

Fish Passage Plan (FPP) Change Request Form

Change Form # & Title: 16BON002 – PH2 Mid-Range Operation
Date Submitted: December 17, 2015; Revised January 29, 2016
Project: BON
Requester Name, Agency: FPOM Bon Ops Task Group
Final Action: APPROVED – January 29, 2016

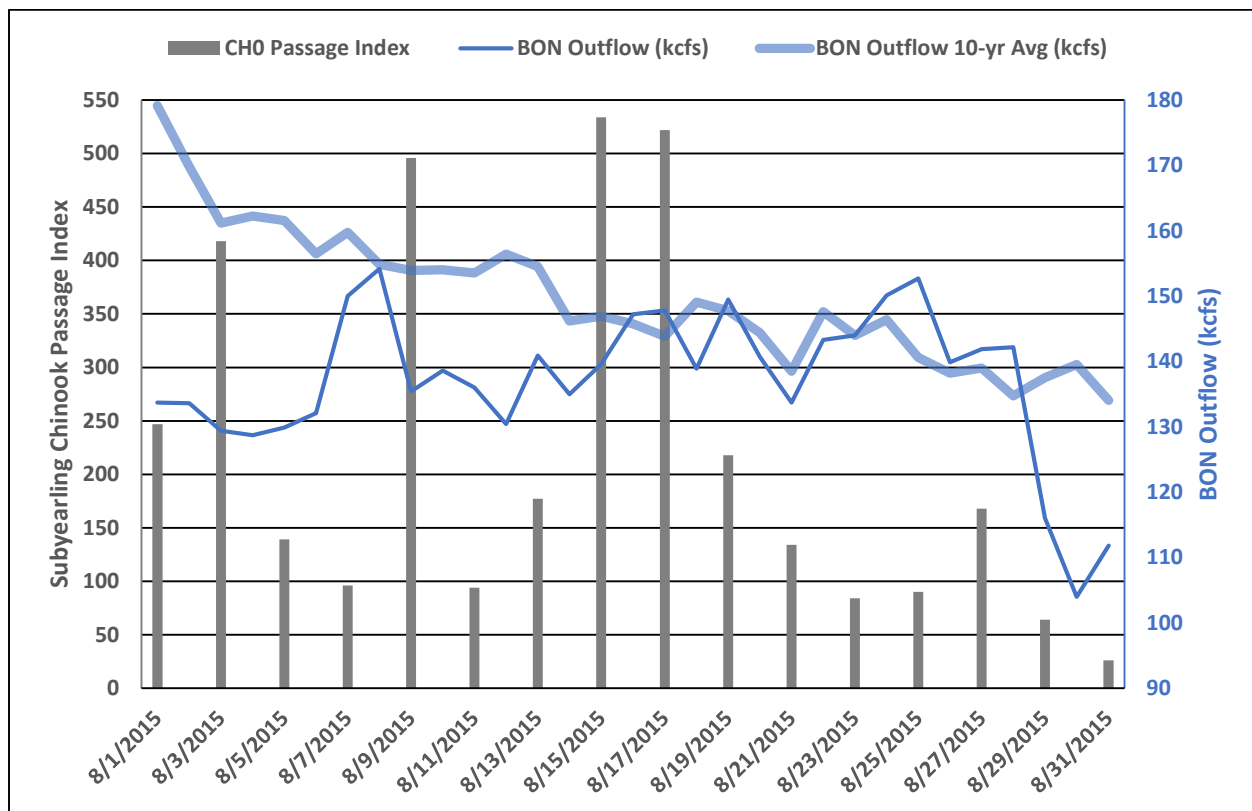
FPP Section: BON 5.2.1 - Turbine Unit Operating Range.

Justification for Change: Change form [15BON006](#) was approved by FPOM for the 2015 FPP in order to reduce deadband issues that occur during low flows when PH2 turbines are restricted to the narrow mid-range of 13-15 kcfs. This change was based on the assumption that PH2 units will rarely be operated above the mid-range in August, consistent with previous years (see FPC Memo [43-15](#), March 13, 2015). Hourly average data for 2015 are summarized in the tables below and confirm that PH2 units were rarely operated above the mid-range in 2015.

This change form confirms the Aug 1–Oct 31 BON turbine operating range until PH2 FGE modifications are installed. Unit 15 modifications were completed in 2015 prior to testing, and the remainder of the units will be outfitted with the same configuration.

August 1-31, 2015 Summary	Unit 11	Unit 12	Unit 13	Unit 14	Unit 15	Unit 16	Unit 17	Unit 18
MAX Hourly Avg Flow (kcfs)	16.1	14.8	14.1	13.8	0	0	15.4	16.1
Total # Hrs Operated	608	133	21	3	0	0	423	199
Hrs at 15.1 - 15.5 kcfs	12 (2.0%)	0	0	0	0	0	10 (2.4%)	1 (0.5%)
Hrs at 15.5 - 16.0 kcfs	5 (0.8%)	0	0	0	0	0	0	10 (5.0%)
Hrs at 16.0 - 16.5 kcfs	2 (0.3%)	0	0	0	0	0	0	3 (1.5%)
TOTAL Hrs > Mid-Range	19 (3.1%)	0	0	0	0	0	10 (2.4%)	14 (7.0%)

Date	Unit 11			Unit 17			Unit 18		
	Op Hrs/Day	# >Mid	% >Mid	Op Hrs/Day	# >Mid	% >Mid	Op Hrs/Day	# >Mid	% >Mid
8/13/15	24	0	0.0%	24	1	4.2%	0		
8/14/15	24	2	8.3%	24	2	8.3%	0		
8/15/15	24	0	0.0%	21	0	0.0%	0		
8/16/15	24	0	0.0%	24	3	12.5%	0		
8/17/15	24	2	8.3%	24	1	4.2%	0		
8/18/15	24	3	12.5%	24	0	0.0%	0		
8/19/15	24	0	0.0%	24	3	12.5%	0		
8/22/15	24	2	8.3%	0			24	2	8.3%
8/23/15	24	5	20.8%	0			24	5	20.8%
8/25/15	24	1	4.2%	11	0	0.0%	24	3	12.5%
8/26/15	13	4	30.8%	0			13	4	30.8%



Proposed Change:

See edits in track changes on the following pages. **Highlighted text is language added per FPOM discussion 1/28/16.**

5.2. Turbine Unit Operating Range.

5.2.4. Through regional coordination with FPOM and TMT, the 1% range guidelines have been temporarily modified as defined below in 5.2.24.1–5.2.24.2 to minimize PH2 gateway turbulence for bypassed juvenile salmonids until structural and/or other solutions are implemented. **These modified guidelines only apply to PH2 units that have not had FGE improvements installed. As of March 2016, Unit 15 is complete and the restrictions below do not apply. All other PH2 units will be operated in accordance with the modified guidelines below until they are outfitted with the same configuration as Unit 15.*

5.2.4.1. **April 1–July 31**: turbine units will be operated in the following order of operating ranges to pass increasing flow:

- a. PH2 units within the 1% mid-range (13-15 kcfs);
- b. Then, PH1 units up to the 1% upper limit;
- c. Then, PH1 units up to the Best Operating Point (BOP);
- d. Then, additional flow will be passed in one of the three following ways, or as otherwise determined by Project Fisheries based on observed conditions:
 - 1) April 1–April 9 / June 16–July 31: PH2 units up to the 1% upper limit.
 - 2) April 10–June 15 (Spring Spill):
 - Adult Trigger¹: When adult spring Chinook total passage counts (excluding jacks) are greater than juvenile spring Chinook collection counts at BON JMF for two consecutive days, Project Fisheries will notify the control room to increase PH2 up to 1% upper limit in priority order from north to south: 18, 17, 16, 15, 14, 13, 12, 11.
 - Juvenile Trigger²: When juvenile spring Chinook collection counts at BON JMF are greater than adult spring Chinook total passage counts (excluding jacks) for three consecutive days, Project Fisheries will notify the control room to maintain PH2 units within the 1% mid-range as a hard constraint and pass additional flow as spill.

5.2.4.2. **August 1–October 31***: PH2 units may be operated within the full 1% range and PH1 units may be operated up to BOP. During this time period, PH2 units will typically be operated within the 1% mid-range; however, the full 1% range may be used as necessary to avoid deadband issues during lower flows. Operations above the mid-range will be infrequent, consistent with previous years. FPOM will continue to review this operation until FGE modifications are complete.

*[*This PH2 operation is approved for 2015 only. A review of previous years (2006-2012) indicated PH2 units were operated in the upper 1% infrequently in August. In 2015, PH2 units will be operated consistent with previous years and will primarily operate at or below the 1% mid-range in August. At the end of the year, the FPOM Task Group will review PH2 operations in 2015 compared to previous years in order to recommend an operation for the 2016 FPP.]*

Comments:

November 17, 2015, email from Jon Rerecich, Corps NWP: The high carbon steel prototype 2014 plates were swapped with stainless last spring, 2015, prior to testing. Unit 15 configuration is considered complete at this point and plans moving forward to outfit the rest of the units with the same config. The FPP change form no 1% restriction is totally appropriate.

December 17, 2015, FPOM Meeting: FPOM needs more time to review this change form along with results from the B2FGE study. Add this change form to the Jan 28th FPP meeting.

January 28, 2016, FPOM FPP Meeting:

- Fredricks would like to see wording added to the Aug 1-Oct 31 operation that confirms PH2 units will be operated in the mid-range “to the extent possible” or “as a soft constraint”.
- Bettin cautioned that the operators would interpret that wording to be more restrictive and we’d be back to dealing with deadband issues that come up during lower flows with such a narrow operating range. The reality is that PH2 units will only very rarely operate above the mid-range, as shown in last year’s data when there was no restriction in place.
- Lorz thinks 2015 was such an outlier water year that the data aren’t representative, so FPOM should review data from this operation again next year.
- Rerecich confirmed FGE modifications are on-track to be installed next in-water work window 2016/17, so this mid-range operation will likely only be implemented for one more year.
- Fredricks reiterated there should be some language to capture the intent to stay within the mid-range, and to add that FPOM will continue to review the data to make sure the operation is implemented consistent with the assumptions.

Record of Final Action: APPROVED as revised at FPP meeting 1/28/2016.