

APPENDIX A

SPECIAL PROJECT OPERATIONS AND STUDIES

APPENDIX A: BONNEVILLE

Bonneville Dam

1. Special Project Operations.

Low water supply in the Columbia River Basin forecast for 2001, coupled with unusual power system conditions (described in Overview section 1.2, page OV-2), may result in modifications to the special project operations and studies described below. RCC will coordinate needed changes with the projects and authorize operations in teletype regulations.

1.1. Spring Creek Hatchery Release. The first hatchery release is expected to occur in mid-March, followed by spill for juvenile fish passage until such time as passage rates drop back to low levels. Spill levels and duration of special operations will be determined in coordination with fish agencies through TMT. Project operations for fish passage will be defined by RCC teletype prior to the release.

1.2. Spill. Spill will be provided continuously from April 10 through August 31 for spring and summer migrants as required in the NMFS Biological Opinions. Daytime spill (see FPP Section 2, Table BON-6 for spill hours) for juvenile fish passage will be 75,000 cfs and nighttime spill will be up to the 120% TDG cap (approximately 95,000 to 120,000 cfs). Discussions are ongoing concerning the daytime spill cap that was established to minimize adult fish fallback, and operation considering river and power conditions expected in 2001.

2. Studies.

2.1. Prototype Testing of ESBS at Bonneville First Powerhouse. In 2001, prototype testing of ESBS, streamlined trash racks, and new VBS will be continued at Bonneville I in MU8. Installation of ESBS and VBS will occur prior to the fish passage season.

FGE testing (NMFS) will begin approximately April 15 and conclude approximately July 15, depending on the number of fish collected. FGE tests will be conducted at night and will require the unit to be shut down for short periods nightly for removal and placement of fyke nets in the emergency bulkhead slot. This outage will be approximately one hour to place the fyke net, and one hour to remove the net nightly.

In addition to the fyke net test above, hydroacoustics will be used to estimate FGE (WES and PNNL). For the WES

deployment, transducers will be installed both on the ESBS and on the trash racks prior to the test start date of 24 April. Testing will be completed on 14 July. Installation on both the trash racks and ESBS will be concurrent with their delivery and will require a one-day outage. As always, several outages should be expected throughout the testing season to repair equipment.

The PNNL deployment will require a one-day unit outage to install 3 upward looking transducers to the lowest trash rack of slot 8B with a diver. In addition to the 3 upward looking transducers, a traversing split beam transducer will be mounted on a frame that will be lowered into the trash rack guides of 8B. This will allow the multiplexing split beam system to measure juvenile salmonid behavior in the near field regions upstream of the streamlined trash racks.

It is expected that Unit 8 will be available for normal operation during non-testing periods as a last on, first off operation to meet project/regional needs.

Also additional outages will be required to remove and inspect the ESBS. The timing of these outages has not been determined, but may be as frequent as weekly during the testing period. These outages are expected to be short duration (2 - 3 hours) and limited to the time required to remove, inspect, and replace the ESBS.

2.2. Bonneville Rehab Biological Testing (also testing under the Turbine Survival Program). A repeat of the biological testing of the minimum gap runner installed in unit 6 is scheduled for fall of 2001. In addition to the biological testing, there will need to be commission testing in both units 4 and 10. The units will undergo a series of pre-startup tests that will require each unit's STSs to be removed. A normal pre-start scenario is to mechanically roll the unit for 1 day. After the unit has been deemed structurally sound, the unit will be HIPOT tested for 2-3 days. After this test series is complete the unit is subjected to several load rejection tests that require the STSs to be removed (2 days). The unit's STSs will be reinstalled and then be advanced to a 72 hour run test, followed by the 100 day commissioning test.

2.3. Lower Columbia River Adult Study. Adult salmon, steelhead and lamprey will be captured at the adult fish monitoring facility and tagged with radio transmitters from April through October 2001. In addition to assessing general migration characteristics, there are three salmon and steelhead elements that are specific to Bonneville Dam. They include an evaluation of potential south shore fishway exit sites,

assessing the effects of closing the First Powerhouse collection channel orifice and sluice gates, and evaluating the effects of dam passage and fallback on adult spring chinook energy expenditure. For the south shore exit evaluation, 10 fish per species, per week will be released at two sites along the new navigation lock wing wall. Their behavior and migrations paths will be evaluated using fixed receivers and by mobile tracking. Access to boating restricted zones (BRZ) will be required. For the collection channel gate evaluation, we will compare project and powerhouse passage times between orifice/sluice gate open versus closed conditions. This test will utilize a randomized block design, with 3-day treatments within 6-day blocks. The test will run the entire study period (April - October). To evaluate adult salmon energy expenditure, approximately 100 spring chinook will be tagged with electromyogram radio transmitters and released above and below the dam throughout the spring migration period (April - June). These fish will be monitored using both fixed gear and by mobile tracking. Again, access to the BRZ will be required.

Adult Pacific lamprey passage will be evaluated using radio telemetry. Two modifications to adult fishways will be assessed for their potential to improve passage success. Nighttime passage into the Cascades and Bradford Island fishways will be tested under two entrance heads. Entrance head will be lowered to 0.5 ft. between 2200 hours and 0430 hours on even days from April 4 to September 30 at Bradford Island. This operation will occur between 2200 hours and 0430 hours on odd days from April 4 to September 30 at Cascades Island. Entrance head will remain within FPP criteria (1.0-2.0 ft.) during all other days and times. In addition to evaluating reduced entrance head, a strip of 12" wide plating will be installed on diffuser gratings from Washington shore's north upstream entrance (NUE) through the ladder's transition. Plating will be installed during the winter maintenance period using divers. Passage success and times through the area will be compared to those of adjacent entrances, and with previous years.

2.4. Fish Passage Efficiency (FPE). FPE research will be conducted at all three structures (First Powerhouse, Second Powerhouse, and Spillway) to evaluate FPE for the spring and summer passage seasons. Primary evaluation techniques will be hydroacoustics and radio telemeter. No specific project operations or unit priorities are needed for this study. However, unit outages will be required for the installation and removal of monitoring equipment. Further, unit outages likely will be needed to fix broken or non-functional equipment within the evaluation timeframe (April through July).

2.5. Movement, Distribution, and Passage Behavior of Radio-Tagged Juvenile Salmonids at Bonneville Dam Associated with the Surface Bypass Program. Access to the project Boat Restricted Zone (BRZ) will be required for conducting this study. Besides this, no specific operational requirements are expected.

2.6. Flat Plate PIT Tag Detection of Juvenile Salmonids at the First Powerhouse Smolt Monitoring DSM. The installation and testing of this equipment is not expected to require any special project operations. However, since this program is in the developmental phase, and water control within the DSM is questionable, possible problems with the operation may arise. In the case of needed repairs to the system, one or two occasions of one or two-hour reversal of flow through this system may be required to adjust the equipment. No serious effects to fish passage are expected.

2.7. Yearling Chinook Delayed Mortality Evaluation. A pilot study to assess the effects of juvenile fish transportation and passage through bypass systems will be conducted at the Second Powerhouse Smolt Monitoring Facility. Yearling chinook will be captured at the facility and placed into holding tanks supplied with artificial seawater. Fish will be held in these tanks from 4-6 months. This study will require no special project operations. It will run from approximately April through December.

2.8. Project Survival Evaluation. Project survival for juvenile fish, and route specific survival will be evaluated in 2001 at Bonneville lock and Dam. Primary technology will be radio telemetry, with both powerhouses and the spillway monitored. Route-specific survival will be evaluated for: (1) the new juvenile bypass system (collection channel downstream through the outfall), (2) spillway, (3) existing juvenile bypass system (JBS) at B1 (collection channel downstream through the outfall), and (4) through one Minimum Gap Runner (MGR) turbine units at B1 (priority will be main unit 6). Research at B1 JBS and MU 6 MGR will likely be spring passage season only.

Unit outages will be required for the installation and removal of monitoring equipment. Further, there will likely be the need for unit outages in order to fix broken or non-functional equipment within the evaluation timeframe (April through July). Specific project operations required will be main unit 6 as a priority unit for the spring passage season/evaluation. Main unit 6 will take the priority place of main unit 2.

2.9. Prototype Testing of FGE Improvements at Bonneville Second Powerhouse. In 2001, prototype testing of a turning vane, gap closure device, and larger VBS will be conducted. Testing will begin in late April and conclude in late July. FGE testing will be conducted nightly and will require the test unit to be shut down nightly for short periods for removal and placement of the fyke nets and STS. The required outage will be for approximately 1-2 hours.

In addition to the fyke net test above, hydroacoustics will be used to estimate FGE (WES and PNNL). For the WES deployment, transducers will be installed both on the STS and on the trash racks prior to the test start date. Testing will be completed on 14 July. Installation on both the trash racks and STS will require a one-day outage. As always, several outages should be expected throughout the testing season to repair equipment.

It is expected that the test unit will be available for normal operation during non-testing periods (unless significant fish injury is seen) to meet project/regional needs.

2.10. All dates shown are approximate and could be advanced or delayed by a week or so depending on various factors such as river flows, contractor schedules, equipment failures, etc. Some evaluations may not proceed. Therefore, a final description of studies and outages being conducted will be coordinated with the region through AFEP (FFDRWG and SRWG), prior to April 1. All special operation requests or schedule changes will be coordinated with the fisheries agencies and tribes through the AFEP and with RCC and BPA.

APPENDIX A: THE DALLES

The Dalles Dam

1. Special Project Operations

Low water supply in the Columbia River Basin forecast for 2001, coupled with unusual power system conditions (described in Overview section 1.2, page OV-2), may result in modifications to the special project operations and studies described below. RCC will coordinate needed changes with the projects and authorize operations in teletype regulations.

1.1. Spill. Spill will be provided continuously from April 10 through August 31 for spring and summer migrants as required in the NMFS BiOp. Actual spill levels are being developed as part of ESA coordination on hydrosystem operations to protect multiple listed species. They will be provided in a manner consistent with TDG management to avoid excessive gas supersaturation conditions.

2. Studies.

At the time of FPP publication, regional coordination for spill and survival studies at The Dalles Dam was ongoing. It is not anticipated, however, that special spillway operations for testing purposes will be requested in 2001. The ice and trash sluiceway forebay gates 1-1, 1-2, and 1-3 also will be open continuously throughout the study period. Additionally, intake occlusions will be evaluated for their ability to decrease turbine entrainment. The occlusion structures will be placed in front of both fish units and main units 1-5. All structures will be kept in place or removed above the water according to a random block design. Each treatment will last three days, a block will last six days. One full day will likely be required to move the occlusions in or out to set up for the next treatment. The turbine unit at an intake occlusion will need to be shut down each time the structure is moved.

2.1. Project Survival Evaluation. Survival studies will be conducted at The Dalles Dam spillway and powerhouse. These studies are currently under discussion within the region, and have not yet been developed.

2.2. FPE and Blocked Trashrack Evaluations. FPE will be evaluated at The Dalles Dam using hydroacoustic and radio telemetry techniques. Unit outages for deployment of equipment will be required beginning in April and will likely include outages of most units to accommodate diver mounted equipment.

In-season outages may also be required for equipment repair. Hydroacoustic and Telemetry equipment will also be deployed at the spillway. Equipment will be removed after the study and will require similar outages as installation.

The Blocked Trashrack portion of the study will take advantage of the equipment for other studies, but may need additional outage of Units 1-5 for additional deployment of equipment. Main units 1-5 will be operated on a first on/last off operational priority during the test period.

2.3. Behavioral Studies. Tracking split-beam sonar will be used to collect data within 15 m of the sluiceway. An acoustic Doppler current profiler will also be deployed near the sluiceway to monitor real time hydraulics. These studies are under development.

2.4. Adult Salmon and Steelhead Passage Evaluations. Radio telemetry techniques will be used to evaluate adult salmon and steelhead passage through the project. A second year of evaluating the effect of closing all powerhouse collection channel floating orifices will be conducted in 2001. Entrance use and passage times will be monitored and compared to previous years' data to ensure that closing the floating orifice gates does not adversely affect adult migrant passage.

2.5. Equipment Installation and Maintenance. Installation of hydroacoustic transducers, radio telemetry equipment, and the release mechanisms for the survival studies will begin in March at The Dalles Dam. Installation of spillway transducers will occur between mid-March and mid-April, spill gates will need to be closed for the installation. The gate in one bay at a time will be closed. Installation of hydroacoustic equipment at the powerhouse and sluiceway will require turbine unit outages to allow for diver access. It will take approximately two weeks in late March to install and align all of the transducers at the powerhouse. Three turbine units will be out of service for approximately 8 hours each day beginning at 0800 hrs. The fish units will be taken out of service on March 16 and 17 between 2000 and 0500 hours. Typically, we can expect approximately 12 transducer failures over the three-month period. Each failure will require a turbine unit outage of approximately four hours. If a dive is required to repair the problem, the two adjacent units will be out of service as well. Equipment will be removed between August 1 and 7 with procedures and outages similar to the installation outages discussed above, if it can be accomplished without manipulating the spill schedule. Equipment removal will be delayed until after the spill season if necessary to prevent interruptions to the other ongoing evaluations.

Additional turbine outages will be needed to install the tracking split-beam system. Units 1-3 likely will need to be turned off for half a day to install this system.

The number of spillway and turbine outages will be minimized as much as possible. We will attempt to install all equipment at a given location in one outage. However, this may not always be possible.

2.6. All dates shown are approximate and could be advanced or delayed by a week or so depending on various factors such as river flows, contractor schedules, equipment failures, etc. Some evaluations may not proceed. Therefore, a final description of studies and outages being conducted will be coordinated with the region through AFEP (FFDRWG and SRWG), prior to April 1. All special operation requests or schedule changes will be coordinated with the fisheries agencies and tribes through the AFEP and with RCC and BPA.

APPENDIX A: JOHN DAY

John Day Dam

1. Special Project Operations.

Low water supply in the Columbia River Basin forecast for 2001, coupled with unusual power system conditions (described in Overview section 1.2, page OV-2), may result in modifications to the special project operations and studies described below. RCC will coordinate needed changes with the projects and authorize operations in teletype regulations.

1.1. Spill. Spill will be provided from April 10 through August 31 for spring and summer migrants as required in the NMFS Biological Opinions or as modified to meet test conditions described in paragraph 2. Between May 15 and July 31, spill will occur from 1900 to 0600 hours (11 hours total). Before and after that time period, spill will be for 12 hours nightly, from 1800 to 0600 hours. At project flows up to 300,000 cfs, spill discharges will be 60% of instantaneous project flow. Above 300,000 cfs project flow, spill discharges will be 180,000 cfs (up to the hydraulic limit of the powerhouse). Spill will be provided in a manner consistent with TDG management to avoid excessive gas supersaturation conditions.

2. Studies.

At the time of FPP publication, regional coordination for spill and survival studies at John Day Dam was ongoing. Although the studies described below represent the current proposal, they may be modified upon completion of the regional coordination.

2.1. Project Survival and Fish Passage Efficiency Studies.

Radio telemetry will be used to survey fish behavior. For Survival and FPE studies, two spill conditions will be compared, in response to the BiOp measure to study 24-hour spill at John Day Dam. The specific spill levels and duration for the FPE study have not yet been agreed upon in the regional forum. Also the study may be withdrawn if daytime spill is not provided in 2001. Special operations required to support the survival and FPE studies will be conducted outside of the juvenile fish migration period to the extent practicable. However, there will be some modification to standard project operation. Boat access to the tailrace BRZ will be required. Radio telemetry evaluations will occur from May 1 through July 31 with a one-week break about the first

week of June.

2.2. Adult Salmon and Steelhead Passage Evaluations. Radio telemetry techniques will be used to evaluate adult salmon and steelhead passage through the project. Adult salmon and steelhead fallback rates will be evaluated during 24-hour spill for juvenile passage studies. The specific spill levels and duration for these studies have not yet been agreed upon in the regional forum. Fallback into the juvenile bypass system and through a modified section of the south ladder will be assessed. Downstream migration of post-spawn steelhead (kelts) will be evaluated using radio telemetry at John Day Dam. As part of this evaluation, adult steelhead passing through the juvenile bypass system will be diverted to the adult holding tank, identified as pre or post-spawn, and enumerated. Steelhead that have been identified as kelts will be tagged with radio transmitters and released back to the river.

2.3. All dates shown are approximate and could be advanced or delayed by a week or so depending on various factors such as river flows, contractor schedules, equipment failures, etc. Some evaluations may not proceed. Therefore, a final description of studies and outages being conducted will be coordinated with the region through AFEP (FFDRWG and SRWG), prior to April 1. All special operation requests or schedule changes will be coordinated with the fisheries agencies and tribes through the AFEP and with RCC and BPA.

APPENDIX A: MCNARY

McNary Dam

1. Special Project Operations.

Low water supply in the Columbia River Basin forecast for 2001, coupled with unusual power system conditions (described in Overview section 1.2, page OV-2), may result in modifications to the special project operations and studies described below. RCC will coordinate needed changes with the projects and authorize operations in teletype regulations.

1.1. Spill. Spill for fish passage will be provided during the spring outmigration season, in accordance with spill specifications in the NMFS BiOp (Appendix E) as updated in 2001 through the TMT Water Management Plan. Special daytime or nighttime spill patterns may be implemented to control dissolved gas levels to agreed upon levels, while attempting to achieve desired spillway discharges. Alternative spill patterns to reduce TDG levels or to change tailrace conditions for fish passage should be coordinated through the TMT.

1.2. Doble Tests. Transformer banks 4 and 6 will be taken out of service, one at a time, and Doble tested in October 2001. The two corresponding turbine units (7 and 8, and 11 and 12) for each transformer bank will be out of service during the testing. Testing will take approximately 3 days per transformer bank.

1.3. Inspection of the Upstream Face of the Dam and the Embankment Riprap. The upstream concrete face of the dam's embankment riprap is to be inspected by boat on or around April 11, 2001. The forebay water level will need to be near elevation 337 for the inspection.

1.4. Installation of Bulkheads in Juvenile Collection Channel. The ice and trash sluiceway gates along the McNary juvenile collection channel will be replaced with taller bulkheads between October 1, 2000 and March 15, 2001. The Contractor will start at turbine unit 14 and work towards turbine unit 1.

1.5. Extended Submersible Bar Screen (ESBS) Perforated Plate Replacements. The perforated plates on the ESBS's will be replaced between November 2000 and July 2001. After the juvenile fish season begins (April 1), one ESBS will be worked on at a time. The spare ESBS will be used while each of the other ESBS's are undergoing repair. Therefore, there will not be a spare ESBS available during the ESBS rehabilitation work. Turbine unit outages of short duration will be required to pull the ESBS's from the gatewell slots and to install the ESBS's.

1.6. Adult Fishway Bulkhead Replacement. The adult collection channel bulkheads will be replaced during the 2001 winter maintenance period. This work will allow the project staff to dewater the entire adult collection channel and inspect it during the winter maintenance periods after the year 2002.

2. Studies.

2.1. Effects of Extended Length Screens on the Behavior of Pacific Lamprey. This study is to determine if ESBS's impact Pacific lamprey at McNary Dam. The contractor will use video equipment to monitor the surfaces of the test ESBS and will evaluate lamprey behavior if they come in contact with the extended length submerged bar screen (ESBS) and during operation of the cleaning brushes. Six video cameras with lights will be installed on the brush-cleaning bar. In order to access the screens for installation and removal of equipment, turbine unit outages will be required during the fish season. Camera installation may be coordinated with other screen work to reduce the impacts to project operation.

2.2. Ice Harbor Spillway Survival Study. Radio tagged chinook salmon will be used to determine spillway survival at Ice Harbor Dam. Monitoring of these fish will continue at McNary Dam. Radio antennas will be mounted on the pier noses at the spillway. Divers will bolt steel pipes to each pier nose. This work will require a spillway outage during the middle of March 2001. If river flow prevents a total spillway outage, a rolling partial spillway outage will be necessary.

2.3. Juvenile Bypass Study. National Marine Fisheries Service will collect and tag subyearling chinook at McNary juvenile fish facility. These fish will be released into randomly selected gatewells and monitored to determine how long it takes them to pass through the facility.

2.4. Existing Style Separator Development. A separator insert composed of the best combination of separator improvements developed from previous separator research will be inserted into the McNary separator. This work will require access and coordination for the pre-season installation. Work will begin in mid-April and continue through August. NMFS will alternate the operation of the separator between the normal separator operation and the insert. During switching of the insert the juvenile fish facility will be placed into primary bypass operation.

2.5. Prototype Testing of a Cylindrical Dewatering Screen. A prototype cylindrical dewatering structure was constructed on the tailrace deck adjacent to turbine unit 14 in 2000. National

Marine Fisheries Service and the Corps will evaluate the biological and debris handling performance of the new prototype testing of the cylindrical dewatering structure. Fish for test purposes will be obtained by gatewell dipping. Debris used for the evaluation may be collected from the raceways at the juvenile fish facility, removed from the vertical barrier screens during periodic cleaning, or removed from the forebay operation.

APPENDIX A: ICE HARBOR

Ice Harbor Dam

1. Special Project Operations.

Low water supply in the Columbia River Basin forecast for 2001, coupled with unusual power system conditions (described in Overview section 1.2, page OV-2), may result in modifications to the special project operations and studies described below. RCC will coordinate needed changes with the projects and authorize operations in teletype regulations.

1.1. Spill. Spill for fish passage will be provided during spring and summer outmigration seasons, in accordance with spill specifications in the NMFS BiOp (Appendix E) as updated in 2001 through the TMT Water Management Plan. Special daytime and nighttime spill patterns may be implemented to control dissolved gas levels to agreed upon levels or to reduce tailrace eddying conditions, while attempting to achieve desired spillway discharges. Alternative spill patterns to reduce TDG levels or to change tailrace conditions for fish passage should be coordinated through the TMT.

1.2. Spillway Tainter Gate Inspection. A Contractor will inspect the Ice Harbor spillway tainter gates during November and December 2001, outside of the spill season. Each spill gate will be taken out of service, one at a time, and inspected. A clearance tag will be issued and stop logs installed to unwater each spillgate for inspection. All wells, beams, and welds will be inspected.

1.3. Doble Tests. Line 1 (TW1, TW2, and TJ0) will be taken out of service for Doble testing in November 2001. The two corresponding turbine units, 1 and 2, will be out of service during the testing. Testing will take approximately 3 days.

1.4. Submersible Traveling Screen (STS) Rehabilitation. A contractor will rehabilitate each STS during the December 2000 through September 2001 time period. One STS will be worked on at a time. The spare STS will be used while each of the other STS's are undergoing repair. Therefore, there will not be a spare STS available during the STS rehabilitation work. Turbine unit outages of short duration will be required for removing and installing STS's.

2. Studies.

2.1. Spillway Survival Study. Radio tags and PIT tags will be used to evaluate spillway survival at Ice Harbor and to partition

relative survival between Ice Harbor and McNary dams. Fish will be released at two different times during the day, morning and evening, and at different levels of spill. Fish will be tagged at Lower Monumental Dam and released into the spillway and tailrace at Ice Harbor Dam. Fish will be monitored with radio receivers through McNary reservoir and the PIT tag detection system at McNary Dam. Release hoses and support equipment will be installed in the spillway and tailrace at Ice Harbor Dam by April 1 and will remain in place until August. Turbine and/or spilling outages may be necessary for short periods if an antenna or receiver must be mounted on a spillway pier. Stable flow conditions will be required for one hour prior to and after fish releases.

2.2. High Velocity Prototype Separator Study. The prototype high velocity fish separator will be evaluated during 2001. Juvenile fish passing through the juvenile bypass system will be periodically diverted through the test facility as part of the evaluation. During non-test periods, juvenile fish will be bypassed through the main juvenile bypass flume. The study may require early operation of the prototype separator to test hydraulic conditions prior to the juvenile fish bypass season. During flow evaluations, all fish passing through the facilities will be bypassed directly back to the river with no additional handling.

2.3. Evaluation of Adult Salmon and Steelhead Migration Past the Snake and Columbia River Dams. Idaho Cooperative Fisheries Research Unit will monitor the passage of adult salmonids through the hydrosystem. This study will determine passage effectiveness with the newly completed spillway deflectors and training wall. Holding of adult fallbacks within the juvenile collection channel will also be evaluated. The study requires the installation of radio receivers and data loggers throughout the fishways and various locations on the dam. The installation of equipment will take place prior to the fish season and is not anticipated to require special project operations.

2.4. Evaluation of Homing of Transported Fish and of Adult Fish Migration Characteristics. If there are an insufficient amount of radio tagged adult fish entering the Snake River, supplemental tagging of adult fish is proposed for the evaluation of homing of transported fish and the evaluation of adult fish migration characteristics (depth and temperature monitoring tags). This will require the operation of the adult trap located in the Ice Harbor south shore fish ladder.

APPENDIX A: LOWER MONUMENTAL

Lower Monumental Dam

1. Special Project Operations.

Low water supply in the Columbia River Basin forecast for 2001, coupled with unusual power system conditions (described in Overview section 1.2, page OV-2), may result in modifications to the special project operations and studies described below. RCC will coordinate needed changes with the projects and authorize operations in teletype regulations.

1.1. Spill. Spill for fish passage will be provided during the spring outmigration season under certain conditions of higher flow, according to specifications in the NMFS BiOp (Appendix E) as updated in 2001 through the TMT Water Management Plan. Special nighttime spill patterns may be implemented to control dissolved gas levels to agreed upon levels, while attempting to achieve desired spillway discharges. Alternative spill patterns to reduce TDG levels or to change tailrace conditions for fish passage should be coordinated through the TMT. Nighttime spill levels may be reduced or curtailed for short periods of time on a daily or every other day basis in order to provide safe conditions for the towboat and fish barge to travel to and from the juvenile fish facilities and for loading the fish barge. Depending on flow levels, Lower Monumental pool may also need to be manipulated above MOP in order to control spill while the fish barge is loading.

General hydraulic model studies are being performed at Waterways Experimental Station. The results of these studies may lead to a request to alter the spill pattern to reduce stilling basin erosion damage.

1.2 Inspection of the Upstream Face of the Dam and Embankment

Riprap. The upstream concrete face of the dam and both the north and south embankment slope protection (riprap) will be inspected by boat on or around April 10, 2001. This work requires the forebay water level to be near elevation 537 feet (minimum operating pool) and the tailwater elevation to be near elevation 437 feet.

1.3. Doble Tests. The transmission line will be out of service for Doble testing and disconnect work in August 2001. This work will require all turbine units to be out of service at one time. The line will be reenergized each night and the turbine units on the transformer bank that is not being worked on will be operated. During the line outages, turbine unit 5 will be

operated at speed-no-load, to supply station power. This work will take approximately 8 days.

1.4. Stilling Basin Survey. A hydrographic survey of the Lower Monumental stilling basin will take place during August or September 2001. This work should take approximately 1 to 2 days (6 to 8 hours). Acoustic mapping techniques will be used to map areas of erosion within and around the stilling basin. The survey will be conducted during daylight hours and special operations will be required to minimize flow through the stilling basin area. No spill will be allowed and turbine units on the north end of the powerhouse will be operated. Fishway auxiliary water may need to be curtailed for short periods of time while areas near the fishway entrances are being surveyed.

1.5. Spillway Tainter Gate Inspection. A Contractor will inspect all the Lower Monumental spillway tainter gates during October and November 2001, outside of the spill season. Each spill gate will be taken out of service one at a time and inspected. A clearance tag will be issued and stop logs installed to unwater each spillgate for inspection. All wells, beams, and welds will be inspected.

1.6. Submersible Traveling Screen (STS) Rehabilitation. A contractor will rehabilitate each STS during the December 2000 through September 2001 time period. One STS will be worked on at a time. The spare STS will be used while each of the other STS's are undergoing repair. Therefore, there will not be a spare STS available during the STS rehabilitation work. Turbine unit outages of short duration will be required for removing and installing STS's.

2. Studies.

2.1. Evaluation of Adult Salmon and Steelhead Migration Past the Snake and Columbia River Dams. Idaho Cooperative Fisheries Research Unit will continue to monitor the passage of adult salmonids through the hydrosystem. The 5 floating orifices (1,3, 5, 7, and 9 numbered from north to south) are closed for the 2001 fish passage season. This will be the second year of this study. Installation of radio receivers and data loggers throughout the fishway and various locations on the dam will be required. The installation of equipment will take place prior to the fish passage season and is not anticipated to require special project operations.

2.2. Ice Harbor Spillway Survival Study. Juvenile fish will be removed from the Lower Monumental Dam daily sample and tagged

with radio tags and PIT tags for a spillway survival study at Ice Harbor Dam.

2.3. Adult Fishway Evaluation. A Walla Walla District Corps of Engineers hydraulic engineer has inspected the adult fishway system in January 2001. Field measurements will be taken in the spring and summer of 2001 and a final report will be completed in December 2001. The purpose of the study is to define the desired operating criteria, analyze the existing operating conditions, and investigate several alternatives to improve fish passage conditions.

2.4. Emergency Auxiliary Water Supply Study. Engineers from Northwest Hydraulic Consultants inspected the adult fishway system in January 2001. Fish pump tests will be performed during the last week of February to develop fish pump head and discharge characteristics from the field data collected. Field measurements will be taken in the spring and summer of 2001 to calibrate and verify the numerical computer models, which will be completed in December 2001.

APPENDIX A: LITTLE GOOSE

Little Goose Dam

1. Special Project Operations.

Low water supply in the Columbia River Basin forecast for 2001, coupled with unusual power system conditions (described in Overview section 1.2, page OV-2), may result in modifications to the special project operations and studies described below. RCC will coordinate needed changes with the projects and authorize operations in teletype regulations.

1.1. Spill. Spill for fish passage will be provided during the spring outmigration season under certain conditions of higher flow, according to specifications in the NMFS BiOp (Appendix E) as updated in 2001 through the TMT Water Management Plan. Special nighttime spill patterns may be implemented to control dissolved gas levels to agreed upon levels, while attempting to achieve desired spillway discharges. Alternative spill patterns to reduce TDG levels or to change tailrace conditions for fish passage should be coordinated through the TMT.

1.2. Doble Tests. The transformers will be taken out of service for Doble testing in September 2001. All turbine units will be out of service at the same time for part of the Doble testing. During this time, turbine unit 5 will be operated at speed, no load, to supply station power. Testing will take approximately 10 hours per day for 3 days. During non-testing hours, normal project operation will occur.

1.3. Spillway Tainter Gate Inspection. A contractor will inspect all the Little Goose spillway tainter gates during November 2001, outside of the spill season. A clearance tag will be issued and stop logs installed prior to dewatering and inspecting each spillway tainter gate. Each spill gate will be taken out of service one at a time and inspected. All wells, beams, and welds will be inspected.

1.4. Spillway Stilling Basin Inspection with Divers. A contractor will inspect the undermining downstream of the spillway roller basin at Little Goose Dam. This inspection will take 1 to 2 days. The dates of this inspection have not been determined. This work will not impact fish passage or dam operation.

1.5. Extended Submersible Bar Screen (ESBS) Perforated Plate Replacements. The perforated plates on the ESBS's will be replaced between November 2000 and April 1, 2001, but work could continue as late as June 2001. If work beyond April 1 is

required, one ESBS will be worked on at a time. The spare ESBS will be used while each of the other ESBS's are undergoing repair. Therefore, there will not be a spare ESBS available during the STS rehabilitation work. Turbine unit outages of short duration will be required for removing and installing ESBS's.

2. Studies.

2.1. Evaluation of Adult Salmon and Steelhead Migration Past the Snake and Columbia River Dams. Idaho Cooperative Fisheries Research Unit will continue to monitor the passage of adult salmonids through the hydrosystem. The 4 floating orifices (1, 4, 6, and 10 numbered from south to north end) are closed for the second year of this study. Installation of radio receivers and data loggers throughout the fishway and various locations on the dam will be required. The installation of equipment will take place prior to the fish season and are not anticipated to require special project operations.

2.2. Adult Fishway Evaluation. A Walla Walla District Corps of Engineers hydraulic engineer has inspected the adult fishway system in January 2001. Field measurements will be taken in the spring and summer of 2001 and a final report will be completed in December 2001. The purpose of the study is to define the desired operating criteria, analyze the existing operating conditions, and investigate several alternatives to improve fish passage conditions.

2.3. Emergency Auxiliary Water Supply Study. Engineers from Northwest Hydraulic Consultants inspected the adult fishway system in January 2001. Fish pump tests will be performed during the last week of February to develop fish pump head and discharge characteristics from the field data collected. Field measurements will be taken in the spring and summer of 2001 to calibrate and verify the numerical computer models, which will be completed in December 2001.

APPENDIX A: LOWER GRANITE

Lower Granite Dam

1. Special Project Operations.

Low water supply in the Columbia River Basin forecast for 2001, coupled with unusual power system conditions (described in Overview section 1.2, page OV-2), may result in modifications to the special project operations and studies described below. RCC will coordinate needed changes with the projects and authorize operations in teletype regulations.

1.1. Spill. Spill for fish passage will be provided during the spring outmigration season under certain conditions of higher flow, according to specifications in the NMFS Biological Opinion on hydrosystem operation (Appendix E) as updated in 2001 through the TMT Water Management Plan. Special nighttime spill patterns may be implemented to control dissolved gas levels to agreed upon levels, while attempting to achieve desired spillway discharges. Alternative spill patterns to reduce TDG levels or to change tailrace conditions for fish passage should be coordinated through the TMT. 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 facilities below the dam.

1.2. Doble Tests. Transformer banks 1 and 2 will be taken out of service for Doble testing in August 2001. All turbine units will be out of service during the Doble testing and turbine unit 5 will be operated at speed, no load, to supply station power. Testing will take approximately 10 hours per day for 3 days. Outside of testing hours, normal project operation will occur.

1.3. Inspection of the Upstream Face of the Dam and Embankment Riprap. The upstream concrete face of the dam and the north embankment slope protection (riprap) will be inspected by boat on or around May 8, 2001. This work requires the forebay water level to be near elevation 733 feet (minimum operating pool) and the tailwater elevation to be near elevation 633 feet.

1.4. Spillway Tainter Gate Inspection. A Contractor will inspect all the Lower Granite spillway tainter gates during October 2001, outside of the spill season. Each spill gate will be taken out of service one at a time and inspected. A clearance tag will be issued and stop logs installed to unwater each spillgate for inspection. All wells, beams, and welds will be inspected.

1.5. Seepage Repair West Lewiston Levee. The west Lewiston levee will be repaired during January through April 2001. The confluence elevation at Lewiston Idaho may be maintained below elevation 735 feet until after the repairs to the levee cutoff are made. This work will not affect dam operations or fish passage.

1.6. Extended Submersible Bar Screen (ESBS) Perforated Plate Replacements. The perforated plates on the ESBS's will be replaced between November 2000 and April 1, 2001, but work could continue as late as June 2001. If work continues beyond April 1, one ESBS will be worked on at a time. The spare ESBS will be used while each of the other ESBS's are undergoing repair. Therefore, there will not be a spare ESBS available during the STS rehabilitation work. Turbine unit outages of short duration will be required for removing and installing the ESBS's.

2. Studies.

2.1. Evaluation of Juvenile Fish Transportation Versus In-River Survival. Juvenile spring/summer chinook and steelhead will be PIT tagged at the juvenile fish collection facility and then released into the river below the project for either in-river migration or collection and transportation at Little Goose Dam. Most fish will be tagged out of the east bank of raceways in NMFS's temporary tagging facilities. Tagging of fish from the raceways will be independent of any other facility sampling operations and will reduce the number of fish direct loaded into fish barges. At the beginning and end of the tagging operation, when fish numbers are low, fish will be tagged in the facility sampling room. This will require an increase in the normal facility sampling rate in order to get the required number of fish on marking days. The adult fish trap will also be operated in 2001 to monitor adult returns of study fish tagged in previous years.

2.2. Evaluation of the Modified PIT Tag Detection and Diversion System. This study will assess the descaling, injury, and delay to fish as they pass through the modified portions of the PIT tag diversion system. The PIT tag diversion portion of the juvenile bypass system will be modified during the 2001 winter maintenance period. The modifications are designed to prevent smolts from holding in the head box. Fish will begin passing through the PIT tag diversion system on approximately March 25, 2001. Hatchery yearling chinook and hatchery steelhead will be obtained through the sampling for the transportation study. Collected fish will be PIT tagged and divided into two groups. One group will be released to the separator and the other group will be released into the 3-way diverter sample tank. Other than positioning the

3 way PIT tag gate to divert all fish to the sample tank during the test period, this study will not require any special project operations.

2.3. Evaluation of Adult Salmon and Steelhead Migration Past the Snake and Columbia River Dams. Idaho Cooperative Fisheries Research Unit will continue to monitor the passage of adult salmonids through the hydrosystem. The submerged weirs in the lower end of the adult fish ladder were modified to decrease the amount of flow over the top of the weirs and to increase flows through the orifices. It is hoped that this modification will reduce the rate of adult turn-around in the transition pool. This modification will remain in place throughout the fish passage season unless it creates poor passage conditions. This modification will be evaluated as part of the study. The study requires the installation of radio receivers and data loggers throughout the fishway and various locations on the dam. The installation of equipment will take place prior to the fish season and is not anticipated to require special project operations.

2.4. Evaluation of the Removable Spillway Weir. A Removable Spillway Weir (RSW) was intended to be installed for the 2001 juvenile fish outmigration outmigration. Delays in construction, however, are resulting in the RSW being installed in late June 2001. A brief hydraulic test (a few hours spill) will be performed after the installation has been completed. It is possible that a fish survival test may be conducted in the fall of 2001 and in early spring of 2002. Balloon tagged fish will be released over the RSW, through a standard spillbay and a tailrace control release. If the balloon tag testing takes place in March before regular MOP operation takes place, the Lower Granite forebay should be lowered to MOP for these tests, as this is the condition that is expected during the regular biological testing season.

2.5. Adult Fishway Evaluation. A Walla Walla District Corps of Engineers hydraulic engineer has inspected the adult fishway system in January 2001. Field measurements will be taken in the spring and summer of 2001 and a final report will be completed in December 2001. The purpose of the study is to define the desired operating criteria, analyze the existing operating conditions, and investigate several alternatives to improve fish passage conditions.

2.6. Emergency Auxiliary Water Supply Study. Engineers from Northwest Hydraulic Consultants inspected the adult fishway system in January 2001. Fish pump tests will be performed during the last week of February to develop fish pump head and discharge characteristics from the field data collected. Field measurements will be taken in the spring and summer of 2001 to calibrate and verify the numerical computer models, which will be completed in December 2001.