CENWW-ODM **08/29/2022**

MEMORANDUM FOR THE RECORD: 22 MCN 15 Unit 1 ESBS and VBS Differential Issues

SUBJECT: Unit 1 ESBS and VBS Differential Issues

Narrative: The ESBS brush cycling in Unit 1A, and 1B slots were short and multiple cycling, respectively, from August 23 to 25 (FPP, Chapter 5, 2.3.2.2.vi.). The electrical staff found no issues with the wiring or control system. During the same time frame, VBS differentials in 1A and 1B slots measured 1.2 to 1.8 feet with the VBS's requiring cleaning three days in a row, which is very unusual. Trash rack differentials for both slots measured from 1.0 to 1.9 feet over those three days. Project staff determined debris inside and outside Unit 1 was contributing to the ESBS and VBS issues (Photos 1 & 2).

Unit 1 was removed from service at 1105 hours on August 25. A camera inspection of Unit 1's ESBS's occurred from 1110 to 1210 hours. Debris in the slots was more than usual, which could have affected the ESBS's (Photos 3 & 4). Trash racks in all three slots were cleaned from 1210 to 1330 hours. Twenty yards of debris was removed, mostly woody material and Eurasian milfoil, which could have affected VBS differential readings. ESBS's and VBS's were raised from 1330 to 1630 hours. Debris was removed from the ESBS's and the VBS's were cleaned (Photo 7).

With all systems clean and debris in the unit's water column, Unit 1 was operated at speed no load from 1637 to 1648 hours, which passed the debris from the unit. With the unit clean, the VBS's and ESBS's were reinstalled by 1845 hours, and the unit returned to service at 1917 hours.

Crane operators can only work 12 hours a day. Other than camera inspections, the whole process required a crane operator. The screen reinstall work needed to be completed by 1900 hours, which it was.

JCC orifices were closed in all three slots from 1110 to 1330 hours for camera inspections and trash rack cleaning. Due to the debris observed, the orifices in 1A and 1B slots were again closed from 1600 to 1845 hours. The orifices were closed to protect the JCC systems from debris. No fish were observed during the camera inspections or the cleaning. The gatewell slots were not dipped for fish removal.

Two days before and after the cleaning, juvenile bypass numbers were 3600, 2751, 1640 and 1600 fish, mostly subyearling Chinook salmon. Adult fallback numbers were 1, 3, 5 and 0 fish. Operating Unit 1 briefly for 11 minutes with screens raised should have had minimal impact on fish.

After the debris removal, both screen brush cycles have operated properly. Since the ESBS's were installed in 1994, this is the first time over a wide variety of forebay debris loads, that a unit had to be cleaned in order to restore proper ESBS brush function.

Trash rack and VBS differentials are back to normal ranges.

A. Species – N/A.
B. Origin – N/A.
C. Length – N/A
D. Marks and tags – N/A
E. Marks and Injuries found on carcass – N/A
F. Cause and Time of Death – N/A

G. Future and Preventative Measures – Continue good debris management.

Photo 1: Forebay debris that had been in front of Unit 1 for a week to ten days.

Photo 2: VBS differential caused by debris.

Photo 3: Debris on the brush bar and chain on ESBS in 1A slot.

Photo 4: Debris on the top bumper on the ESBS in 1A slot.

Photo 5: Debris on the brush bar and chain on the ESBS in 1B slot.

Photo 6: Debris wad on the ESBS in 1B slot.

Photo 7: Debris removed from the two ESBS's (mostly the screen in 1A slot).

Sincerely,

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