



Colorado River District

75 Years

Protecting Western Colorado Water



MEMORANDUM

JANUARY 6, 2012

TO: BOARD OF DIRECTORS

CC: ERIC KUHN, GENERAL MANAGER
DAN BIRCH, DEPUTY GENERAL MANAGER

FROM: JOHN CURRIER, P.E., DON MEYER, P.E.

SUBJECT: WOLFORD MOUNTAIN RESERVOIR

We want to update you on:

1. The status of installation of additional instrumentation at Ritschard Dam,
2. The cost to date of investigations of the unusual settlement of the dam,
3. Reservoir operations.

This is informational only; there are no action items.

Additional Dam Instrumentation

Adding additional instrumentation was recommended by the expert peer review panel and agreed upon by the River District and our consultant, URS Corporation. Installation got underway shortly after the October Board meeting, and after some difficulty was completed the 2nd week of December.

The additional instrumentation includes 4 additional inclinometers to monitor horizontal movements over time within the dam and 7 additional piezometers to monitor water levels within and under the dam. With these additions there is a very extensive array of instrumentation in the dam.

Installation was slowed when a low, but potentially dangerous, concentration of hydrogen sulphide (H₂S) gas was encountered in shallow, shale bedrock in one of the inclinometer holes. While not expected so shallow in the bedrock, H₂S naturally occurs in many shales, including the Niobrara formation that underlies the dam. Additional cost and time was incurred as H₂S monitoring was required and the drillers had to be trained and ready to work with supplied air.

Cost of Unusual Deformation Investigations to Date

Since early 2009 when the River District first started investigating the unusual settlement, expenditures total \$940,000. Costs can be broken down into two broad, related categories; 1) installing instrumentation in the dam and, 2) engineering analyses. They are broken down as follows:

1. 2009 Instrumentation Installation:	\$ 140,000
2. 2011 Instrumentation Installation:	\$ 193,000
3. Engineering Services (URS):	\$ 547,000
4. Peer Review Panel:	<u>\$ 60,000</u>
Total	\$ 940,000

Over the next several years we expect the pace of expenditures will slow significantly as we are in a monitoring and observation mode. For budget purposes we expect expenditures of \$100,000 in both 2012 and 2013. While a significant amount, it will be considerably less than 2009-2011 expenditures. It is difficult to project expenditures beyond 2013 as they will depend on results from the on-going monitoring.

Reservoir Operations

Due to the unusually high runoff volumes in the spring of 2011, flood control was the priority for reservoir operators on the Upper Colorado River. Fall operations focused on releasing the Endangered Fish pools above Shoshone (Wolford, Williams Fork and Surplus in Green Mountain Reservoir) to the 15 Mile Reach while maintaining a flow at the Shoshone Power Plant conducive to the grouting work begun by Xcel at the dam in early September. Apparently the voids in the abutment and foundation were more extensive than anticipated, and the grouting effort was suspended in mid-December due to unsafe working conditions related to the cold weather. Xcel will recommence grouting operations after runoff, therefore a Shoshone call is not anticipated until mid-summer at earliest.

Below is a graph of 2011 Wolford Reservoir operations. Inflows were well above average throughout the year, resulting in higher reservoir levels than normal going into 2012. Snowpack above the reservoir is currently 75 percent of average, and the CBRFC Most Probable runoff forecast is 74 percent of average. Even considering that the reservoir is fuller than normal, Staff is planning to reduce outflow in order to conserve storage as a precaution against a 2002 type runoff scenario.

