

1. Introduction

1.1 General

The upper reservoir of the Taum Sauk Pumped Storage Project (shown full in Figure 1-1) was overtopped during the final pumping cycle the morning of December 14, 2005. Overtopping of the 10 ft high parapet wall and subsequent failure of the rockfill embankment formed a breach about 720 feet wide at the top of the rockfill dam and 430 feet at the base of the dam, as shown in Figure 1-2. Reservoir data indicate that pumping stopped at 5:15 AM December 14, 2005 with the initial breach forming at approximately the same time. Breach widening formed quickly, and complete evacuation of the 4,350 acre-ft upper reservoir occurred within about 25 minutes. The breach flow passed into the East Fork of the Black River (the river upstream of the lower Taum Sauk Dam) through a State park and campground area and into the lower reservoir. Upon leaving the Lower Taum Sauk Dam Spillway area, the high flows proceeded downstream of the Black River to the town of Lesterville, MO, located about 3.5 miles downstream from the Lower Dam, see Figure 1-3. The incremental rise in the river level was about 2 feet which remained within the banks of the river.

1.2 Appointment of Independent Panel of Consultants

This Panel was convened by the FERC Director of Dam Safety to establish an independent assessment of the technical causes of the release of the Upper Reservoir at Taum Sauk. It is anticipated that the conclusions of this report will be applied in the review of other pumped storage projects, which are without spillways on the upper reservoirs and which are within the jurisdiction of the FERC.

Following the breach of the upper reservoir at the Taum Sauk pumped storage project, the Federal Energy Regulatory Commission (FERC) established an Independent Panel of Consultants (IPOC). The individuals on this Panel were contacted by the Director of Dam Safety, Mr. Constantine Tjoumas, during the week of December 26, 2005.

The members of the Independent Panel of Consultants are:

Dr. Alfred J. Hendron, Jr., Geotechnical Engineer
Joseph L. Ehasz, Geotechnical Engineer
Kermit Paul, Mechanical & Electrical Engineer

The Panel members accepted the assignment of investigating the technical causes of this breach; the contractual arrangements were made by the FERC Dam Safety office in Washington D.C.

1.3 Scope of Investigations

In the contractual scope of work for each Review Panel member it was specified that the Panel should:

- Review the operational characteristics of the project including the overpumping protective systems leading up to the breach of the upper reservoir
- Perform a forensic evaluation of the breach of the upper reservoir dam to determine the specific failure mode
- Submit a final report documenting the results of their forensic findings on the cause of the breach of the upper reservoir
- Continue as a panel of experts to assist the FERC staff in reviewing the analysis, design and construction of the remedial measures needed to re-establish the upper reservoir

In this report, the first three bulleted items above are addressed in detail. Reviews of the design and construction of re-establishment of the upper reservoir will be treated in subsequent Panel Reports.

Panel Member Hendron was requested by FERC to visit the Taum Sauk Project on December 14, 2005, before this Panel was appointed. The breach area and the remaining embankment was inspected by Panel Member Hendron on December 15 with FERC staff from the Washington office and from the Chicago Regional Office. Panel Members Ehasz and Paul visited the Taum Sauk site on December 28, 2005. The Panel assembled an initial information request list of 24 items on January 3, 2006 which was necessary to further the Panel's investigation. This list was sent to Mr. Tjoumas on January 6, 2006. This correspondence is given in Appendix A. The Panel received various items of information for review during January and Panel Members Paul and Hendron visited the Taum Sauk Project again on January 30 as part of the First meeting of the AmerenUE Board of Consultants at the site and in St. Louis between January 30 and February 1.

As part of this investigation the Panel held interviews of AmerenUE staff and AmerenUE subcontractors at the project site and in St. Louis on February 8, 9, and 10. Similar interviews of FERC Chicago and Washington D.C. staff and the

authors of the 2003 Part 12 Report were also held in the Chicago Regional office on February 17th, 2006.

The Panel participated in the AmerenUE Board of Consultants Second meeting in St. Louis on March 23 and 24. On March 24, the Panel also received presentations concerning the Taum Sauk site and breach from the Missouri DNR, Division of Dam Safety, and the Geological Survey. The Rizzo forensic report for AmerenUE was received on April 10, 2006 and the Finding Investigation conducted by FERC staff was received on April 25, 2006.

In the remainder of this report, the Panel has described the conditions which existed at the Upper Taum Sauk Reservoir prior to the reservoir release and we have given our conclusions on the most probable causes of the reservoir release at the breach location.