Priest Rapids Coordinating Committee
Statement of Agreement

Expansion of Fish Mode Operational Range for the Wanapum Turbines

Submitted to the Priest Rapids Coordinating Committee: October 25, 2022

Approved by the Priest Rapids Coordinating Committee: January 24, 2023

Statement: The Priest Rapids Coordinating Committee (PRCC) approves the change in the operational range of Fish Mode for the Wanapum Dam turbines from 11.8 - 15.7 kcfs to a new range of 10.0 - 15.7 kcfs, with the understanding of the following provisions.

- The PRCC will be provided with information on the number of starts/stops documented for the Wanapum Turbine Units prior to December 31 of each year that this SOA is in effect or unless modified by the PRCC.

- This SOA will be terminated if the project-wide juvenile salmon and steelhead performance standard of 86.49% is not achieved on a species-by-species basis over the course of the 2025-2027 survival evaluations, unless there is compelling evidence[1] that factors other than Wanapum Dam turbine operations reduced juvenile salmon and steelhead survival through the Priest Rapids Project.

- If the project-wide juvenile salmon and steelhead performance standard of 86.49% is achieved on a species-by-species basis over the course of the 2025-2027 survival evaluations, this SOA would remain in effect until performance standard check-ins are repeated in 2035-2037 unless the survival performance of 86.49% is not achieved on a species-by-species basis.

Proposal: Based on existing data and best available science from the 2005 balloon tag evaluation (Normandeau, et al. 2006), Grant PUD has proposed that the lower end of the Fish Mode range at Wanapum Dam be adjusted from 11.8 kcfs to 10.0 kcfs. Per this evaluation, at 10.0 kcfs turbine flow, fish survival should remain above 95%.

Based on 2022 Wanapum Dam operations, this additional operational flexibility will potentially reduce the frequency of turbine unit startups and shutdowns by an estimated 53%. In addition, the reduction of starts and stops would likely reduce migrating juvenile salmon and steelhead exposure to cavitation events. It is recognized that a biological benefit would be extremely hard to quantify, however it is general knowledge that exposure to cavitation events may cause harm to juvenile salmon and steelhead.

[1] Compelling Evidence would include force majeure events as defined in Part VIII, Section 8.3 of the Priest Rapids Salmon and Steelhead Settlement Agreement or other non-operational factors.

Background: During the juvenile fish passage season, Wanapum and Priest Rapid turbines are operated in a protocol referred to as "Fish Mode". The goal of Fish Mode is to constrain the discharge of each turbine to a range associated with ≥95% smolt survival.

Operationally, Fish Mode limits the turbines from their maximum and minimum hydraulic capacity. Flow limits on the upper end of the Fish Mode range reduce the Project's generating capacity and ability to move water through the turbines during high flows. Flow limits on the lower end of the Fish Mode range create challenges due to increased turbine unit startups/shutdowns and frequency regulation, which has become increasingly important as wind and solar are added to the grid.

The Fish Mode at Wanapum Dam (turbine flow range 11.8-15.7 kcfs) was established from a 1996 turbine fish balloon-tag study (Normandeau et al. 1996). The result of that study illustrated that survival was highest at 15 kcfs turbine flow and declined in both directions moving away from 15 kcfs. At 11 kcfs, average survival was approximately 95% and presumably was used as the lower bound of the allowable range.

In 2005, a Fish Mode balloon-tag study was repeated to evaluate survival through the new advanced hydro turbine design (AHTS). The purpose of the 2005 evaluation was to determine if smolt survival through the AHTS was equal to or greater than the existing turbines (Normandeau et al. 2006). The focus of this study was placed on the upper end of the Fish Mode flow range for the purpose of increasing hydraulic capacity.

Results of the 2005 balloon evaluation indicated that the AHTS survival rates were not statistically different than the existing turbines at the higher flows. The AHTS had the highest survival (99.56%) at 9 kcfs flow at the 10 foot release depth. Survival remained above 95% at the 10 foot and 30 foot release depths between about 9.5 to 16 kcfs, as required per Action 1 of the 2004 NOAA-Fisheries Biological Opinion for the Priest Rapids Project (NOAA-Fisheries 2004).

FERC confirmed that the biological results from the AHTS had similar survival to the existing turbines and issued an order on December 14, 2005, authorizing Grant PUD to install the remaining nine AHTS (FERC 2005).

Based on the results, the Wanapum Dam fish mode range was not updated based on the 2005 results showing no significant increase in smolt survival rates when flows through the new turbines was above 15.7 kcfs.

Literature Cited:

Federal Energy Regulatory Commission (FERC). 2005. Order 113 FERC Ş 62,205 authorizing installation of remaining turbines at Wanapum Dam.

National Marine Fisheries Service. 2004. Biological Opinion for ESA (Endangered Species Act) Section 7 Consultation on Interim Operations for the Priest Rapids Hydroelectric Project (FERC No. 2114). NOAA (National Oceanic and Atmospheric) Fisheries Consultation No. 1999/01878.

Normandeau Associates, J.R. Skalski, and Mid-Columbia Consulting Inc. 1996. Fish

Survival Investigation compared to Turbine Survival at Wanapum Dam, Columbia River, Washington. Report prepared for the Public Utility District No. 2 of Grant County, Washington, Ephrata, WA.

Normandeau Associates, J.R. Skalski, and R.L. Townsend. 2006. Performance Evaluation of the New Advanced Hydro Turbine System (AHTS) at Wanapum Dam, Columbia River, Washington. Report prepared for the Public Utility District No. 2 of Grant County, Washington, Ephrata, WA.