

California Energy Commission Agricultural Peak Load Reduction Program

For Water Agencies

Administered by the Irrigation Training and Research Center



Case Study

Berrenda Mesa WSD

Site

Berrenda Mesa Water Storage District (BMWSD) is located in the southern part of the San Joaquin Valley near Bakersfield. The district receives water from the State Water Project – California Aqueduct.

Opportunity

Berrenda Mesa WSD pumps water from the California Aqueduct Coastal Branch, 250 feet uphill, to a reservoir at the head of their main canal. The pump station consists of 10 pumps with a combined nameplate horsepower (HP) of 9,900. This pump station requires over 4.6 megawatts (MW) of average peak load (June-Sept., Monday-Friday 12-6 pm) to supply irrigation water to the district.



Figure 1. View of the pipeline running from the pump station at the end of the California Aqueduct Coastal Branch up to the Berrenda Mesa Reservoir.

Solution

The district proposed and designed two projects that have curtailed the entire 4.67 MW of peak load as part of the California Energy Commission Agricultural Peak Load Reduction Program (APLRP) for water agencies administered by the Irrigation Training and Research Center (ITRC).

The first project involved permanently increasing the height of the spillway on the Berrenda Mesa Reservoir. The existing 100 foot-wide spillway was raised



IRRIGATION TRAINING AND RESEARCH
CENTER
California Polytechnic State University
San Luis Obispo, CA
(805) 756-2434



15 inches to accommodate an additional 15 acre-feet of storage capacity. The additional water is stored in the reservoir during the off-peak period and delivered for irrigation during the peak period, thereby reducing the need to pump water during that time. One-third (5 inches) of the proposed spillway will be used for storage of water, while the other two-thirds (10 inches) will provide a cushion to avoid spill associated with wind, fetch and operational variations.

The second project removed sediment in the main reservoir, increasing the storage capacity and reducing the need to pump water during the peak period.

The first project was fully operational during the 2002 peak season (June-September), curtailing 770 kW of peak load.



Figure 2. Increased height of bank at the reservoir inlet (top) and increased spillway height (bottom) in Berrenda Mesa Reservoir.

The second project was completed prior to the 2003 peak season and curtailed an additional 3,900 kW of peak load.



Figure 3. Berrenda Mesa Reservoir at the head of the Main Canal.



IRRIGATION TRAINING AND RESEARCH CENTER
California Polytechnic State University
San Luis Obispo, CA
(805) 756-2434



Benefits

- The State of California has benefited from the curtailment of approximately 4.6 MW from the electricity grid during the summer peak period.
- BMWSD and its water users benefit from the significant reduction in power costs associated with no on-peak pumping.
- Extra storage in the Berrenda Mesa Reservoir provides additional benefits beyond load shifting. The storage provides enhanced regulation and flexibility at the head of the main canal.

Summary Category	Results
Total Cost	\$170,068
Total Grant	\$90,504
Kilowatts (KW) Curtailed	4,670
Grant \$ per kW Curtailed	\$19.38

Further Information

– **California Energy Commission**

Ricardo Amon
 (916) 654-4019
Ramon@energy.state.ca.us

– **Irrigation Training and Research Center**

California Polytechnic State University
 San Luis Obispo, CA 93407
 Dr. Charles Burt
 (805) 756-2379, cburt@calpoly.edu
 Dan Howes
 (805) 756-2347, djhowes@calpoly.edu
www.itrc.org



This information was developed under the California Energy Commission Agricultural Peak Load Reduction Program. It does not necessarily represent the views of the Energy Commission, its employees, or the State of California. The Commission, the State of California, Cal Poly, ITRC, their employees, contractors, and subcontractors make no warranty, express or implied, and assume no legal liability for the information in this report; nor does any party represent that the use of this information will not infringe upon privately owned rights.



IRRIGATION TRAINING AND RESEARCH
 CENTER
 California Polytechnic State University
 San Luis Obispo, CA
 (805) 756-2434