



MEMORANDUM

EUGENE WATER & ELECTRIC BOARD

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TO: Commissioners Brown, Carlson, Barofsky, McRae and Schlossberg
FROM: Lisa Krentz, Electric Generation Manager, and Daniel Huang, Dam Safety Program Supervisor
DATE: October 6, 2022
SUBJECT: Dam Safety Program Update
OBJECTIVE: Information

Issue

This memo provides an update on EWEB's Dam Safety Program (DSP).

Background

EWEB owns and operates three hydroelectric projects that are licensed with the Federal Energy Regulatory Commission (FERC). The FERC mandates that licensees (owners) develop and implement an Owner's Dam Safety Program (ODSP) if any dam or other project work is classified as having a high or significant hazard potential in accordance with the new 18 CFR Part 12 Subpart F. Two of EWEB's hydroelectric projects, Carmen-Smith and Leaburg-Waltermville, are classified as high hazard, meaning a failure or mis-operation could result in loss of human life. As such, EWEB is required to have an ODSP to comply with the regulation and ensure that dam safety is of the highest priority within the organization.

EWEB's DSP was formally established in 2019 with the creation of the DSP Department within the Generation Division. The supervisor of the DSP Department serves as the Chief Dam Safety Engineer (CDSE), in accordance with the FERC definition in 18 CFR 12.61. Currently the DSP Department consists of two full time Professional Engineers and two Engineering Specialists.

Revised 18 CFR Part 12 dam safety regulations, which codified the previous FERC directive for the ODSP, took effect on April 11, 2022. The regulations now require that the licensees submit an ODSP to FERC; review the ODSP implementation and discuss with senior management at least once annually; and submit the results of the annual review, including findings, analysis, corrective measures, and/or revisions to the ODSP, to FERC.

Section 12.63 of the code listed the following six ODSP components as a minimum requirement.

1. Dam safety policy, objectives, and expectations
2. Responsibilities for dam safety
3. Dam safety training program
4. Communication, coordination, reporting, and reports
5. Record keeping and databases
6. Continuous improvement

Additionally, the ODSP and its implementation shall be audited by an external auditor independently at least once in five years.

Discussion

Significant progress on goals and program improvements have been implemented since the DSP was established in 2019. Highlights include:

- Board Policy SD21-Dam Safety that guides EWEB's DSP was established and adopted in May 2020.
- EWEB's ODSP outlining dam safety expectations, roles, and responsibilities was formally submitted to FERC in October 2021.
- The DSP is strongly supported by the Executive Team. On-going monthly meetings to apprise leadership of dam safety projects, operations, and risks are held with the Assistant General Manager and Chief Operations Officer.
- EWEB's working relationship and credibility with FERC regulators has significantly improved over the last three years. Success areas include: 1) clear communications with the FERC Division of Dam Safety and Inspection Portland Regional Office (D2SI-PRO) through a single EWEB point of contact; 2) high quality, accurate, products and submittals with achievable plans and schedules; 3) increased staff expertise for identifying and responding to dam safety issues; 4) dedicated dam safety staff that work cross-functionally on O&M and Capital Projects; and 5) D2SI-PRO acknowledged EWEB's ODSP achievement by removing the 2018 requirement to have routine mandatory meetings.
- All major recommendations resulting from the 2019 Association of State Dam Safety Officials (ASDSO) audit team have been successfully implemented. A few recommendations are still being implemented, such as on-going improvements and procedure documentation.
- EWEB's hydroelectric projects are fully compliant with FERC dam safety regulations. The Program has successfully processed and electronically filed over 250 correspondences, reports, and submittals with D2SI-PRO since January 1, 2020.
- A Dam Safety Surveillance and Monitoring (DSSM) program has been implemented for each of the two high hazard projects. As required, annual reports are submitted to FERC. Risks associated with dams, reservoirs, and canals have been identified, and follow up investigation are occurring as needed.

Project and Status Updates

Carmen-Smith Project Operations and Safety Status

The Carmen-Smith Hydroelectric Project consists of the Carmen Diversion dam and reservoir, Smith dam and reservoir, and Trail Bridge dam and reservoir. All have been operated safely and in compliance with regulations for the past year. The performance of the dams is monitored with instrumentation and inspected routinely following the approved DSSM plan. Several dam safety concerns exist at the Carmen-Smith project.

- TRAIL BRIDGE RESERVOIR SINKHOLES AND INVESTIGATION – Three active sinkholes were discovered in the Trail Bridge reservoir during a periodical bathymetric survey in 2021. The results of the 2022 follow-up survey indicated that one sinkhole had increased slightly in size over the past year. EWEB staff are actively investigating the root cause and potential failure modes with a consultant team, FERC, and a Board of Consultants comprised of dam safety experts. As of this correspondence, a subsurface geotechnical drilling program is now underway. Other investigations conducted include geophysical surveys, dye tracing, diving inspections, and chemical tests.

EWEB has taken several measures to mitigate the public safety risk, including significantly lowering the reservoir operation level, increasing surveillance and monitoring, and communicating risks with Emergency Action Plan stakeholders and the Carmen-Smith Fish Working Group.

- TRAIL BRIDGE FISH IMPROVEMENT PROJECTS AND IMPACTS – The Carmen-Smith License requires the construction of fish passage and habitat improvement projects at Trail Bridge Dam and reservoir. These include modifying the spillway and gates for downstream fish passage, construction of a trap and haul facility by the powerhouse, and surface regrading upstream of the emergency spillway. All of these projects have significant dam safety considerations and require extensive engineering studies and physical model testing. The DSP staff are working directly with project managers and consultant experts to ensure all dam safety concerns are addressed and FERC requirements are met.
- SMITH DAM SPILLWAY MODIFICATION – The existing Smith Dam spillway must be modified to increase its capacity to mitigate the risk of dam overtopping in the event of a probable maximum flood. The design will also meet the License’s fish flow release requirement and minimize erosion downstream. This project is currently nearing the “30% design” milestone and waiting for FERC approval to conduct subsurface geotechnical investigation at the site.
- CARMEN DIVERSION RESERVOIR SINKHOLES AND FISH FLOW RELEASE STRUCTURES – Several dam safety issues exist at Carmen Diversion Reservoir, including sinkholes, operation of the diversion tunnel gate during flood condition, spillway degradation, and the proposed fish flow release structures. Sinkhole investigations were concluded in 2020. A remediation proposal was submitted to FERC, but EWEB has not received FERC’s comments. To ensure safety, the reservoir is currently operated at a lower-than-normal elevation, which does not significantly affect power generation, and EWEB has implemented increased monitoring. The DSP staff are working closely with consultants, project managers, and FERC engineers on the spillway condition investigation, tunnel gate operation, and design of the flow release control structures.
- BOARD OF CONSULTANTS FOR CARMEN-SMITH PROJECT – In 2021, the Chief Dam Safety Engineer worked in coordination with FERC D2SI to assemble a team of four nationally recognized dam safety experts, known as the Board of Consultants (BOC). The BOC will review infrastructure project designs and dam safety issues and provide recommendations. The BOC functions independently between EWEB and FERC to review technically challenging matters and designs affecting dam safety, including probable maximum flood routing, hydraulic performance of emergency spillways and embankment erodibility, sinkhole investigations, and spillway modifications. The BOC review meetings are conducted periodically following FERC protocols and guidelines.
- EMERGENCY ACTION PLAN (EAP) and EXERCISE – The DSP successfully planned and conducted an EAP Functional Exercise for the Carmen-Smith Project in December 2021. This exercise is a FERC requirement every five years, and all EAP stakeholders, including county, city, and local emergency management agencies, participated.

Leaburg-Waltermville Project Operations and Safety Status

The Leaburg-Waltermville Hydroelectric Project consists of the Leaburg canal development and the Waltermville canal development. Although the Leaburg canal has been out of service for power generation since 2018, the canal is used for stormwater management and is required to meet all dam safety rules and regulations. Although the Waltermville canal continues to operate for power generation, several engineering issues have been identified. The DSP staff and operations staff work closely to surveille and monitor canal embankments and control systems following the DSSM procedures and FERC requirements.

- LEABURG CANAL – The Leaburg Strategic Evaluation team continues to make progress on the long-term alternatives analysis. DSP staff are responsible for the DSSM and work with operations staff to ensure the canal remains safe to the public. Since it was taken out of service, several ongoing dam safety issues have been investigated, including embankment sinkholes, instabilities, and excessive seepage. The 2020 semi-quantitative risk analysis identified the need for short-term risk reduction measures that must be implemented prior to a long-term solution. DSP staff are currently working with the Leaburg project team to develop a geotechnical drilling plan that will provide subsurface information necessary to move forward with near term risk reduction designs. Pending FERC approval, drilling is expected to start in the first half of 2023.
- WALTERVILLE CANAL – The Walterville canal has been operating safely, although several engineering issues have been identified at the spillway and forebay. EWEB is currently investigating the stability of canal embankments and concrete structures under seismic loading conditions, and completing a probable maximum flood analysis, both of which were recommended by an independent consultant and required by FERC. Excessive and unpredictable seepage has been observed from a drainage pipe near the powerhouse. Although unlikely at this time, if the situation cannot be resolved, it may require lowering the canal elevation to reduce seepage or entirely ceasing generation until a solution can be implemented. Thresholds and alert procedures are being employed to ensure staff are notified if seepage changes rapidly. The investigation drilling plan was submitted to FERC for review in January, and drilling will begin once FERC grants approval.
- PART 12D INDEPENDENT CONSULTANT INSPECTION – FERC Part 12D regulations require a periodic inspection of the Leaburg-Walterville Project by an independent dam safety consultant. The process is extensive, including potential failure modes analyses (PFMA) workshops and reviews of construction history, engineering records, and current operations. A total of eight full day workshops were conducted in August and September of this year. The inspection and review process will be concluded by the end of this year.

Upcoming Projects

- FURTHER DSP DEVELOPMENT – EWEB’s ODSP is still a relatively young program that will continue to mature over the next few years. EWEB will focus program development efforts on 1) skill development for staff; 2) dam safety awareness education for all EWEB staff working on projects that could affect dams and reservoirs; and 3) enhancing relationships with FERC. The DSP will continue to serve as a liaison for FERC D2SI and will provide technical and regulatory advice to project managers.
- CARMEN-SMITH – The Carmen-Smith Project is scheduled for a FERC Part 12D inspection in 2023. Trail Bridge sinkhole investigation will continue, with guidance from the BOC process, as will work on flood routing and spillway modifications.
- LEABURG-WALTERVILLE – The 2022 Part 12D inspection is likely to contain follow-up actions for both Leaburg and Walterville developments. Priority will be given to any deficiencies that have high public safety risks. The DSP staff will continue to provide subject matter expertise to the Leaburg strategic evaluation team.

Requested Board Action

No Board action is requested at this time. This memo is for information only.