Four Lakes Task Force

Secord and Smallwood Dams
Summary of Semi-Quantitative Risk Analysis

GEI Consultants of Michigan, P.C. recently completed the Semi-Quantitative Risk Analysis (SQRA) report. The analysis was used for developing the Inflow Design Flood (IDF) recommendations for Secord and Smallwood dams.

GEI led the SQRA process, which resulted in a recommended IDF for both dams. The recommendation will allow the dams to safely pass a 10,000-year storm event, which corresponds to a 1 in 10,000-year Annual Exceedance Probability (.01% AEP). AEP is the chance or probability of a natural hazard event (usually a rainfall or flooding event) occurring annually and is usually expressed as a percentage. The May 2020 floods for the Secord and Smallwood dams were estimated to be between the 100- to 200-year flood (1% to 0.5% AEP).

The Approach
The IDF was selected following the guidelines in the Federal Emergency Management Agency (FEMA) P-94 – *Selecting and Accommodating Inflow Design Floods for Dams* (FEMA, 2013). This approach was recommended by the Michigan Dam Safety Task Force in its review of the State of Michigan Dam Safety Program. The SQRA workshop to select the IDF consisted of representatives from FLTF, GEI, the Federal Energy Regulatory Commission (FERC), Michigan Department of Environment, Great Lakes and Energy (EGLE,) AECOM Technical Services (AECOM), Essex Partnership and Spicer Group Inc. (SGI). In addition, FERC, the U.S. Army Corps of Engineers (USACE) and the U.S. Bureau of Reclamation (USBR) attended review meetings.

To pass large, infrequent storms more safely on Secord and Smallwood dams, the IDF is based on a hypothetical modeled storm, which is greater than any historically recorded storm. Making a risk-informed decision, that meets the tolerable risk guidelines of USACE and USBR, ensures the dams are being built to a federal standard that exceeds current EGLE design requirements. The SQRA report was provided to both EGLE Dam Safety and AECOM (for 3rd party peer review) as part of the Part 315 EGLE dam safety permitting process.

Summary
Secord Dam: The 60% design spillway for Secord was sized to safely pass the IDF of 17,515 cubic feet per second (cfs). The current Secord Dam Tainter gate spillway discharge capacity is approximately 7,740 cfs.

Smallwood Dam: The Smallwood 60% design spillway was sized for an IDF of 25,500 cfs. The current Smallwood Dam Tainter gate spillway discharge capacity is approximately 10,145 cfs.

Overall, dam safety will be improved by significantly increasing spillway capacity from what historically existed.