APPENDIX A: LOWER GRANITE

Lower Granite Dam[1]

1Special Project Operations.

1.1Spill. 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 Lower Granite 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.

1.2Doble Tests. Transformer bank T1 and turbine units 1, 2, 3, and 4 will be taken out of service for Doble testing in 2010. The outage is tentatively scheduled for 16-20 August 2010. This work will require a total powerhouse outage, and 100% spill (except for station service) for up to 4 hours. By then, all clearance tags should be hung, and the line could be re-energized allowing generation availability of Units 5 and 6. Turbine unit 1% efficiency operations and turbine priorities will continue to follow fish passage plan requirements during these tests. Another total plant outage will be required on the last day of testing to remove clearance tags and restore T1 bank.

1.3Navigation at Lower Granite Dam. When spill at Lower Granite is greater than 60 kcfs, there is a danger of having the fish barge being pushed upstream into the dam, causing a hazardous situation. Under these conditions, spill is reduced to 60 kcfs when fish transport barges approach or leave the barge dock. This reduction should be limited to no more than 1 hour. The project biologist will notify the control room prior to a barge leaving the loading dock so that spill can be reduced.

1.4 Precise Level Surveys. Dam safety has scheduled the performance of Precise Level surveys at Lower Granite 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.

1.5 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 spillway road way deck bridges and the spillway gate trunnion pedestrian bridges, the Navigation lock downstream Bridge, and the south shore project access Bridges, and upstream construction facility Bridge. Inspections require using a boat to inspect under the bridge in the spillway forebay or the use of a snooper truck from the road way deck. No underwater inspection of piers will be

[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.

accomplished. Inspection of the spillway bridges will be attempted to be accomplished before the spill season.

1.6 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.

1.7 Transient Model Validation (Exciter Step Response) Lower Granite. 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 6 units at Lower Granite. 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.

1.8 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.

1.9 Unit 3 rewind. Unit 3 will be rewound and will be out of service between July 1, 2010 and December 31, 2010. Additionally, Unit 3 will be out of service for asbestos abatement March 1, 2010 to March 31, 2010.

1.10 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.

2 Studies.

2.1 A study to compare seasonal SARs of early in-river migrating versus transported Snake River yearling anadromous salmonids. A study will be conducted to determine seasonal effects of transporting fish from the Snake River to optimize a transportation strategy. At Lower Granite, fish will be collected for this study starting on approximately April 5, with marking beginning on April 6, 2010. Depending on the number of fish available, fish will be collected 1-2 days with tagging occurring on the day following collection. A barge will leave each Thursday morning with all fish collected during the previous 1-3 days. By barging all fish (minus the in-river group) during 1 to 3 days of collection, barge densities will be maintained at a level similar to what would occur under normal transport operations that time of year. This pattern will occur in the weeks preceding general transportation and will be incorporated into general transportation once that operation begins. The desired transported sample size is 6,000 wild Chinook and 4,000 - 6,000 wild steelhead weekly for approximately eight weeks.

2.2 Bull Trout PIT Tag Study. Incidental bull trout passing through the Lower Granite Juvenile Fish Facility will be collected and held for PIT tag insertion, the released to the Lower Granite primary bypass outfall. Project duration begins and ends with scheduled juvenile fish facility operations. No special turbine or spill operations will be necessary. Study continues in 2010.

2.3 A study to compare SARs of Snake River fall Chinook salmon under alternative transportation and dam operational strategies. A sample of Subyearling Chinook salmon will be collected at Lower Granite juvenile fish facility using the sort by code system. Fish will be measured and compared to fish captured at Bonneville Dam to determine growth for in-river migrants. Sort by code will also be used to collect holdover fall Chinook juveniles in the spring. Scale samples will be collected from returning adults at the adult trap using sort by code.

2.4 Kelt reconditioning / transportation. Provide assistance to post spawn steelhead collected at Lower Granite separator either by transportation, temporary rearing and feed, or other measures to determine the feasibility and success of these alternatives for rehabilitation to support increased steelhead population growth.

2.5 A Study to Evaluate Hydropower System-related Latent Mortality Associated with Passage of Yearling Chinook Salmon Smolts through Snake River Dams. This study will test the hypothesis of hydropower system-related latent mortality that was promoted as an explanation for the difference in life-cycle productivity between upstream and downstream populations of spring/summer Chinook salmon prior to and

after dam construction. Three groups of hatchery-reared yearling Chinook salmon smolts will be PIT tagged at Lower Granite Dam on the Snake River. One group will be transferred by truck and released below Ice Harbor Dam; a second group will be transported an identical amount of time by truck before being released into the Lower Granite Dam tailrace; a third group will be released into the Lower Granite Dam tailrace without having been transported by truck.