

APPENDIX A: MCNARY

McNary Dam¹

1 Special Project Operations.

1.1 Spill. Spill for fish passage will be provided during the outmigration season in accordance with spill specifications in Appendix E and as coordinated through TMT. Alternative spill patterns to control dissolved gas levels or change fish passage conditions will be coordinated through the FPOM. During periods of high river flow, spill volumes and the elevation of McNary reservoir may need to be manipulated on a daily or every-other-day basis to provide safe conditions for loading the fish barge at the juvenile fish facility below the dam.

1.2 Doble Tests. Two transformer banks, T4, T5 and the respective turbine units will be taken out of service for Doble testing in 2010. Turbine units 7 and 8 will be unavailable for up to 4 days during T4 testing between 20 and 24 September 2010. Turbine units 9 and 10 will be out of service for up to four days during T5 testing 30 August to 2 September 2010. There may be some overlap between the 2 tests. Since McNary Dam has multiple transformer banks and transmission lines, and redundant switching capability, most turbine units will be available for operation during these tests. Turbine unit 1% efficiency operations and turbine priorities will continue to follow fish passage plan requirements. Outage dates will be coordinated with the region as they become available.

1.3 TSW Installation. TSW2 will remain in spillbay 20 for the spring fish passage season and will be removed for the summer fish passage season. TSW1 will be in Spillbay 19 for the spring fish passage season and also be removed for the summer fish passage season. The spill pattern for spring will be the same as 2008, but may be modified for the summer passage season.

1.4 Headgate Repair. This is a long term program to return the headgates to a safe operating condition by adding new roller chain, seals, anodes, and other miscellaneous components. The plan will require short unit outages throughout the year while transporting rebuilt gates from the turbine units to the repair pit and vice versa. Each swap will take from 4 to 6 hours to complete, and take place approximately every 2 months. Headgate movements are to take place concurrently with other outages as they occur, and no special operations outside the Fish Passage Plan are expected.

1.5 Navigation – Fish barge transit of tailrace. In order to safely allow juvenile fish barges to pass across the spillway tailrace, the project may temporarily reduce spill (to 0 kcfs if necessary) to safely allow the juvenile fish barge to transit the tailrace from the navigation lock and tie up at the loading facility. Once the barge is loaded

¹ The purpose of this section is to notify regional interests of planned activities that will or may affect fish passage. Further coordination may occur as needed.

and ready to leave the facility, spill may again be reduced as needed until the barge has safely departed. Departure usually takes about 30 minutes to complete.

1.6 Waterfowl Nesting. From the end of April to the beginning of July, the McNary pool may be restricted to operations to elevations between 337.0 and 340.0 feet in support of waterfowl nesting on Lake Wallula. Pool elevations are also operated between 338.5 and 339.5 feet at least once every 4 days during daylight hours for a period of 4 to 6 hours. A yearly teletype has been issued to regulate the McNary pool in this fashion since at least 1982.

1.7 New 230 kv Transformer Installation: Installation of new main unit transformers for transformer banks T1 and T2, 3 transformers per bank, will be in the period July 2010-Oct 2010. The T2 transformer work is 1 July to 31 Aug 2010. The Government will shut down generator units 3 and 4 and de-energize transformer bank T2 on 1 July 2010. The installation for T2 is estimated to be complete and system in commercial operation not later than 31 August 2010. The T1 transformer work is 1 Sept. to 31 Oct. 2010. The Government will shut down generator units 1 and 2 and de-energize transformer bank T1 on 1 Sept. 2010. The installation for T1 is estimated to be complete and system in commercial operation not later than 31 October 2010.

1.8 Steady State Model Validation Testing. Western Electricity Coordinating Council requires steady state model validation testing on a periodic basis to ensure the generating equipment will meet real and reactive power ratings. All units will be tested on a 1-2 year cycle. Test will involve running the unit out of fish priority sequence and outside the 1% criteria. Testing can take place at any time except from 1 April to 31 August due to fish considerations. Tests will preferably be conducted just after unit annual maintenance, but may happen at other times. Tests will last for a standard of 30 minutes at maximum load with additional time to run the unit along the maximum real/reactive power curve to the minimum settings. Total test time is anticipated to be 90 minutes or less. Test durations will be minimized to the extent possible and will only be run for the purpose of completing the required model validation testing.

1.9 Model Validation (Governor Step response) Western Electricity Coordinating Council (WECC) requires a Governor response calibration to ensure the generating equipment responds as planned to system requirements and disturbances. Unit calibrations will be accomplished on all six units at Lower Granite. Calibration will involve running each unit in the manual GDACS mode and stepping the MW set point by 5 MW through the 1% range. To accomplish this, at least two other units will need to be operating in automatic to ensure a steady plant output while stepping through the operating range. This may result in operating units out of the sequence of the fish season priorities when calibrating units 4-6 if there is not sufficient water to operate four units. Each unit's calibration is expected to take approximately 1 day. Calibration will take place between March 29 and April 16.

- 1.10 Transient Model Validation (Exciter Step Response) McNary.** Western Electricity Coordinating Council requires model validation testing on a five year minimum cycle to ensure the generating equipment responds to as planned to system requirements and disturbances. Unit tests will be accomplished on all 14 units at McNary. Testing will involve running the test unit out of fish priority sequence and outside the 1% criteria. Testing will take place at some time from October 1 to April 1 or at night during September; each unit will be run for approximately 1 hour with 30 minutes outside the 1% criteria. Test durations will be minimized to the extent possible.
- 1.11 Precise Level Surveys.** Dam safety has scheduled the performance of Precise Level surveys at McNary Lock and Dam, in the February/March/April 2010 time frame. This requires the contracted surveyors to have a direct line of sight across the top of the embankment and roadway deck of the powerhouse, spillway, non-overflow sections, and Navigation lock and that the brass cap survey markers do not have anything set over the top of them.
- 1.12 Bridge Inspections.** Bridges as appurtenance structures to the dam are inspected every two years based on the Federal DOT Bridge Inspection Program. Those Bridges include the Navigation lock upstream split Bascule Bridge, and the Fish Ladder Section 5 and Section 22 Bridge. Inspections require using a boat to inspect under the bridge in the Navigation forebay or the use of a snooper truck from the road way deck. No underwater inspection of piers will be accomplished.
- 1.13 Periodic Inspection.** McNary Lock and Dam is scheduled to be inspected on March 23 & 24, 2009. Most of the inspection is land based, but on the morning of March 23 we will be inspecting the upstream and downstream face of the concrete dam, shore line, and embankment slope protection (RIP RAP) by boat. We will request that the McNary Pool be lowered to as close to 335 as possible as well as having a tailwater as low as possible. It may only be possible to get a forebay of between 336.5 or 337, but our goal is to get it as low as reasonably possible to expose as much areas of the project to look for damage. These inspections are accomplished once every five years and are being schedule prior to spilling for fish. We will also test the McNary spillway emergency generator prior to this inspection date. During the test we will raise as many of the spillway lift gates as possible with emergency power to maximize power usage and then close them.
- 1.14 Unit 2 and 7 rewind.** Units 2 and 7 will be taken out of service July 1, 2010 through January 1, 2011 for winding and various other electrical and mechanical component replacements from the old excitation system down to the wicked gate servomotors. The McNary project intends to perform cavitation repair on these same units during the outage.
- 1.15 Asbestos Abatement.** Units 2 and 7 will be taken out of service for asbestos abatement/cleanup for 1 month in March 2010.

2 Studies.

2.1 Developing a separator for Juvenile Lamprey. This study will require access to fish collection facilities at McNary Dam and access to the fish collection channel and orifice trap. In addition, project assistance may be needed to obtain lamprey from bypass collection operations. No special turbine or spill operations will be necessary as all work will take place within the collection channel. Project assistance may be required during installation and removal of test screen material in the JBS exit raceways. Pacific lamprey macrophthalmia and ammocoetes collected at the JBS are inadvertently transported downstream during barging and trucking operations to transport juvenile salmonids past dams. The ability to separate lamprey at these operations would allow release of both anadromous and resident lamprey juveniles back into the river after collection. Methods to separate lamprey at JBS exit raceways may provide insights into ways to reduce other sources of juvenile lamprey mortality at dams. Study is to continue in 2010, may be moved to Lower Monumental raceway.

2.2 Evaluation of Adult Pacific Lamprey Passage Success at McNary and Lower Snake River Dams. This study will evaluate passage success for adult Pacific lamprey *Lampetra tridentata* at McNary Dam, Ice Harbor Dam, and the remaining lower Snake River dams and associated river segments using a combination of radio telemetry and half duplex passive integrated transponder (HD PIT) systems. Adult lamprey will be trapped in adult fishways at McNary dams, held and then tagged at the juvenile smolt sampling facility prior to release. This study will require McNary, Ice Harbor and potentially other Snake River dams to provide power for electronics equipment in the fishways and tailrace areas, access for the installation, repair, and testing of electronic and trapping equipment and access for the downloading of data from radio and PIT tag detection equipment. Some project crane support may be needed to install antennas in and near fishways. Maintenance and installation of equipment will occur during the winter maintenance period when adult fishways are dewatered. Work is continuing in 2010.

2.3 Video Monitoring of Adult Fish Ladder Modifications to Improve Pacific Lamprey Passage at the McNary Dam Oregon Shore Fishway, 2010. The Corps is planning to make some modifications to the Oregon shore fish ladder at McNary dam with the intent of improving upstream lamprey passage (reduce delay and increase ladder passage success). Modifications are planned in the tilting weir section of the upper Oregon shore fish ladder where a total of nine stem walls that support the tilting weirs will be modified to include lamprey orifices; two orifices per stem wall totaling 18 orifices. In addition to the lamprey orifices, metal plating will be installed over the top of three diffuser grating sections to aid lamprey attachment and improve lamprey passage at diffusers 12, 13, and 14 (between weirs 265-266, 268-269, and 271-272). This study will use video monitoring to determine if these new lamprey orifices delay or harm migrating ESA listed salmon and steelhead. Video monitoring will be used to determine if salmon and steelhead attempt to pass the lamprey orifices or are attracted to and thus delay passage as a result of attempted passage. Therefore,

cameras will need to be positioned to capture video of fish behavior immediately downstream of weirs 335 and 336 and at one diffuser plating location.

This study will require McNary to provide power for electronics equipment in the fishways, access for the installation, repair, and testing of electronic equipment and access for the downloading of data from video camera equipment. Some project support may be needed to install video cameras in and near fishways. Maintenance and installation of equipment will occur during the winter maintenance period when adult fishways are dewatered. Work is new in 2010.

2.4 Evaluation of Juvenile Salmonid Condition (descaling) Under Different Turbine Operating Conditions at McNary Dam. This study will generate fish condition information for run-of-the-river yearling and subyearling Chinook salmon, sockeye salmon, Coho salmon, and steelhead collected from orifice traps attached to the “A” gatewells in turbine units 4 and 5 at McNary Dam. The turbines will be operated at either the Best Operating Point (BOP) (13,400 – 14,000 cfs), or within 1% of the peak efficiency turbine rating curve (maximum of 12,355 cfs), depending on forebay head. Fish sampling and evaluations will begin on 1 May or as soon as sufficient numbers of fish are available and will continue through 30 June or until rising water temperatures limit the general handling of juvenile salmonids (typically this is not until early to mid-July).

2.5 Evaluation of Juvenile Salmonid Gatewell Egress Using Updated Orifice Lighting Treatments at McNary Dam. This study will compare gatewell egress rates for juvenile run-of-the-river yearling and subyearling Chinook salmon, sockeye salmon, Coho salmon and steelhead under different orifice lighting treatments. The test gatewell at unit 6, slot B will be equipped with a standard vertical barrier screen (VBS) and extended length bar screen (ESBS). Fish will be collected and PIT tagged at the Juvenile Fish Collection Facility at McNary Dam. Gatewell egress will be measured with an in-line PIT detection system installed in the existing orifice trap at gatewell 6B and compared to each light treatment. During testing, unit 6 will be operated at 62 MW. Results of this study may result in improved orifice lighting strategies for future applications to USACE projects on the Snake and Columbia Rivers.

The existing orifice trap will need to be modified in order to inject light into the orifice or to have a light device attached to the gatewell side of the orifice. Orifice trap modifications to the bypass channel will occur during the period when the orifice flow into the channel is shut down (January – March, 2010). Turbine loading will need to be held as constant as practicable at 62 MW. All fish for the study will be collected at McNary Dam. Changes in daily smolt monitoring sampling schedule and sample rates may be requested to meet daily target numbers for tagging. Collection operations at McNary Dam during April through July will be coordinated with the Project Fishery Biologist and the Smolt Monitoring Program personnel. NMFS personnel will require access to the juvenile fish collection channel at all hours during the orifice trap installation and study period.