EXH. JPH-22
DOCKETS UE-240004/UG-240005
2024 PSE GENERAL RATE CASE
WITNESS: JAMES P. HOGAN

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY,** **Respondent.**	**Docket UE-240004** **Docket UG-240005**

TWENTY-FIRST EXHIBIT (NONCONFIDENTIAL)
TO THE PREFILED DIRECT TESTIMONY OF

JAMES P. HOGAN

ON BEHALF OF PUGET SOUND ENERGY

FEBRUARY 15, 2024

Lower Baker Dam Crest Improvement

January 26, 2023

PSE PUGET SOUND ENERGY

LBK Crest Improvement Overview

Existing Spillway (23 Gates)

Main Improvements

- Widen spillway gates (23 to 12 gates)
- Increase height and add non-overflow section (floodwalls) to prevent overtopping abutments
- Add hoists to all gates with remote operation
- Raise access road and critical equipment above PMF level
- Add gate maintenance pit to left abutment
- Add gantry crane for improved maintainability
- New debris boom with anchors and new early warning sirens installed in 2018
- Intake Gate House raised mezzanine and intake gate hydraulics installed 2020

Improved Spillway (12 Gates)

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Aerial View of Proposed Improved LBK Crest

Not Shown: Fragile Wire, Warning Sirens, Gantry Crane, Debris Boom

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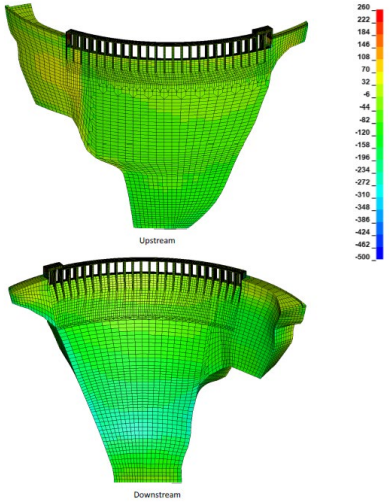
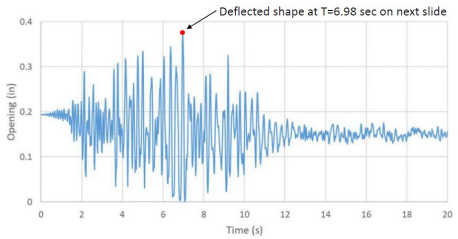
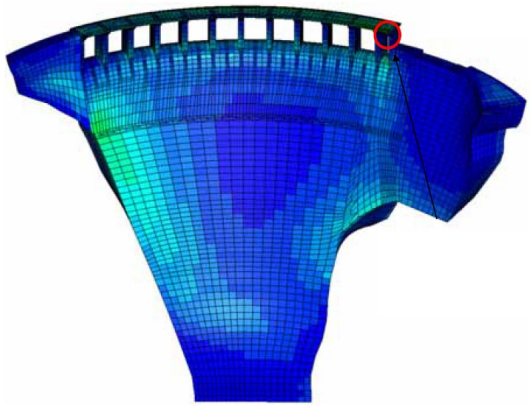
LBK Finite Element Modeling (FEM)

- ❑ Quest Structures (Yusof Ghanaat) is performing the finite element modeling of Lower Baker Dam
- FEM (M1) Validation and Linear Response Analysis of Existing Lower Baker dam final report received January 2021.
- FEM (M2) Nonlinear Analysis of Existing Lower Baker dam final report received January 2023.
- FEM (M3) Linear Analysis of Improved Crest results to support design were received October 2022. M3 completion and final report expected March 2023.







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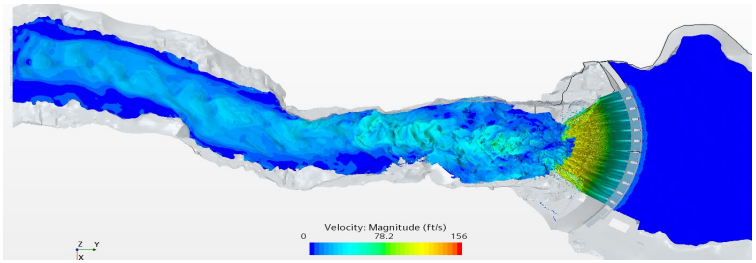
LBK Scour / Hydraulic Analysis

- ❑ Utah Water Research Laboratory (UWRL) is performing physical hydraulic modeling and Computational Fluid Dynamics (CFD) modeling of LBK Dam in support of the Crest Improvement project and scour analysis.
- ❑ Dr. George Annandale, Dr. Hank Falvey, and Dr. Michael George are performing scour analysis of LBK Dam

- Physical hydraulic model of Existing Crest was first run December 2020
- Physical hydraulic model of New Crest Design was first run December 2021
  - Baffle blocks, apron extension, single Robert's Splitter, and tailwater increase included on physical model runs to observe effects on scour
- CFD model was started in January 2022 to support scour analysis due to the physical models inability to get velocities and dynamic pressures caused by the highly turbulent and aeriated flow
  - CFD partial model to prove concept results report was July 2022
  - CFD full model results and physical model comparison were discussed January 2023
  - Expect CFD model results and comparison summary report February 2023
- Scour analysis expected through 2023.



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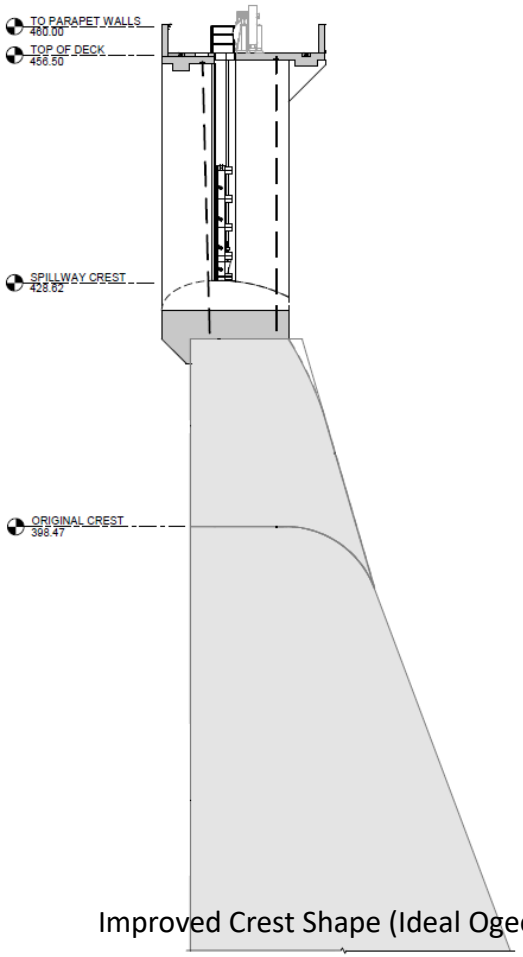
LBK Crest Improvement Schedule

- Design is currently at 60%.
- BA and BiOPs completed in 2021 along with Seepage Reduction Project
- FEM linear analysis of Improved Crest expected March 2023
- Scour analysis and CFD modeling through 2023
- Design PFMA meeting June 2023
- 90% design expected August 2023
- 100% design expected December
- Obtain local permits 2024-2025
- RTA design expected February 2024
- Construction RFP April 2024
- Award Construction contract August 2024
- Construction Management contract award October 2024
- Construction PFMA meeting November 2024
- Submit Design, QCIP, and TCEAP to FERC for construction approval December 2024
- Preconstruction submittals and bulkhead fabrication in 2025
- Left abutment and left spillway construction 2026
- Spillway center section construction 2027
- Right abutment and right spillway construction 2028
- Final Construction Report (FCR) December 2028



Improved Crest Shape (Ideal Ogee)

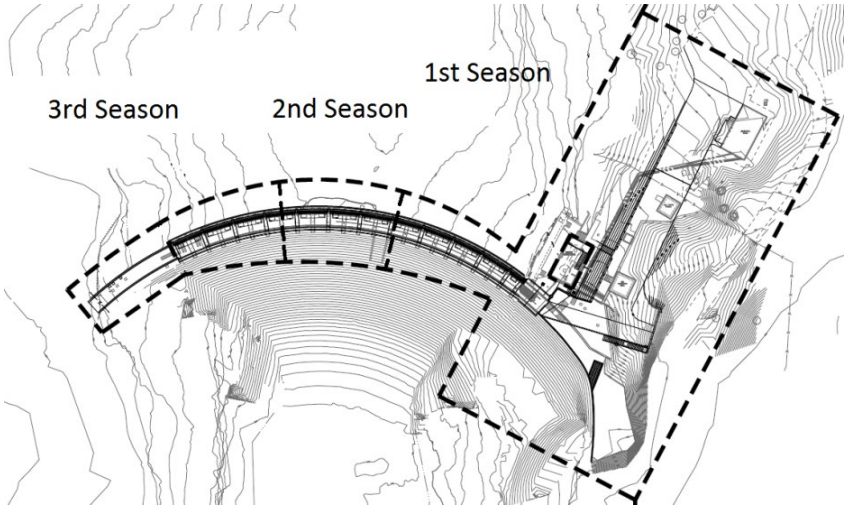
PUGET SOUND ENERGY

LBK Crest Improvement Construction Sequence

- Construction to begin after Seepage Reduction Project. Anticipate 3 major construction seasons starting in 2026. Major spillway construction window is ~APR thru ~SEP (outside of flood or high flow season).
- All work anticipated to be above water level, but a lot below OHW. (OHW is 442' and crest is 428'). Bulkhead to be used to extend and protect construction work.
- The spillway and power plant will remain operational through construction
- Minimum stream flows will be maintained throughout construction.

1st Season is 2026

Improved Spillway



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