Mitman, Jeffrey

From: Ferrante, Fernando
Sent: Monday, December 14, 2009 1:50 PM
To: Mitman, Jeffrey
Subject: Taum Sauk and Rockfill Dam Failures

Jeff,

A quick read of the Taum Sauk May 25, 2006 report I have available indicate that the panel that studied the failure for FERC concluded that *"the December 14, 2005 failure was overtopping of the parapet wall and embankment. The possible modes of failure for the breach event of this dam and the factors which made this dam especially vulnerable and sensitive to overtopping"* are:

- Deficient monitoring of the reservoir level
- Guidelines vulnerable to misoperation
- Lack of spillway
- Higher sensitivity to erosional effects of overtopping due to inadequate design of the dam and parapet

Another earlier April 7, 2006 report states that:

*The Breach of the Rockfill Dike, the primary Barrier to the Event, is the root cause of the **"rapid release of water from the Upper Reservoir."** (emphasis from the original report) The stability failure of the Dike was caused by:*

(1) A rapid rise in the phreatic surface and the associated pore pressure at the Dike/foundation interface caused by the flow overtopping the Parapet Wall. (underlining added here)

(2) Weak foundation conditions attributed to the original design and construction specifications.

(3) Inadequate shear strength of the material comprising the rockfill attributed to the original design and construction practices.

(4) Poor construction practices and failure to meet the intended design criteria.

Additionally, some possible overtopping events due to hurricane activity may have further undermined the capacity of the parapet ahead of the overpumping event. In short, as I read it, the design of the parapet was inadequate to protect from overtopping, and the design of the dam itself was vulnerable to increased erosional effects once overtopping occurred.

Thank you,

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