CENWW-OD-G **August 12, 2019**

MEMORANDUM FOR THE RECORD 19 LGS 09 Doble Outage Modification and ESBS Problems

SUBJECT: Little Goose Doble Outage Modification and ESBS Problems

Background

Little Goose Lock and Dam originally scheduled T2 Doble outage, outlined in Appendix A, Table A-1 of the Fish Passage Plan. Little Goose was unable to conduct the T2 Doble due to Unit and bus configuration with Unit 5 out of service and opted to conduct testing and maintenance on the T1 transformer. The configuration at Little Goose Dam is such that Units 1-4 are connected to the T1 transformer, and Units 5-6 are connected to the T2 transformer. Additionally, T1 transformer work requires the single 500kv line to be out of service while personnel are working due to the close proximity of the line. Therefore, Unit 6 was operating at "speed no load" to provide station service power during daytime hours and configured to normal operation the remainder of the time from August 05 through 08.

Little Goose Project removed Units 1-4 and the T1 transformer from service from August 05 at 08:27 through August 08 at 16:52. This placed Little Goose out of Unit priority outlined in the Fish Passage Plan (Chapter 8, Table LGS-5). Additionally, the adult ladder cooling pump is required to be in operation per Chapter 8 Section 2.4.2.14. of the Fish Passage Plan (FPP). With power being fed from the T1 transformer only, the adult ladder cooling pump was out of service from August 05 at 04:40 through August 08 at 17:30. Lastly, the ESBS screen cleaning brush located in Unit 6 gatewell slot "C" failed due to a PLC on August 05 at 18:25. The ESBS's are required to operate within a running turbine unit in accordance to Chapter 8 Section 3.2.2.2. of the FPP. Currently ESBS brushes are operating every 4 hours. Unit 6 was not forced out of service and continued to operate until electricians could troubleshoot the issue. Little Goose was unable to call electricians out that same night as the Doble testing schedule required them to be at work extremely early the morning of August 05. Additionally, replacing the ESBS with a spare ESBS was not an option as the gantry crane was out of service. Lastly, Little Goose is currently conducting an unwatering/dewatering pump upgrade and was unable to operate on the emergency diesel generator due to the load requirement of the unwatering/dewatering system without sacrificing plant safety. The ESBS was repaired by 08:44 on August 06.

Impact to Adult Passage

Unit priority was changed from 1, 2, 3, 4, 6 to just unit 6 operating at "speed no load" from August 05 at 08:27 through August 08 at 16:52 during daytime hours. In addition, the fish ladder cooling pump was out of service from August 05 at 04:40 through August 08 at 17:30. Changes in unit priority and fish ladder temperature differentials may increase passage delays,

however, the daily adult counts during the outage were within the variability in daily passage numbers before and after the outage.

Impact to Juvenile Passage

The Unit 6 gatewell slot "C" ESBS brush was out of service for approximately 15.5 hours and approximately 4 brush cycles were missed. Debris loads are currently minimal and the short brush outage likely had little influence on descaling or mortality rates. The period before, during and after the brush outage descaling and mortality rates were within the daily variability for these fish condition metrics.

Path Forward

Numerous discussions have taken place in regards to abnormal or emergency power plant situations when ESBS cleaning brushes fail. Little Goose personnel felt that the safest option at the time was to operate Unit 6 in hopes that the brush could be fixed when the electricians arrived at 04:30 on August 06. Additionally, electricians are troubleshooting the multiple ESBS cleaning brush PLC failures during our power switching procedure to determine the cause. Little Goose currently has 2 ESBS PLC's as spares and are in the process of ordering more. Electricians are also trying to determine if other USACE Projects have similar PLC's that could be used in case of an emergency. Lastly, Little Goose is currently still awaiting parts for the gantry crane.

Estimated mortalities by species, and origin:

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 – N/A

Table 1: Adult passage at Little Goose Dam from August 1 through August 11, 2019.

Date	Chinook	Sockeye	Steelhead
1-Aug	18	1	53
2-Aug	31	2	41
3-Aug	29	1	58
4-Aug	22	0	49
5-Aug	**19**	**1**	**16**
6-Aug	**14**	**1**	**21**
7-Aug	**14**	**0**	**35**
8-Aug	**8**	**1**	**12**
9-Aug	42	2	53
10-Aug	15	0	46
11-Aug	22	1	15

Figure 1: Little Goose Dam adult ladder temperature; August 1 through August 9, 2019.

Table 2: Daily juvenile fish collection and mortality at Little Goose Dam from August 1 through August 12, 2019.

Date	Collection	Mortality	Percent
1-Aug	307	4	1.30%
2-Aug	404	2	0.50%
3-Aug	697	2	0.29%
4-Aug	906	0	0.00%
5-Aug	1636	2	0.12%
6-Aug	**1639**	**8**	**0.49%**
7-Aug	1691	9	0.53%
8-Aug	1002	8	0.80%
9-Aug	738	12	1.63%
10-Aug	774	12	1.55%
11-Aug	1839	6	0.33%
12-Aug	1212	5	0.41%

Table 3: Daily percent juvenile fish descaling at Little Goose Dam from August 1 through August 12, 2019.

Date	Percent Descaling
1-Aug	0.0
2-Aug	0.5
3-Aug	0.7
4-Aug	0.9
5-Aug	1.1
6-Aug	**1.6**
7-Aug	3.0
8-Aug	3.6
9-Aug	6.3
10-Aug	0.5
11-Aug	0.6
12-Aug	0.7

Sincerely,

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