



MEMORANDUM

EUGENE WATER & ELECTRIC BOARD

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TO: Commissioners McRae, Barofsky, Schlossberg, Brown, and Carlson
FROM: Lisa Krentz, Generation Manager; Laura Ohman, Dam Safety Program Supervisor/Chief Dam Safety Engineer
DATE: October 1, 2024
SUBJECT: Dam Safety Program Update
OBJECTIVE: Information

Issue

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

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 ODSP if any dam or other project work is classified as having a high or significant hazard potential in accordance with 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.

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 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 components as minimum requirements of the ODSP:

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 independent external auditor at least once every five years. This audit was completed in 2019 and is due to be completed again in 2024. The auditors are under contract and scheduled to perform the audit in October. The ODSP Audit report will be filed with FERC by the end of the year.

Dam Safety Program Staffing

EWEB's ODSP was formally established in 2019 with the creation of the Dam Safety Department within the Generation Division. The department consists of two Professional Engineers, two Engineering

Associate/Planners, and one Regulatory Compliance Specialist. The supervisor of the Dam Safety Department serves as the Chief Dam Safety Engineer (CDSE), in accordance with the FERC definition in 18 CFR 12.61. In July 2023, Laura Ohman was promoted to Dam Safety Program Supervisor. Per FERC requirements, the CDSE appointment must be approved by the FERC Division of Dam Safety and Investigations (D2SI). In September 2024, FERC acknowledged and accepted Ms. Ohman's appointment to CDSE and as key point of contact to FERC D2SI. In May 2024, the Dam Safety Team welcomed two new staff members, an Engineering Associate II who filled an engineering position vacancy that occurred in February 2024, and a Dam Safety Regulatory Compliance Specialist II focused on FERC requirements related to dam safety. These staff are critical to ensuring that the dam safety team has capacity to ensure safe operation of our hydroelectric projects.

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 are being operated safely and in compliance with regulations. The performance of the dams is monitored with instrumentation and inspected routinely following the approved Dam Safety Surveillance and Monitoring (DSSM) plan. Several dam safety concerns exist at the Carmen-Smith project.

- **SEISMIC HAZARD ANALYSIS** – In July 2024, FERC accepted EWEB's Seismic Hazard Analysis (SHA) for the Carmen-Smith Project with follow-up comments. EWEB will provide the required additional analysis by November 2024. Revised plans and schedules for multiple interdependent analyses are being developed in response to the accepted SHA.
- **PART 12D INDEPENDENT CONSULTANT INSPECTION** – FERC Part 12D regulations require a periodic inspection of the Carmen-Smith Project by an independent dam safety consultant (IC) every five years. The periodic inspection was completed on November 2-3, 2023, and the IC's final report was submitted to FERC in March 2024. FERC performed its annual inspection in conjunction with the periodic inspection and found no conditions that require immediate remedial action to protect the safety of the project. FERC has provided nine initial items that require follow-up actions by EWEB. These items include improvements to the dam safety surveillance and monitoring program (DSSMP), evaluation of the stability of the approach channel to Trail Bridge spillway and the rock cut slope above the Trail Bridge spillway gate house, condition assessment of the Trail Bridge Emergency Spillway, corrosion evaluation related to Smith spillway radial gate, and ground survey and evaluation of the Carmen Diversion embankment area for potential subsidence. EWEB submitted a plan and schedule to respond to FERC comments and progress is underway.
- **FERC ANNUAL DAM SAFETY INSPECTION** – FERC Part 12D regulations require an annual dam safety inspection by FERC. The 2024 inspection was conducted July 17-18 and found no conditions that require immediate remedial action to protect the safety of the project. FERC has provided eleven items which require follow-up actions by EWEB. These items include installation of a replacement weir downstream of Trail Bridge Dam, development of inspection maps of the Trail Bridge Emergency Spillway and Smith diversion conduit, and field marking of vegetation and seepage blanket features at Carmen Diversion for visual reference of vegetation growth in key monitoring areas. EWEB submitted a plan and schedule to respond to FERC comments and progress is underway.
- **BOARD OF CONSULTANTS FOR CARMEN-SMITH PROJECT** – In 2021, as required by FERC, the CDSE worked in coordination with FERC D2SI to assemble a team of four nationally recognized dam safety experts, known as a Board of Consultants (BOC). The BOC reviews infrastructure project designs, dam safety issues, and provides recommendations. BOC review meetings are conducted periodically following FERC protocols and guidelines. The BOC functions independently from EWEB and FERC to review technically challenging matters and designs affecting dam safety, including probable maximum flood routing, hydraulic

performance of emergency spillways, embankment erodibility, sinkhole investigations, spillway modifications, and FERC license required designs for fish passage facilities and water release structures. More recently, the BOC has reviewed license required habitat design projects for dam safety impacts. EWEB's 5th BOC Meeting was held on July 10, 2024, covering topics of Carmen Diversion Reservoir Habitat Design and the Structural Monitoring Plan for Smith and Trail Bridge Reservoirs Habitat Structures. Smith and Trail Bridge Reservoir Habitat Designs were installed in the summer of 2024, and Carmen Diversion Reservoir Habitat Design will be installed in Summer 2025. EWEB's 6th BOC Meeting is scheduled for October 2024 and will include habitat and dam safety updates to designs for 2025 construction projects.

- TRAIL BRIDGE RESERVOIR SINKHOLES AND INVESTIGATION – Three active sinkholes were discovered in the Trail Bridge reservoir during a periodic bathymetric survey in 2021. Subsequent annual bathymetric surveys indicate very little change since 2022. EWEB Staff has investigated the root cause and potential failure modes with a consultant team, FERC, and the BOC. The Consultant Team's conclusion remains that the reservoir sinkholes are unlikely to progress in a way that would undermine the structural integrity of Trail Bridge Dam. Progression could lead to increased loss of reservoir water into the subsurface which might result in operational impacts but would not be expected to result in dam safety hazards. EWEB submitted the final sinkhole investigation report to FERC in May 2024. The BOC and FERC have recommended that EWEB perform a risk assessment in order to increase confidence in these conclusions, including a risk assessment for construction of the proposed Trap and Haul facility at the toe of Trail Bridge Dam to ensure that EWEB can safely proceed with the current design and location. The risk assessment plan was developed with EWEB's Consultant, in collaboration with FERC Staff, to ensure that the plan meets FERC requirements and expectations. The risk assessment plan was submitted to FERC for review in May 2024, and a workshop to conduct the assessment is scheduled for November 4-8, 2024. Following the workshop, a risk assessment report will be developed, reviewed by the BOC, and submitted to FERC for review and concurrence. Once complete, EWEB can progress on developing a sinkhole remediation plan, if needed, and determine if the proposed trap and haul facility can move forward as currently designed.
- OWNER'S DAM SAFETY REPRESENTATIVE – EWEB has awarded a ten-year, \$1M contract to Cornforth Consultants, Inc., to provide dam safety review capacity and expertise, in response to feedback from FERC and fisheries agencies, to support the major capital improvement projects at Carmen Smith. The contract also includes specialized support services for EWEB's Owner's Dam Safety Program for ongoing regulatory compliance and continuous improvement efforts. The kick-off meeting was completed in September, with document review to commence immediately, followed by dam safety reviews of the Smith Spillway and Flow Release Structure project (30% design), and Trail Bridge Fish Passage (60% design).
- TRAIL BRIDGE FISH PASSAGE AND HABITAT PROJECTS AND IMPACTS – The Carmen-Smith License requires the construction of fish passage and habitat improvement projects at Trail Bridge Dam, reservoir and upstream reaches. These include modifying the spillway and gates for downstream fish passage, construction of a trap and haul facility adjacent to the powerhouse, surface regrading upstream of the emergency spillway, and installation of fish habitat structures in the reservoirs and bypass reaches. All of these projects have significant dam safety considerations and require extensive engineering studies. Project managers work directly with Dam Safety staff, design engineers, the new Dam Safety Owner's Representative, and the BOC to identify and address dam safety concerns and address all FERC requirements in a timely manner.
- TRAIL BRIDGE SPILLWAY INVESTIGATION – EWEB and its Consultant performed a ground penetrating radar (GPR) scan of the spillway in August 2024 to investigate whether there are voids present between the spillway slab and the rock foundation. The investigation found no voids and allows us to work with our consultant on the next phase of the investigation to evaluate the underdrain system and uplift pressures on the spillway slab.

- SMITH DAM SPILLWAY MODIFICATION – The existing Smith Dam spillway must be modified to increase its capacity to mitigate the risk of the dam overtopping in the event of a probable maximum flood. The design will also meet the FERC License fish flow release requirement and will minimize scour downstream of the spillway. A subsurface geotechnical investigation and geologic reconnaissance have been completed. A geophysics study was postponed due to the Boulder Creek Fire located 5 miles south of Carmen-Smith that resulted in a closure of Highway 126. That work is expected to occur later this fall. EWEB will also be starting the 60% design in the Fall of 2024.
- 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 a flood condition, spillway degradation, and the proposed fish flow release structure required by the FERC License. Sinkhole investigations were concluded in 2020. To ensure safety, the reservoir is currently operated at a lower-than-normal elevation, which does not significantly affect power generation, and EWEB continues increased monitoring. EWEB submitted a dewatering and inspection plan for the Carmen Diversion Spillway structure in August 2021 and has responded to FERC comments with two revisions since the original submission. The work was scheduled for Fall 2024 but, due to staffing constraints, FERC was unable to complete their review in time to perform the work this year. The project is now rescheduled for late summer/fall 2025, pending FERC approval.

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. The Waltermville Canal has been dewatered since February 27, 2024, when a known seepage flow that had been under close surveillance at the Waltermville Canal forebay spiked. Dam safety and operations staff continue to surveil and monitor canal embankments and control systems following the DSSM procedures and FERC requirements.

- SEISMIC HAZARD ANALYSIS – In July 2024, FERC accepted EWEB’s Seismic Hazard Analysis (SHA) for the Leaburg-Waltermville Project with follow-up comments. EWEB will provide the required additional analysis by November 2024. Revised plans and schedules for multiple interdependent analyses are being developed in response to the accepted SHA.
- LEABURG-WALTERVILLE ANNUAL FERC INSPECTION – FERC Part 12D regulations require an annual dam safety inspection by FERC. The FERC annual dam safety inspection occurred on September 18-19, 2024, after the drafting of this memo. Follow up actions required by EWEB, if any, will be addressed in a timely manner.
- LEABURG CANAL – In January 2023, the Board approved Management’s recommendation to move towards decommissioning the Leaburg project. Dam safety staff are responsible for dam safety surveillance and monitoring 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 near-term risk reduction measures to reduce hydraulic loading that must be implemented prior to a long-term solution. Work progresses on these measures, including creating a low-level outlet at the powerhouse to pass additional flows, which was completed in December 2023. In addition, a drilling program plan was developed and submitted to FERC in 2023 that will provide subsurface information necessary to move forward with near term risk reduction designs. EWEB has held two virtual meetings to discuss FERC review comments and responded with two revisions since the original submission. Drilling scheduled for 2024 has been postponed to spring 2025, pending FERC approval.

- WALTERVILLE CANAL – The Walterville Canal has been dewatered since February 27, 2024, when a known seepage flow that had been under close surveillance at the Walterville Canal forebay dramatically increased. EWEB has been directed by FERC to maintain the drawn-down condition until they authorize increased water levels. EWEB has been working with consulting engineers to develop a repair plan for the forebay. In addition, several other dam safety investigations are underway. EWEB is currently assessing the stability of canal embankments and concrete structures under seismic loading conditions, and has completed a probable maximum flood analysis, both of which were recommended by an independent consultant and required by FERC. Erosion in the vicinity of the siphon spillway has been mitigated with both temporary repairs and changes in spillway operations while staff develop alternatives for longer term corrective measures. A subsurface investigation drilling plan for the forebay area and upstream high hazard canal embankments was implemented in March 2023. The geotechnical report presenting results from the work was submitted to the FERC in October 2023, although FERC has not yet responded. Because the results affect the ongoing investigations and are a critical path to developing liner repair options, EWEB has asked for a meeting in late September to determine next steps.

Additional Upcoming Projects

- DAM SAFETY PUBLIC OUTREACH BROCHURE – Every five years, EWEB is required to provide a public outreach information brochure to property owners adjacent to our hydroelectric projects, and within the inundation zone of a breach of a canal or dam. The content includes situational awareness for living next to canals and dams, activities that can jeopardize safe operation of the canals, dam safety awareness, and dam safety emergency planning. EWEB Dam Safety staff have worked with the Communications and Marketing team, Business Continuity team, and Property teams to update the brochure and identify recipients. The brochure will be mailed to residents this fall.
- ODSP AUDIT – EWEB’s ODSP is still a relatively young program that will continue to mature over the next few years. EWEB continues to focus program development efforts on 1) skill advancement 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 CDSE will continue to serve as a liaison for FERC D2SI and will provide technical and regulatory advice to project managers. An ODSP Audit is scheduled for October 2024 and will be completed and filed with FERC by the end of the year.
- EMERGENCY ACTION PLAN (EAP) and EXERCISE – EAP drills are conducted annually. In addition, an EAP Functional Exercise is required by FERC every five years. The next EAP Functional Exercise for the Leaburg-Walterville Project will take place in October 2024. County, city, and local emergency management agencies will participate. The next EAP Functional Exercise for the Carmen-Smith Project will take place in 2026.

Requested Board Action

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