

# IMPACT EVALUATION OF LAKE POWELL WATER SURFACE ELEVATION FALLING BELOW MINIMUM POWER POOL

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## **Introduction**

At the present time we are continuing into the sixth year of a severe drought of yet unknown duration. The Lake Powell water surface elevation as of July 9, 2004 was 3584.88 feet, which is approximately 43% of capacity. Lake Powell stands 115 feet below the normal full water surface elevation and 95 feet above the minimum power pool elevation. The seven Basin States are engaged in a process of contingency planning to evaluate management options for drought mitigation and recovery in the event that dry weather patterns persist. The purpose of this report is to quantify the potential effects of the water surface falling below the minimum power pool at Lake Powell as a basis for evaluating strategies which may mitigate this problem.

## **Hydrology Summary**

The worst case scenario (1953 – 1964 hydrology added to the current drought) shows that Lake Powell can deliver a minimum objective release of 8.23 maf per year through the 20 year period of analysis, but at severe costs. This hydrology predicts the Powell water surface elevation to fall below the minimum power pool elevation of 3490 feet by 2006 and to remain or fall below power pool in 10 of the next 17 years. It also indicates on three occasions the water surface is just at or near the dead pool elevation of 3370 feet.

## **Glen Canyon Dam Power Generation**

### **Minimum Power Pool:**

The eight penstocks at Glen Canyon Dam are located at a centerline elevation of 3470 feet and are 15 feet in diameter. The top elevation of the penstock is therefore 3477.5 feet. The Bureau has set the minimum power operation level at 3490 feet to avoid vortex problems on the surface of the lake and to avoid cavitation problems with the generating turbines.

**Generating Capacity:**

Power generation at Glen Canyon reflects the following:

Average Power Year . . . . .	4,505 GWh/yr
Water Year 2003. . . . .	3,518 GWh/yr
At 7.5 maf/yr release. . . . .	3,200 GWh/yr

**Power Revenues:**

The power revenues which accrue to the Basin Fund must equal the costs, (see below for a list of costs), over time. Glen Canyon Power produces about \$100 million per year of the \$130 million annual revenue to the Basin Fund. As generating capacity declines or as costs increase the power rates must be adjusted. The current rate is approximately 2.072 cents/KWh. If costs remain the same and generating capacity falls to 3,200 KWh/yr, the power rates would need to increase to about 3.3 cents/KWh, to maintain the required revenue.

**Glen Canyon Power Users:**

Glen Canyon Power is marketed throughout the west including the following number of power entities by state (note: Glen Canyon electricity is delivered to over 200 customers. The numbers below include agencies that act on behalf of several customers - so they only total 116).

Arizona	24	New Mexico	15
Nevada	2	Wyoming	4
Colorado	22	Utah	49

A large number of the entities are cities, power distribution companies, irrigation projects and tribes. If Glen Canyon cannot produce power, Western Area Power would be required to make supplemental electrical purchases of approximately \$180 million per year to meet current contractual commitments. These costs combined with USBR and Western’s operational expenses could not be recouped by raising power rates because it would be above the market rate for power. As a result, Western would have to significantly reduce its electricity delivery obligations. Thus, power customers would have to purchase replacement power at prevailing market rates which are expected to be more than double the current costs of Glen Canyon power. Retail electric rates would rise for Glen Canyon customers. About 10% of CRSP power is provided to reclamation projects such as the Dolores Project. The loss of Glen Canyon power could result in a radical increase in project pumping costs.

### CRSP Basin Fund

The Basin Fund is expected to be deficit in 2007 under this hydrology scenario. The uses of the basin fund are as follows:

Western O & M of CRSP Transmission System	\$36 Million
BOR's O & M of CRSP Power Plants	29 Million
Capitalized Equipment Replacement	13 Million
Transmission Services Purchased	9.5 Million
Integrated Projects	7 Million
Principal Payment on Debt	6 Million
Interest	3.6 Million
Salinity Control	2 Million
Purchases of Firming Energy	80 Million*
Environmental Programs (AMP, RIP, experimental flows)	20 Million**
Principal to Irrigation Projects	49 Million***
	<u>\$255.1 Million</u>

\* *In an average year this amount will be zero*

\*\* *These are non-reimbursable expenses*

\*\*\* *No annual revenue requirement*

Many of the items in the Basin Fund are critical and cannot be neglected even if power generation ceases. For example, limited operation costs and equipment replacement must still be provided. In addition, very serious consequences would accompany a termination of funding for environmental programs. Power revenues have contributed through FY 2004, \$50.9 million to the Upper Colorado Endangered Species Recovery Implementation Program (RIP) and \$7.2 million to the San Juan River Basin RIP. Continued power revenues supply all of the base funding requirements of this program and are critical to secure the additional \$100 million in leveraged funds necessary to support the capital construction portions of these programs through 2008. The species Recovery Implementation Program (RIP) is an integral part of Upper Basin project operations. There are currently 756 completed ESA section 7 project consultations that relied on this RIP. If the program is not operated, all of these biological opinions might have to be reopened and modified to avoid a jeopardy opinion. This could ultimately affect the ability to use the project water. The failure to fund and implement the San Juan River Basin RIP would have similar consequences.

The Glen Canyon Adaptive Management Program (AMP) also forms the basis for NEPA and ESA section 7 decisions. These decisions might also have to be reopened and modified to avoid a jeopardy decision. The outcome of reopening these issues is uncertain. Power revenues also provide \$8.2 million of the \$10.7 million annual budget