

Appendix K: Memo on November 2018 Joint Operation Flow Test of AWSSB and Single Fish Units

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Joint Operation of a Single Fish Unit and AWS Backup System at The Dalles East Fishladder.

On November 28 2018, The Dalles AWS backup system (AWSBS) was successfully operated simultaneously with a single fish unit. The AWSBS was operated with each of the two fish units at separate times. In addition, the tests included the startup and shutdown of a fish unit while the AWSBS was operating; and conversely, the startup and shut down of the AWSBS while a fish unit was operating. The latter operation represents a typical scenario in during which one of the fish units goes down and the AWSBS can be called into service to augment the auxiliary water flow for the fish ladder.

The fish turbines and fish ladder were monitored during the tests and showed no adverse conditions developed in either system. No seiche was seen in the fish ladder and no abnormal pressure variations were observed with the turbines. The flow in the fish ladder appeared similar to a normal operation with two fish units. Recorded channel velocities were also similar to a normal dual unit operation.

The discharge in the single fish units were run at 2500 cfs and the estimated AWS backup discharge was about 1550 cfs, for a combined 4050 cfs. Tests were done at a relatively low tailwater, which creates a more conservative test in terms of meeting fish ladder entrance criteria. (The ladder entrance weirs become increasingly hydraulically efficient with lower tailwater since the lower settings of the ladder entrance weirs create a lower projection into the water column.) The project tailwater was 75.5 feet, which is exceeded 85% of the time during the year.

The fish ladder entrance data at all three entrances were physically recorded during the joint AWS and fish unit operation with the following summary results:

Entrance Location	Number of Weirs	Weir Submergence	Entrance head
East	2.3	10.5 ft	1.5 ft
West	2	8.3 ft	1.25 ft
South	2	8.5 ft	0.5 ft

During the joint fish unit and AWSBS operation, the east and west entrances were reliably within criteria; however the south entrance was not. (This being in spite of the combined AWS entrance flow (~ 4000 cfs) being higher than the estimated marginal target rate, 3200 cfs). Noteworthy was that the fish ladder programmable logic control (PLC) screen indicated the south entrance was within criteria at the same time. The physical measurements are accurate, whereas the PLC data relies on calibrations which have been known frequently to stray.

The criteria problem at the south entrance can be easily corrected by raising one of the two weirs sufficiently to raise the entrance head back into criteria. The south entrance weirs are 15-feet wide each, which represents 86% of the combined width of two narrower entrance weirs at the east and west entrance locations. As noted above, this was a conservative test towards meeting entrance criteria due to the particularly low tailwater.

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