2022 Fish Passage Plan

Appendix I

Dworshak Dam

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Dworshak Dam (DWR)	
Corps Project Acronym	DWR
Location	North Fork Clearwater River (RM 1.9) - Ahsahka, ID
Reservoir	Dworshak Reservoir
Available Flood Storage Space	2,016 kaf
Forebay Normal Operating Range	1,445 ft – 1,600 ft
Minimum Instantaneous Flow	1.0 kcfs
Tailrace Rate of Change Limit	1 ft/hour at Peck gauge
Turbine Units	3 Francis turbines
Turbine Generating Capacity	400 MW (Units 1, 2 @ 90 MW each + Unit 3 @ 220 MW)
Powerhouse Hydraulic Capacity	10.5 kcfs
Spillbays	2 Spill Gates + 3 Regulating Outlets (RO)
Spillway Hydraulic Capacity	Spill Gates = 150 kcfs; Regulating Outlets (ROs) = 40 kcfs

Table 1. Dworshak Dam Details and Information.

1. FISH

1.1. Fish Hatcheries

Dworshak Dam was constructed without fish passage facilities and blocks access to anadromous fish spawning habitat on the North Fork Clearwater River upstream of the dam. To mitigate for the loss of habitat, the Corps built the Dworshak National Fish Hatchery (DNFH) downstream of the dam at the confluence of the North Fork and Clearwater rivers. The DNFH is co-managed by the U.S. Fish & Wildlife Service and Nez Perce Tribe to raise B-run steelhead smolts for annual release. The Nez Perce Tribe also raises coho at DNFH. The DNFH and Clearwater Fish Hatchery (CFH) also raise and release both spring Chinook and B-run steelhead as part of the *Lower Snake River Compensation Plan*[1]. The CFH is solely operated on reservoir water and shares any excess with DNFH. Providing water that is free of IHN disease is critical for successful hatchery operations.

During large hatchery releases, the hatchery will coordinate with the Corps to request sufficient outflow from Dworshak Dam to promote downstream migration. The Corps NWW Water Management will notify hatchery staff when flows in the North Fork Clearwater River are anticipated to have elevated levels of total dissolved gas (TDG).

1.2. Dworshak Board Annual Operation Plan

As part of the Snake River Basin Adjudication (SRBA) settlement, the Nez Perce Tribe and the United States entered into an Agreement[2] for the use of 200,000 acre-feet (200 kaf) of water in the Dworshak Reservoir. The water is to be used for flow augmentation to benefit fish and is implemented pursuant to the operational Memorandum of Agreement (MOA, included in the

[1] Lower Snake River Compensation Plan: https://www.fws.gov/lsnakecomplan/Reports/LSRCPreports.html
[2] SRBA Dworshak Agreement & MOA: http://pweb.crohms.org/tmt/SRBA-Dworshak-Agreement.pdf

SRBA Agreement as Appendix A) between the Nez Perce Tribe, the Corps, NOAA Fisheries, Bonneville Power Administration, and the State of Idaho.

The MOA signatories comprise the Dworshak Board, which is chaired by the Nez Perce Tribe and meets annually to develop the Operational Plan for the release of the 200 kaf each year. The Dworshak Board's annual Operational Plan is presented to regional salmon managers of the Technical Management Team (TMT), typically in August, and posted to the meeting agenda website. The Dworshak Board Annual Operational Plan volume and timing criteria should guide release of the SRBA 200 kaf. Deviation from the planned operations requires Dworshak Board approval.

1.3. Adult Fish

Adult steelhead and spring Chinook often migrate up into the North Fork Clearwater River and hold below the dam as they physiologically stage for spawning then migrate out to spawning areas. Adult steelhead are generally present in the tailrace from **October through March**, and adult spring Chinook from **June through August**.

An investigation into adult steelhead mortalities that occurred in November[3] indicated that fish may be able to swim into the draft tube during extended periods of low flow through a unit (e.g., multiple starts and stops for testing) and come into contact with the spinning turbine runner. As a result of this incident, the fish protection measures described below will be implemented.

2. TURBINE UNIT OPERATIONS & MAINTENANCE (O&M)

2.1. General

Hydroelectric power generation relies on converting mechanical energy, in the form of pressurized water, into electrical energy – water comes into contact with the turbine runner and supplies the mechanical energy to spin the unit. When starting a unit, water fills the draft tube and starts to spin the unit, providing a potential pathway for adult fish to reach the spinning turbine runner at a time when water velocity in the draft tube is relatively slow. To minimize any potential for injuring or killing adult fish, the project will implement fish protection measures during turbine operations, maintenance, and testing, as described below.

2.2. Turbine Unit Operations

a. Turbine units may be operated year-round in any order through their full operating range within the appropriate ramping rates defined in the Water Control Manual (see **Table 1** above).

b. After initial start-up, units are operated at "speed no load" (SNL, opening the wicket gates) during the time it takes to adjust the generator voltage and frequency to synchronize with the grid. Before any generator breaker can be closed, the frequency

[3] FPOM Memo For the Record (MFR) 16DWR01: pweb.crohms.org/tmt/documents/FPOM/2010/NWW%20Memos%20of%20Coordination%20and%20Notification/DWR%20MOC%20and%20MFR/

(which is directly related to the speed the unit is rotating) and voltage must be adjusted to match the frequency and voltage of the Bulk Electrical System (BES) on the other side of the breaker. The time of response to voltage control impulses tends to be similar for various machines; however, the time of response to frequency (speed) control impulses varies fundamentally with the type and size of the machine. The generators at Dworshak Dam have large moments of inertia and long penstocks (water starting time) and the voltage and frequency must be adjusted multiple times to allow the generator to react to each adjustment to match the BES prior to closing the breaker. This process is called synchronizing the unit. *Due to the size and type of machines at Dworshak Dam, the duration of SNL from starting a unit to synchronizing with the grid may be up to 5 minutes.*

c. Whenever starting or stopping a unit, the draft tube depression system will be used before opening the wicket gates (startup) and after closing the wicket gates (shutdown) to prevent adult fish from impacting the runner. The system uses compressed air to maintain the water level in the draft tube below the runner and takes approximately 30 seconds to 1 minute after initiation to lower (depress) the water to about 6 feet below the runner. Fish are prevented from contacting the runner in less time, as soon as the water level is below the runner.

d. BPA may request that a unit operate in "synchronous condensed mode", which spins the turbine as a motor for purposes of stabilizing the transmission system. The draft tube depression system is required during this mode. The request is situational and varies in frequency and duration.

2.3. Turbine Unit Maintenance & Testing

a. Turbine maintenance and testing will be coordinated with FPOM as described below in **section 2.4**.

b. Each unit requires annual preventative maintenance to maintain operational condition. Annual maintenance is typically performed one unit at a time and requires the unit out of service for 2–6 weeks.

c. The annual maintenance period is September 15 through the end of February to coincide with the refill period after summer flow augmentation and before flood risk management operations.

d. Required transformer maintenance and condition (Doble) testing requires one or two generating units out of service beginning September 21 every two out of three years.

e. In addition, one unit each year requires a 4 to 6-week outage for cavitation repair.

f. If maintenance requires unwatering the draft tube, the project will implement procedures defined below in **Section 3** (*Fish Salvage Procedures for Turbine Unwatering*).

g. After maintenance, testing is required to validate the unit is functioning properly. The required testing sequence is defined below in **Section 4** (*Unit Startup Procedure*).

h. During testing, the project will implement fish protection measures including using the draft tube depression system.

i. The duration of testing will be minimized to the extent possible with no more than 5 minutes at SNL.

j. If testing is anticipated to require more than 5 minutes at SNL, or if the draft tube depression system is out of service, the operation will be coordinated with FPOM per **section 2.4** and monitored by trained staff (NPT or DFH staff will also be invited to assist with observation).

k. Should there be an unplanned need to extend testing at SNL for longer than 5 minutes due to a specific problem, the project may operate at SNL for longer than 5 minutes to assist in the resolution of the problem to limit the starts/stops affiliated with unit shutdown that would occur with the 5-minute threshold.

l. Should further monitoring disclose that unit starts/stops are the primary cause of adult fish mortality, rather than SNL, the restriction on SNL will be reviewed.

m. Cyclical maintenance testing (e.g., model validation and efficiency testing) typically involves starting and stopping a unit, which requires periods of SNL for up to 5 minutes. To the extent possible, cyclical maintenance testing will be performed when fish are less likely to be present in the tailrace (April, May, or September). If testing is performed outside of these months and is anticipated to require more than 5 minutes at SNL, the operation will be monitored by trained staff and coordinated with FPOM, per **Section 2.4**.

2.4. <u>FPOM Coordination</u>

2.4.1. SNL > 5 Minutes

a. All turbine operations, maintenance, or testing that require periods of SNL longer than 5 minutes when adult fish are likely present in the tailrace (October–March and June–August) will be coordinated with FPOM.

b. Prior to the operation, FPOM will be provided with a proposed sequence to review for potential adverse impacts.

c. A Fisheries Biologist will monitor the operation for fish impacts and report findings to FPOM (see template for "*Dworshak Unit Maintenance Monitoring Form*" at the end of this Appendix). In the event of any observations of fish injury or mortality, the monitoring Biologist will immediately contact the Project Chief of Operations or authorized designee to suspend testing.

d. In the event of an emergency that requires operating a unit at SNL for more than 5 minutes or for station power (light load with low flow through the draft tube) when adult

fish are likely present in the tailrace (October–March and June–August), project staff will coordinate with CENWW-OD-T and fill out a maintenance monitoring form identifying specific time interval(s) and develop a Memo for the Record (MFR) for distribution to FPOM if any mortality is noticed (see MFR template in **FPP Chapter 1 – Overview**).

2.4.2. September Maintenance

a. Required transformer maintenance and Doble testing occurs every two out of three years starting September 21. The annual Doble testing schedule will be provided to FPOM via the Fish Passage Plan Appendix A (Special Operations & Studies).

b. Other required September maintenance that may impact the Dworshak Board's annual Operation Plan to draft 200 kaf for the benefit of fish (see **section 1.2**) will be pre-coordinated with Nez Perce Tribe and FPOM prior to March of that year, or as soon as the need is known.

3. FISH SALVAGE PROCEDURES FOR TURBINE UNWATERING

OPERATING GUIDANCE #14

Dworshak Dam Fish Protection Procedures for Turbine Maintenance

Dworshak O&M Section Date of Issue: March 2012 Last Revision: 14 February 2019

3.1. Define operational procedures to minimize the number of fish that can become trapped when unwatering a penstock/scrollcase for annual maintenance, repairs, or overhaul of a power unit. If any fish are trapped, define proper handling procedures and documentation requirements. These activities will be followed to completion including the fish protection and recovery provisions outlined in this procedure, regardless of overtime requirements.

3.2. This procedure provides a general outline of the unwatering process itself and includes details for only those constraints specifically intended to promote fish survival. It is not intended to address the details of personnel safety policy or procedures, or any detailed operational instructions for the actual unwatering process. Personnel safety provisions are detailed in the appropriate activity hazard analysis. Details of the operational steps for unwatering are covered by separate Operating Procedures. All unwatering efforts will be adhered to in reducing the time incurred throughout the unwatering process.

3.3. Hydroelectric turbines and water passages must be inspected and serviced periodically. This requires draining the water passages between the emergency (headgate) gates and the tailrace stoplogs. After the water reaches tail water level, the remaining water is drained to an unwatering sump and then pumped out into the river. Any fish trapped in the draft tube area must be removed before being stranded or lost through drains. It is therefore desirable to minimize the numbers of fish involved in the draining process and then to quickly salvage any fish that may have been trapped.

3.4. The DWR Operations & Maintenance (O&M) Section will coordinate with NWW District Operations Technical Support Branch and provide notification at least two weeks if possible in advance of any maintenance requiring unwatering or otherwise potentially affecting fish. District Operations will inform NOAA and other regional fishery agencies through Fish Passage Operations and Maintenance (FPOM) Team standard coordination process when any fish salvage operations are to occur.

3.5. DWR O&M Section will notify LWG of the need to provide the LWG Fisheries Biologist to lead the planned turbine unit unwatering as soon as possible prior to the date of unwatering. LWG Fisheries Biologist will direct and coordinate the fish protection procedures and the recovery and release process. The exact location for any fish release will be identified and visited just before fish salvage operations begins. If a flume is used, there will need to be flushing flow and the impact velocity with the tailrace will need to be at a level that does not harm fish of the size anticipated in this salvage operation. The LWG Fisheries Biologist will conduct meetings and briefings as necessary to ensure all unwatering team members are familiar with this Operating Guidance, documenting entrapped fish, and the required ESA safe fish handling and recovery process.

3.6. LWG Fisheries Biologist directs fish protection and recovery operations with the help of operations and maintenance personnel from the operating project. The LWG Fisheries Biologist may request additional personnel from USFWS Dworshak hatchery personnel to work in concert with and assist with the activity at the discretion of the Dworshak Operations Manager. During the unwatering process, the LWG Fisheries Biologist will be present at the draft tube entry door and will direct and monitor water levels, and fish condition through the final stages of the draft tube unwatering.

3.7. The night before a unit is to be unwatered, the operator will turn off the lights overlooking the tailrace to reduce the attraction of smaller fish. Several hours before the unit is to be unwatered the DWR Operations Section will contact BPA to get final approval for the outage and make sure all the clearance tags are ready to be placed. Early on the day of the unwatering, the mechanics and operators will coordinate to lower the emergency gate and/or install the intake bulkhead. This will isolate the intake water passage from the forebay. At least one day in advance the LWG Fisheries Biologist will ensure that adequate fish recovery equipment and personnel trained in fish handling are available for the unwatering and fish recovery event. Trained personnel to assist in the salvage procedure may come from local fish facilities and/or district operations division.

3.8. When the turbine unit draft tube is to be unwatered, the operator will coordinate with local agencies (e.g., USFWS personnel from Dworshak Hatchery), RCC, and BPA to run the unit with the maximum possible load for 15 minutes to flush the scroll case and the draft tube of fish. In the case of unit 3, full load will not be achieved and 2.5 kcfs will be used to stay within the river rate-of-change restrictions. At pool elevation of 1520' minimum discharge of 3.5kcfs is required to obtain stable operation and reduce gassing, at the same time a small unit would be cut back to allow for the rate of change which is still limited to 1'/hr on ramp up and down. The operator will close the penstock emergency gate (hydraulic headgate) to drain the water out of the penstock down to tailrace water elevation. Once a seal is confirmed by closing the unit wicket gates and monitoring penstock pressure and flow, the mechanics will place the tailrace stoplogs. The process from flushing the remaining water out of the penstock and confirmation of a seal through complete installation of tailrace stoplogs is estimated to take 4-6 hours barring any complications. All efforts in this step will be made to reduce the time involved from flushing to the installation of stoplogs via staging equipment, support supplies material and crews (units 1 & 2 have two stop logs each and unit 3 has four). If a seal is not obtained, the process, *including flushing*, must be repeated. Installation of the penstock maintenance bulkhead may be accomplished after the tailrace stoplogs are installed.

3.9. Once seal is confirmed, the operator will open the penstock drain and the draft tube unwatering valve and start draining the draft tube thorough the unwatering sump. At the same time the sump unwatering pumps will be initially reprogrammed to maintain water level in the draft tube to an elevation between 936 to 938 feet, depending on the unit to provide a sanctuary pool. The draft tube is drained by gravity to the unwatering sump, so by restricting the unwatering sump to a minimum elevation of 936 to 938 feet, the draft tube is also restricted to this minimum elevation. The bottom of the draft tube is at an elevation of 929' for unit 3 and 933' for units 1 and 2, creating a large sanctuary pool between 3 to 7 feet deep for any trapped fish. The water level in the draft tube will be monitored remotely from the draft tube access door. At no time will the water level in the unwatering sump drop below 936' or 938' depending

on the unit, without all aspects of the fish recovery plan in place to include; recovery devices, insulated transport device, etc. Project personnel will have dip nets, lifting sling, and insulated fish carrying tank, and all other required fish recovery equipment and safety equipment at the unit during the final unwatering process.

3.10. For safety reasons, the draft tube entry door will not be opened until confirmation that the tailrace stoplogs are sealed, i.e.: the water level is verified to be below the draft tube man door petcock and a maximum of two unwatering pumps maintaining the water level in the sump. Once Operations has declared a satisfactory seal has been achieved, the mechanics will then open the draft tube access door, maintenance personnel will place a tube with a bubbling device turned on to provide additional oxygen to any trapped fish. The biologist will deploy sonar into the draft tube capable of viewing fish to determine if a large number of fish are present. If a large number of fish are present, the process will be reversed and the turbine will be readied to be re-run at night when fish are less likely to move into the unit. If an unusually large number of fish are not identified, maintenance personnel will prepare for access into the draft tube.

3.11. When satisfied all fish recovery preparations are in place, the LWG Fisheries Biologist will authorize the clearance holder to request the water level in the draft tube be lowered to 935 feet for units 1 and 2, and 931.5' for unit 3, a level that allows for safe entry into the draft tube. Upon receiving the clearance holder's request to lower the draft tube water elevation, the shift operator shall contact the LWG Fisheries Biologist to confirm that all fish recovery preparations are complete, and lowering the water level that allows safe entry is authorized. Once the level in the draft tube drops below 935 to 938 feet, the LWG Fisheries Biologist and project maintenance personnel will visually monitor the draft tube water level.

3.12. When the water is down to a level where entry is safe, approximately two feet in depth, personnel should enter the draft tube through the draft tube access door to inspect for trapped fish. Any live fish will be netted one at a time with a knotless dip net and placed in a lifting sling that is sized to hold the fish and water. The sling will then be lifted vertically to the entry door then transferred directly to large insulated fish carrying tank full of river water with no more than ½ pound of fish per gallon of water in the tank at one time. The container will then be transported to the freight elevator, and be taken to the 1005-foot level erection floor, transferred to the release site as determined by the LWG Fisheries Biologist earlier and released into the tailwater, using a flume if necessary, as determined previously in **section 5**. All fish handling only once during the process. At all other times the fish transfer will be water to water. Adequate flushing flow must be maintained throughout each step the fish salvage process. If a large number of fish are involved, it may be necessary to remove the salvage personnel, allow a sanctuary pool to refill, allowing the fish to recover from the activity and low oxygen levels.

3.13. When the LWG Fisheries Biologist has determined that either there are no fish in the draft tube or that all the fish have been safely removed, he will notify the shift operator that all fish recovery operations are complete. He will also notify the clearance holder that all fish protection restrictions on water levels in the draft tube and unwatering sump have been released.

3.14. Other considerations for fish protection include the following:

a. Annual routine maintenance work windows intended to minimize likelihood of trapping endangered species will be investigated to determine if work can be shifted to a time with less endangered species, although BPA power demands, requirements to control TDG and temperature in the river and hatchery, and provide flow augmentation somewhat limit the timing of unit outages. Unwatering work is recommended to occur as soon as possible during the month of September. Adjustments may be considered according to experience.

b. A routine annual maintenance schedule will be submitted to NWW Operations, Technical Support Branch, Adult Fish Passage Coordinator for review.

c. Within 24 hours of completion of Operation & Maintenance activities, fish salvage activities should be documented with a *Record of Fish Salvage Operations* (see template at end of this Appendix). Records should be maintained with helpful information to predict the number of fish to be salvaged in a forthcoming unwatering activity. The records should also contain comments on how well the unwatering and fish recovery activities proceeded, any problems encountered, and observations on fish and holding conditions. Submit this report to NWW-OD-T Adult Fish Passage Coordinator.

3.15. Equipment required for performing this procedure:

a. Hose attached to tailrace deck wash system (river water) to fill fish transfer tanks as needed.

b. Two large fish nets, knotless, one for each worker.

c. Two small fish nets, knotless, one for each worker.

d. Two vinyl slings sized to hold fish and water

e. Headlamps for workers in draft tube.

f. One radio.

g. Waders for workers.

h. Rubber or neoprene gloves for workers.

i. Wristwatches.

j. Thermometers.

k. Hard hats, waders/rubber boots, neoprene gloves, and rain gear for personnel entering draft tube.

l. Fish bucket lifting gear (station at entry door).

m. Two 4-wheel carts with 150-gallon fish tanks, approximately 1/3 full of water on each return from the tailrace or industrial water supply. Have supplemental oxygen system, air lines and air stones standing by at same location. The 4-wheel carts should have a portable source of oxygen and air lines during transport to the release location.

n. Hazardous atmosphere monitoring device for sensing inside draft tube (at entry door).

o. *Record of Fish Salvage Operations* (see template at end of this Appendix).

3.16. Personnel required for performing this procedure:

a. Operators for lift line (lowers and raises fish).

b. LWG Fisheries Biologist.

c. Shift operator (ensures slow and proper timing of draft tube drainage).

d. Four laborers (two inside draft tube to net fish into rubber lifting slings and at least two outside draft tube to transfer fish to release site).

3.17. Fish Handling Procedures:

a. Establish an unwatering coordinator, usually the LWG Fisheries Biologist.

b. Roll the unit for about 15 minutes before lowering the emergency gate and tailrace stoplogs. (all done within 4-6 hours)

c. Attend a safety meeting and discuss safe operating and Walla Walla District ESA fish handling policy and procedures. Be sure proper clearance procedures are discussed. Also, the draft tube area should be treated as a confined space.

d. Begin draining the draft tube as described above. This requires several hours.

e. Obtain a tailrace river temperature, draft tube reading.

f. Allow the deck wash system to run until the water temperature matches within 2ºF of the river temperature, then fill the fish transport tanks with this water.

g. Ensure that unwatering is done very slowly once the water is about two feet deep. Mechanics and LWG Fisheries Biologist will monitor water level throughout the unwatering process.

h. Two workers enter the draft tube.

i. Net fish into fish slings and lift them out of the draft tube via the rope hoist. Nets should be knotless and no more than one fish should be in a net at one time. When it is necessary to transport fish in sanctuary bags, ensure the bags contain a sufficient amount of water and that fish return to fresh water as soon as possible. Pour fish into the fish transfer tank. The LWG Fisheries Biologist will determine if water should be refreshed and if oxygen is needed by monitoring the overall fish condition. Generally from the draft tube to release in the river tailrace, it should take no more than 6 to 8 minutes to capture, transport and release a fish.

j. The LWG Fisheries Biologist monitors the number of fish in the transfer tank and, considering the water temperature and holding time, determines when the fish should be taken to the tailrace to be released to the river. Fish placed in tanks and containers will not exceed ½ pound per gallon of water and will be released as soon as possible.

k. When the fish transfer tank exits the powerhouse, use the deck wash system to refresh the water and/or adjust the water temperature as needed. Ensure that the water temperature in the tank, the deck wash system, flume flushing water is within 2ºF of the river

temperature. May use frozen river ice in maintenance of water conditions during the transport of fish to the tailrace.

l. Fish should not be netted twice (once in the salvage location and not again at the release site). The preferred method of releasing fish should to the tailrace flume or river via water to water transfer.

m. Complete the Record of Fish Salvage Operations (attached at end of this document). This is a permanent record.

4. DWORSHAK DAM TURBINE UNIT STARTUP PROCEDURE AND RETURN TO SERVICE TEST SEQUENCE

4.1. The following tests are performed without the unit operating:

- **Mechanical Over-speed Device Test:** With the unit shutdown.
- **Anti-creep Test:** With the unit shutdown.

4.2. Incomplete Sequence Test: Start the unit depressed. Unit 1 and 2 should trip after 3 minutes and unit 3 should trip after 5 minutes.

4.3. Auto Sync Test: Start the unit depressed and bring unit to SNL. Put the unit online with auto synchronizer (~ 60 sec).

- **Trip Unit** with lockout relay.

4.4. Depression Test: Start the unit depressed and put the unit online.

- **Synchronous Condense Unit.**
- **Power System Stabilizer (PSS) Test within Exciter limits.**
- **AVR/Capability Curve Testing** (defines boundary within which the unit can operate safely).
- **Maximum MVA Test:** Set the unit to the WECC/NERC requirement loading and run for 1 hour.

RECORD OF FISH SALVAGE OPERATIONS - DWORSHAK DAM

**Submit this report to NWW-OD-T Adult Fish Passage Coordinator within 24 hours of fish recovery. FPOM must be notified immediately of any fish mortalities.

LWG Fisheries Biologist in Charge: Other Personnel:	Activity	Date	Time
	Emergency Gate in Place		
	Tailrace Stoplogs Installed		
	Draft Tube Door Open		
	Fish Recovery Begins		
	Fish Recovery Complete		
Purpose of un-watering:			
River Temperature: (Note: Temperature of containers to be maintained within 2°F of river temperature.)			
Problems/Comments:			

SPECIES AND COUNTS OF FISH RELEASED TO TAILRACE

Species	Female		Male		Comments
	Clipped	Un-clipped	Clipped	Un-clipped	

SPECIES AND COUNTS OF FISH MORTALITIES

Species	Female		Male		Comments
	Clipped	Un-clipped	Clipped	Un-clipped	

DWORSHAK UNIT MAINTENANCE MONITORING FORM

Unit Tested: _____

Unit OOS Date / Time _____/_____

Unit RTS Date / Time _____/_____

Monitoring Biologist Name: _____

Location(s) of monitoring person observing operation: _____

Operation being monitored: _____

Comments: _____

_____

WEATHER / WATER CONDITIONS

Cloud Cover: Yes / No

Air Temperature: ____°F

Glare on Water: Yes / No

Water Temperature: ____°F

Degree of Turbidity:

Comments: _____

TESTING TYPE

Commissioning: Yes / No

Annual: Yes / No

WECC / NERC: Yes /No

Other: Yes /No (describe: _____)

Comments: _____

_____

SNL OPERATIONS

SNL = Speed No Load (if more than one occurrence, use table).

Start time (hh:mm:ss) _____ End time (hh:mm:ss) _____ Total time (hh:mm:ss) _____

Time at SNL per instance (if more than one):

Run Number	Start Time (hh:mm:ss)	End Time (hh:mm:ss)	Total Time (hh:mm:ss)

Other Comments (note here if issues with air depression system):_____

_____

FISH ISSUES

FISH LOSSES /INJURED

Salmonids Recovered/NOT Recovered					
Chinook Unclipped	Injured _____	Dead _____	Kokanee	Injured _____	Dead _____
AVG SIZE			AVG SIZE		
Chinook Clipped	Injured _____	Dead _____	Steelhead Unclipped	Injured _____	Dead _____
AVG SIZE			AVG SIZE		
Coho	Injured _____	Dead _____	Steelhead Clipped	Injured _____	Dead _____
AVG SIZE			AVG SIZE		

Describe external condition of injured or fish lost and whether recovery occurred: _____

_____

Live fish seen in tailrace? Yes / No (if yes, how many? _____)

***** If mortality is observed during testing, contact Operator to suspend testing. Contact District Ops to have them undertake informal consultation and regional coordination. Do not restart testing until District Ops informs on consultation results.**

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