Lower Granite Dam[1]

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 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.

1.2 Navigation Lock Outage. Scheduled navigation lock outage for 2011 is January 17 – March 13.

1.3 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.

1.4 Trilateration Surveys. Dam safety has scheduled the performance of Trilateration surveys at Lower Granite Lock and Dam, in the February/March/April 2011 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 Periodic Inspection. Lower Granite Lock and Dam is scheduled to be inspected on March 22 2011. Most of the inspection is land based, but on the morning of March 22 the upstream and downstream face of the concrete dam, shore line, and embankment slope protection (RIP RAP) will be inspected by boat. We will request that the Lower Granite Pool be lowered to as close to 733 as possible as well as having a tailwater as low as possible. 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. The Lower Granite spillway emergency generator will also be inspected. During the test we will raise as many of the spillway gates as possible with emergency power to maximize power usage and then close them.

[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.

1.6 Transient Model Validation 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 3 units. 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 in July or August; 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.

1.7 Cavitation repair. Unit 3 will undergo cavitation repair and will be out of service between July 1, 2011 and November 11, 2011. Unit 5 will undergo cavitation repair from mid November 2011 to March 2012.

1.8 Installation of Fiber Optic cable Lower Granite. If the installation cannot be accomplished prior to the fish season a 12 day outage of LWG will occur during the first half of August to allow a fiber optic cable to be run from the substation to the dam. This outage will require the project to run one unit speed no load and spill the rest for the duration of the outage. Final coordination of this operation will occur at FPOM.

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 4, with marking beginning on April 5, 2011. 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 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.

2.3 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 was completed in 2010, and will be repeated at the similar level of effort in 2011. During the 2011 smolt passage season, CRITFC researchers initiating a kelt acoustic tag telemetry study from three Clearwater River streams through Lower Granite dam. A single barge supported hydrophone array will be operated in both the entrance gate upriver of the forebay BRZ and the exit gate downriver of the tailrace BRZ.

2.4 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.

2.5 A study to evaluate straying behavior in steelhead. In 2011 and 2012, juvenile steelhead will be collected for physiological monitoring at several points during barging to assess imprinting-associated changes in the olfactory system and endocrine physiology. Specifically, fish will be collected at Lower Granite Dam prior to barging, every 12 hours during barging, and as fish are released at Bonneville Dam. At each sampling point, 20 fish will be euthanized and olfactory rosettes and bulbs will be collected for subsequent mRNA analysis of imprinting-associated genes. Blood plasma will be collected and frozen for later analysis of thyroid hormone levels, and gill filaments will be collected to assess Na+,K+ ATPase levels as an indicator of smolting. Equivalent in-stream migrants will be collected at Lower Granite Dam and at the juvenile fish bypass and monitoring facility at Bonneville Dam.

2.6 A study to identify overwintering behavior of Fall Chinook salmon. Adult fall Chinook salmon collected at the Lower Granite adult trap in fall 2011 would be sampled for otoliths at Lyons Ferry Hatchery. Otolith microchemistry would be used to assess juvenile overwintering location of these returning adults. Comparisons between natural and surrogate overwintering behavior would be made to assess similarity (and thus appropriateness) of using hatchery origin fish (surrogates) to make management decisions with respect to natural origin fish.

2.7 Developing Half-Duplex PIT Tag Antennas at Fishway Entrances and Exits at Lower Granite Dam. New lamprey Half-Duplex PIT Tag antennas will be installed near fish way entrances and the exit during the winter maintenance period at Lower Granite Dam. This study will require Lower Granite 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 2011.