# Fish Passage Plan (FPP) Change Form

**Change Form # & Title**: 21BON002 – Update Turbine Operating Range Criteria

**Date Submitted**: March 4, 2020

**Project**: Bonneville Dam

**Requester Name, Agency**: Scott Bettin, BPA; Lisa Wright, Corps

**Final Action:**

**FPP Section**: BON Section 4.2. “Turbine Operating Range”

**Justification for Change**:

Aligns FPP project-specific chapters with current BPA Load Shaping Guidelines in Appendix C. This operation was included in the Action Agencies proposed action that was evaluated in the 2020 CRS Biological Opinions from NOAA Fisheries and USFWS.

*At Bonneville Dam, the PH2 mid-range restrictions will remain in effect until the gatewell turbulence issues at higher operating points are resolved.*

Also, this change form proposes increasing the spill threshold to return PH2 units to the mid-range. Last year, 180 kcfs was too low and it took us over 150 kcfs spill for a few days, which likely required us to do the rock removal contract. Raising the spill threshold before going back to the mid-range would avoid that from happening again this year.

**Proposed Change**: See following pages for edits to existing FPP in “track changes”.

**Comments**:

**Record of Final Action**:

Proposed Change:

4.2. Turbine Unit Operating Range

**4.2.1.** Lower and upper limits of turbine operating ranges at PH1 and PH2 are in **Table BON-15**. Turbine units will be operated within these ranges according to *BPA’s Load Shaping Guidelines* (**Appendix C**) and as described below.

**4.2.2. In-Season (Spring/Summer Spill for Juvenile Fish Passage, April 10 – August 31).** Bonneville Dam PH1 units 1-10 will be operated between the 1% lower limit and the Best Operating Point (BOP), except under limited conditions and durations when turbines may be operated above BOP for the use of reserves or for TDG management during high flows (refer to **Appendix C** for more information). All required fish passage spill operations will be met prior to operating PH1 turbines above BOP.

PH2 units 11-18 will be operated within restricted operating ranges as follows:

**4.2.2.1.** From April 10 through June 15 (spring spill), as a soft constraint, PH2 units should not be operated below the 1% mid-range (< 13 kcfs) to minimize turbulence for turbine-passed fish.

**4.2.2.2.** Until gatewell structural modifications are completed, PH2 units will be operated within the 1% mid-range (13–15 kcfs) from April 1 through July 31 to minimize turbulence for bypassed fish. *RCC will issue a teletype with any in-season modifications as construction and testing is completed*.

During this time, additional flow above project hydraulic capacity (PH2 in mid-range + PH1 at BOP + FOP spill + corner collector, ladders, etc.) will be passed in the following sequential order with increasing flow, or as otherwise determined by Project Fisheries based on observed conditions. This sequence of operations is also summarized in **Table BON-14**:

April 1–9 Pre-Spring Spill and June 16 – July 31 Summer Spill:

1. Increase PH2 units up to the 1% upper limit.
2. Then, increase spill.

April 10 – June 15 Spring Spill w/ Juvenile Trigger: when juvenile spring Chinook collection counts[[1]](#footnote-1) exceed adult spring Chinook total passage counts[[2]](#footnote-2) (excluding jacks) for at least three consecutive days, Project Fisheries will notify the control room to pass additional flow as follows:

1. Maintain PH2 units within mid-range and increase spill up to a maximum of 150 kcfs to avoid causing erosion in the spillway stilling basin. *This applies during Performance Standard spill and Gas Cap spill. DO NOT SHAPE TO ONLY APPLY TO HOURS OF GAS CAP SPILL*.
2. Then, increase PH2 units above the mid-range to the 1% upper limit in order from south to north (Unit 11 to Unit 18). *NOTIFY* *FPOM ASAP (no later than 3 workdays) and include in the Weekly Report*.
3. Then, increase spill above 150 kcfs, up to 210 kcfs.
4. Then, increase spill above 210 kcfs and resume operating PH2 units within the mid-range. *PH2 UNITS MAY ONLY BE OPERATED ABOVE THE MID-RANGE WHEN SPILL IS BETWEEN 150 KCFS AND 210 KCFS.*

April 10 – June 15 (Spring Spill) w/ Adult Trigger: when adult spring Chinook total passage counts5 (excluding jacks) exceed juvenile spring Chinook collection counts4 for two consecutive days, Project Fisheries will notify the control room to pass additional flow as follows:

1. Increase PH2 units up to the 1% upper limit in order from north to south (Unit 18 to Unit 11).
2. Then, increase spill.

Table BON-. Sequential Steps to Pass Increasing Levels of Flow, per Modified PH2 Operating Range Guidelines in section 4.2.2.2.

|  |  |
| --- | --- |
| **April 1 – 9** | 1. PH2 in mid-range and PH1 up to BOP.
 |
| **Pre-FOP Spill** | 1. Then, increase PH2 > mid-range up to 1% upper limit.
 |
|  | 1. Then, spill (start with B2CC if not already open).
 |
| **April 10 – June 15** | **JUVENILE TRIGGER** |
| **FOP Spring Spill** | 1. FOP Spring Spill, PH2 in mid-range, and PH1 up to BOP.
 |
|  | 1. Then, increase spill > FOP up to 150 kcfs. *This applies during all hours. DO NOT SHAPE TO ONLY APPLY TO HOURS OF GAS CAP SPILL.*
 |
|  | 1. Then, increase PH2 > mid-range up to 1% upper limit (south to north) and *NOTIFY FPOM as soon as possible.*
 |
|  | 1. Then, increase spill > 150 kcfs up to 210 kcfs.
 |
|  | 1. Then, increase spill > 210 kcfs and resume PH2 in mid-range.
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|  |  |
|  | **ADULT TRIGGER** |
|  | 1. FOP Spring Spill, PH2 in mid-range, and PH1 up to BOP.
 |
|  | 1. Then, increase PH2 > mid-range up to 1% upper limit (north to south).
 |
|  | 1. Then, increase spill > FOP.
 |
| **June 16 – July 31** | 1. FOP Summer Spill, PH2 in mid-range, and PH1 up to BOP.
 |
| **FOP Summer Spill** | 1. Then, increase PH2 > mid-range up to 1% upper limit.
 |
|  | 1. Then, increase spill > FOP.
 |
| **August 1 – 31\*****FOP Summer Spill** | 1. FOP Summer Spill, PH2 in full 1% (\*see footnote), and PH1 up to BOP.
2. Then, increase spill > FOP.
 |

\*Starting August 1, PH2 units may be operated within the full 1% range for flexibility during low flows. During this period, PH2 units will typically be maintained within the mid-range but may be adjusted through the full 1% range as necessary to avoid dead-bands during low flows. PH2 operations above the mid-range will be infrequent, consistent with previous years.

**4.2.2.3.** If in-season operation outside the 1% range or above BOP at PH1 is necessary, Project personnel shall record the information to provide to BPA on a weekly basis according to the *Guidelines*. In-season operation outside the 1% range may be necessary to:

Meet BPA load requests made pursuant to BPA's policy, statutory requirements, and *Load Shaping Guidelines* (**Appendix C**).

If the draft tube is to be dewatered (**section 5.5**), the unit will be operated at full load > 1% (or at speed-no-load < 1% if not possible to load) for a minimum of 15 minutes prior to installing tail logs in order to flush fish from the unit.

Operate a turbine unit solely to provide station service (< 1%).

Comply with other coordinated fish measures.

**4.2.3. Off-Season (September 1 – April 9).** While not required to do so in the off-season, turbines will normally run within the 1% range since it is the optimum point for maximizing energy output of a given unit of water over time. Operation outside the 1% range is allowed if needed for power generation or other needs.

1. **Juvenile Spring Chinook** reported as “*CollCount*” in the SMP Smolt Data. Query current year, “*BO2*”, “*Combined Chinook Yearling*”: <https://www.fpc.org/smolt/smpsubmitdataquery_2014v7.html> [↑](#footnote-ref-1)
2. **Adult Spring Chinook** reported as “*Spring Chinook Adult*” for Bonneville Dam: <https://www.fpc.org/currentdaily/HistFishTwo_7day-ytd_Adults.htm> [↑](#footnote-ref-2)