 MWh
On Peak:	805 MWh	On Peak:	34,520 MWh
Surplus:	46,400 MWh	Surplus:	71,443 MWh
Off Peak:	12,414 MWh	Off Peak:	51,392 MWh
On Peak:	33,986 MWh	On Peak:	20,051 MWh
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Purchase Prices:		Purchase Prices:	
Off Peak:	\$13.06/MWh	Off Peak:	\$13.65/MWh
On Peak:	\$20.98/MWh	On Peak:	\$20.98/MWh
Sales Price:	\$17.16/MWh	Sales Price:	\$10.81/MWh
<hr/>			
Purchase Expense:	\$132,548	Purchase Expense:	\$726,741
Off Peak:	\$115,659	Off Peak:	\$2,512
On Peak:	\$ 16,889	On Peak:	\$724,230
Surplus Sales:	\$796,224	Surplus Sales:	\$772,299
<hr/>			
Base Case Expense:	(\$663,676)	Change Case Expense:	(\$45,558)
Total Net Expense for June 1993			\$618,118

Table 2
Glen Canyon Dam Interim Release
for July 1993
Net Expense Analysis

<u>Base Case (Without Interim Release)</u>		<u>Actual (With Interim Release)</u>	
Firm Load & Losses:	627,864 MWh	Firm Load & Losses:	627,864 MWh
GC Generation:	430,622 MWh	GC Generation:	430,622 MWh
Other CRSP/IP Generation:	177,835 MWh	Other CRSP/IP Generation:	177,835 MWh
Total Generation:	608,457 MWh	Total Generation:	608,457 MWh
Purchases:	51,107 MWh	Purchases:	55,475 MWh
Off Peak:	49,974 MWh	Off Peak:	71 MWh
On Peak:	1,133 MWh	On Peak:	55,404 MWh
Surplus:	31,700 MWh	Surplus:	36,068 MWh
Off Peak:	4,284 MWh	Off Peak:	30,512 MWh
On Peak:	27,416 MWh	On Peak:	5,556 MWh
<hr/>			
Purchase Prices:		Purchase Prices:	
Off Peak:	\$10.03/MWh	Off Peak:	\$10.03/MWh
On Peak:	\$22.11/MWh	On Peak:	\$22.11/MWh
Sales Price:	\$18.29/MWh	Sales Price:	\$16.59/MWh
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Purchase Expense:	\$526,290	Purchase Expense:	\$1,225,695
Off Peak:	\$501,239	Off Peak:	\$712
On Peak:	\$25,051	On Peak:	\$1,224,982
Surplus Sales:	\$579,793	Surplus Sales:	\$598,368
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Base Case Expense:	(\$53,503)	Change Case Expense:	\$627,326
Total Net Expense for July 1993			\$680,830

Table 3
 Glen Canyon Dam Interim Release
 for August 1993
 Net Expense Analysis

<u>Base Case (Without Interim Releases)</u>		<u>Actual (With Interim Release)</u>	
Firm Load & Losses:	632,575 MWh	Firm Load & Losses:	632,575 MWh
GC Generation:	441,676 MWh	GC Generation:	441,676 MWh
Other CRSP/IP Generation:	154,112 MWh	Other CRSP/IP Generation:	154,112 MWh
Total Generation:	595,788 MWh	Total Generation:	595,788 MWh
Purchases:	64,660 MWh	Purchases:	66,309 MWh
Off Peak:	62,871 MWh	Off Peak:	626 MWh
On Peak:	1,789 MWh	On Peak:	65,683 MWh
Surplus:	27,873 MWh	Surplus:	29,522 MWh
Off Peak:	5,102 MWh	Off Peak:	25,898 MWh
On Peak:	22,771 MWh	On Peak:	3,624 MWh
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Purchase Prices:		Purchase Prices:	
Off Peak:	\$13.25/MWh	Off Peak:	\$13.25/MWh
On Peak:	\$22.09/MWh	On Peak:	\$22.09/MWh
Sales Price:	\$21.16/MWh	Sales Price:	\$21.14/MWh
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Purchase Expense:	\$872,560	Purchase Expense:	\$1,459,232
Off Peak:	\$833,041	Off Peak:	\$8,295
On Peak:	\$39,519	On Peak:	\$1,450,937
Surplus Sales:	\$589,793	Surplus Sales:	\$624,095
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Base Case Expense:	\$282,767	Change Case Expense:	\$835,137
Total Net Expense for August 1993			\$552,370

Table 4
Glen Canyon Dam Interim Release
for September 1993
Net Expense Analysis

<u>Base Case (Without Interim Releases)</u>		<u>Actual (With Interim Release)</u>	
Firm Load & Losses:	519,336 MWh	Firm Load & Losses:	519,336 MWh
GC Generation:	314,013 MWh	GC Generation:	314,013 MWh
Other CRSP/IP Generation:	139,657 MWh	Other CRSP/IP Generation:	139,657 MWh
Total Generation:	453,670 MWh	Total Generation:	453,670 MWh
Purchases:	83,788 MWh	Purchases:	68,124 MWh
Off Peak:	75,997 MWh	Off Peak:	14,907 MWh
On Peak:	7,791 MWh	On Peak:	53,217 MWh
Surplus:	18,123 MWh	Surplus:	2,458 MWh
Off Peak:	2,977 MWh	Off Peak:	941 MWh
On Peak:	15,146 MWh	On Peak:	1,517 MWh
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Purchase Prices:		Purchase Prices:	
Off Peak:	\$15.79/MWh	Off Peak:	\$15.82/MWh
On Peak:	\$22.78/MWh	On Peak:	\$23.03/MWh
Sales Price:	\$23.08/MWh	Sales Price:	\$22.56/MWh
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Purchase Expense:	\$1,377,472	Purchase Expense:	\$1,461,416
Off Peak:	\$1,199,993	Off Peak:	\$235,829
On Peak:	\$177,479	On Peak:	\$1,225,588
Surplus Sales:	\$418,279	Surplus Sales:	\$55,452
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Base Case Expense:	\$959,193	Change Case Expense:	\$1,405,964
Total Net Expense for September 1993			\$446,771

Table 5
Glen Canyon Dam Interim Release
for October 1993
Net Expense Analysis

<u>Base Case (Without Interim Releases)</u>		<u>Actual (With Interim Release)</u>	
Firm Load & Losses:	462,372 MWh	Firm Load & Losses:	462,372 MWh
GC Generation:	253,459 MWh	GC Generation:	253,459 MWh
Other CRSP/IP Generation:	94,988 MWh	Other CRSP/IP Generation:	94,988 MWh
Total Generation:	348,447 MWh	Total Generation:	348,447 MWh
Purchases:	117,645 MWh	Purchases:	115,149 MWh
Off Peak:	93,174 MWh	Off Peak:	45,681 MWh
On Peak:	24,471 MWh	On Peak:	69,468 MWh
Surplus:	3,720 MWh	Surplus:	1,224 MWh
Off Peak:	804 MWh	Off Peak:	637 MWh
On Peak:	2,916 MWh	On Peak:	587 MWh
<hr/>			
Purchase Prices:		Purchase Prices:	
Off Peak:	\$14.87/MWh	Off Peak:	\$15.18/MWh
On Peak:	\$24.27/MWh	On Peak:	\$23.29/MWh
Sales Price:	\$22.42/MWh	Sales Price:	\$22.42/MWh
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Purchase Expense:	\$1,979,409	Purchase Expense:	\$2,311,347
Off Peak:	\$1,385,497	Off Peak:	\$693,438
On Peak:	\$593,911	On Peak:	\$1,617,910
Surplus Sales:	\$83,402	Surplus Sales:	\$27,442
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Base Case Expense:	\$1,896,006	Change Case Expense:	\$2,283,905
Total Net Expense for October 1993			\$387,899

Table 6
 Glen Canyon Dam Interim Release
 for November 1993
 Net Expense Analysis

<u>Base Case (Without Interim Releases)</u>		<u>Actual (With Interim Release)</u>	
Firm Load & Losses:	468,852 MWh	Firm Load & Losses:	468,852 MWh
GC Generation:	292,691 MWh	GC Generation:	292,692 MWh
Other CRSP/IP Generation:	119,095 MWh	Other CRSP/IP Generation:	119,095 MWh
Total Generation:	411,786 MWh	Total Generation:	411,787 MWh
Purchases:	90,452 MWh	Purchases:	58,594 MWh
Off Peak:	88,642 MWh	Off Peak:	29,039 MWh
On Peak:	1,810 MWh	On Peak:	29,555 MWh
Surplus:	33,386 MWh	Surplus:	1,529 MWh
Off Peak:	3,343 MWh	Off Peak:	165 MWh
On Peak:	30,043 MWh	On Peak:	1,364 MWh
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Purchase Prices:		Purchase Prices:	
Off Peak:	\$16.00/MWh	Off Peak:	\$16.02/MWh
On Peak:	\$24.56/MWh	On Peak:	\$25.58/MWh
Sales Price:	\$22.16/MWh	Sales Price:	\$22.16/MWh
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Purchase Expense:	\$1,462,726	Purchase Expense:	\$1,221,222
Off Peak:	\$1,418,272	Off Peak:	\$465,205
On Peak:	\$44,454	On Peak:	\$756,017
Surplus Sales:	\$739,834	Surplus Sales:	\$33,883
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Base Case Expense:	\$722,892	Change Case Expense:	\$1,187,339
Total Net Expense for November 1993			\$464,447

TABLE 7
GLEN CANYON DAM INTERIM RELEASE
Summary of Estimated Actual Net Expense
Associated With Interim Release

WY 1992 Cumulative Net Expense \$5,311,632		
Month/Yr	Estimated Actual Net Expense	Cumulative Estimated Actual Net Expense
October 1992	\$336,662	\$5,648,294
November 1992	375,274	6,023,568
December 1992	471,698	6,495,266
January 1993	466,684	6,961,950
February 1993	380,314	7,342,264
March 1993	344,101	7,686,365
April 1993	227,469	7,913,834
May 1993	311,296	8,225,130
June 1993	618,118	8,843,248
July 1993	680,830	9,524,078
August 1993	552,370	10,076,448
September 1993	446,771	10,523,219
WY 1993 Net Expense \$5,211,587		
WY 1993 Cumulative Net Expense \$10,523,219		
October 1993	387,899	10,911,118
November 1993	464,447	11,375,564
WY 1994 Net Expense \$852,346		