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 UNITED STATES OF AMERICA
 FEDERAL ENERGY REGULATORY COMMISSION

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Energy Northwest

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 Letterbook
 Licensing (eFile)

Project No. 2244-022

ORDER AMENDING LICENSE TO INCORPORATE REVISED
 INCIDENTAL TAKE STATEMENT

(Issued February 14, 2019)

1. On November 12, 2018, Energy Northwest filed a request to amend its license for the Packwood Lake Hydroelectric Project No. 2244¹ to incorporate a Revised Incidental Take Statement filed by the National Marine Fisheries Service (NMFS) on November 9, 2018. The project is located on Lake Creek, a tributary to the Cowlitz River, in Lewis County Washington. The project occupies federal lands within the Gifford Pinchot National Forest and Goat Rocks Wilderness administered by the U.S. Forest Service (Forest Service).
2. On March 22, 2018, NMFS issued a biological opinion that concluded that issuing a license for the project, was not likely to jeopardize the continued existence of upper Cowlitz River stocks of Chinook and coho salmon and steelhead, which are federally listed under the Endangered Species Act. As part of its biological opinion, NMFS included an incidental take statement with 9 reasonable and prudent measures to minimize take of these three species, along with 9 terms and conditions to implement the measures. The project license, which was issued October 11, 2018, included the reasonable and prudent measures and implementing terms and conditions as Appendix (D), and made them requirements of the license through ordering paragraph (G).
3. On November 9, 2018, NMFS revised the incidental take statement of its March 22, 2018 biological opinion to clarify some language and improve the efficiency and effectiveness of three of the reasonable and prudent measures. NMFS revised language for Term and Condition 2, numbers 1 and 2 to avoid misinterpretation; Term and Condition 3, numbers 2 and 4 to allow the licensee to survey for fish, and allow block nets to move fish out of the tailrace slough, instead of installing a temporary weir; and Term and Condition 4, number 1 to change the timeline for responding to unplanned outages.

¹ Order Issuing New License (165 FERC ¶ 62,031).

4. The licensee and NMFS worked together to develop the Revised Incidental Take Statement. The Revised Incidental Take Statement as filed by NMFS are consistent with the requirements of the October 2018 license and would continue to protect Chinook and coho salmon and steelhead. The licensee's request to amend its license to add NMFS's Revised Incidental Take Statement, should be approved.

The Director orders:

(A) Energy Northwest's, November 12, 2018 request to amend the license for the Packwood Lake Hydroelectric Project No. 2244 to incorporate the Revised Incidental Take Statement, filed by the National Marine Fisheries Service on November 9, 2018, is approved.

(B) Appendix D, attached to this order, incorporates the National Marine Fisheries Service's Revised Incidental Take Statement filed November 9, 2018 and replaces the Appendix D of the October 11, 2018, Order Issuing New License.

(C) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the Federal Power Act, 16 U.S.C. § 825l (2012), and the Commission's regulations at 18 C.F.R. § 385.713 (2018). The filing of a request for rehearing does not operate as a stay of the effective date of this order, or of any other date specified in this order. The licensee's failure to file a request for rehearing shall constitute acceptance of this order.

/for/ Steve Hocking, Chief
Environmental and Project Review Branch
Division of Hydropower Administration
and Compliance

APPENDIX D**NMFS REVISED BIOLOGICAL OPINION REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS, FILED NOVEMBER 9, 2018****Packwood Lake Hydroelectric Project
FERC Project No. 2244***Reasonable and Prudent Measures*

NMFS believes that the following reasonable and prudent measures are necessary and appropriate to minimize or to monitor the incidental take of the LCR Chinook salmon, LCR coho salmon, or LCR steelhead species resulting from the Proposed Action. In order to be exempt from the prohibitions of Section 9 of the ESA, FERC must comply with all of the reasonable and prudent measures and terms and conditions set forth below.

1. Conduct ongoing monitoring and reporting program to confirm the incidental take estimated in this statement, and that the Terms and Conditions of this Incidental Take Statement are effective in avoiding and minimizing incidental take from permitted activities. Conduct required biological monitoring to evaluate post-restoration and enhancement conditions and operational changes.
2. Minimize the likelihood of incidental take from restoration and enhancement measures by applying terms and conditions and the project specifications that avoid or minimize adverse effects to riparian and aquatic habitats during these activities.
3. Minimize the number of mortalities caused by stranding fish from planned and unplanned Project outages.
4. Minimize take from fish handling during monitoring/evaluation studies and fish salvage operations by applying permit conditions that avoid or minimize adverse effects.
5. Continue the measures for maintenance, testing, and operation of the screen to ensure the continued efficacy and minimize risk of water quality impairment and disturbance of listed fish within the tailrace. Conduct monitoring and report the results in an annual report to NMFS (NMFS' section 18 article 1).

6. Ensure continued protection from prior agreed-upon measures during relicensing discussions (FERC 2009a) for listed salmonids.
7. Ensure that recent reintroduction of fall-run Chinook does not create additional impacts that were not considered in the biological opinion associated with this ITS.
8. Implement the Water Temperature Monitoring and Enhancement Plan as required by the WDOE in the 401 Water Quality Certification.
9. Prepare and provide NMFS with plan(s) and report(s) describing how listed species in the action area would be protected and/or monitored and to document the effects of the action on listed species in the action area.

Terms and Conditions

The terms and conditions described below are non-discretionary, and FERC or any applicant must comply with them in order to implement the reasonable and prudent measures (50 CFR 402.14). FERC or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this incidental take statement (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse. To be exempt from the prohibitions of Section 9 of the ESA, FERC must ensure that Energy Northwest fully carries out the conservation measures in their new license to be issued by FERC.

FERC must include in the license the following terms and conditions that carry out the RPMs listed above. Partial compliance with these terms and conditions may result in more take than anticipated, and invalidate this take exemption. These terms and conditions constitute no more than a minor change to the proposed action because they are consistent with the basic design of the proposed action.

A. **To carry out RPM #1, FERC or its Licensee must undertake the following Term and Condition 1:**

1. Prepare, in consultation with NMFS and consistent with NMFS' terms and conditions and recommendations (NMFS 2008), all design, monitoring and evaluation plans required by FERC or by

this opinion to protect ESA-listed Chinook and coho salmon, and steelhead, and Chinook and steelhead and coho critical habitat.

2. Ensure completion of a comprehensive monitoring and reporting program regarding all actions authorized or completed under the restoration and enhancement measures.
3. Conduct monitoring to determine if tailrace fish screen is effectively excluding fish from Project tailrace and stilling basin without causing delay, injury, or mortality of listed species
4. All Chinook, coho, and steelhead fish handling must be conducted by qualified biologists, and all staff participating in fish and aquatic studies must have the necessary knowledge, skills, and abilities to ensure safe handling of Chinook and coho salmon and steelhead. Carry out each study using Best Management Practices (BMPs) for the collection, handling, and transfer of LCR Chinook and LCR coho salmon, and LCR steelhead, as appropriate.
5. Prepare an annual report that summarizes actions carried out during the previous calendar year. These reports will fulfill the FERC's requirements for notifying NMFS when the amount or extent of incidental take is approached or exceeded (50 CFR §402.14(i)(1)(iv) and (i)(3)).

B. To carry out RPM #2, FERC or its Licensee must undertake the following Term and Condition 2 as part of Project related construction activities:

Design criteria related to in-water work timing, sensitive area protection, fish passage, erosion and pollution control, choice of equipment, in-water use of equipment, and work area isolation can avoid or reduce these adverse effects. Those measures will ensure that actions are not completed at sites occupied by adult fish congregating for spawning or where redds are occupied by eggs or pre-emergent alevins, defer construction until the fewest number of fish are present, and otherwise ensure that the adverse environmental consequences of construction are avoided or minimized (NMFS 2008c).

1. Develop a stream restoration and enhancement plan (SREP) for the lowest 1.0 mile (RM 0.0 to 1.0) of Lake Creek in the anadromous zone, including the placement of wood and gravel, and monitoring of effectiveness, after consultation with the natural resource agencies and

tribes, within 2 years of license issuance. Initial implementation of the plan will occur within 5 years of license issuance. Energy Northwest will collaboratively revise the lower Lake Creek Stream Restoration Plan (as needed) every 5 years with the first revision taking place 10 years after license issuance.

2. Develop a plan to improve fish passage on Snyder Creek where its culvert crosses under the tailrace canal by rerouting Snyder Creek into Hall Creek on the downstream side (south) of the tailrace canal within 2 years of license issuance. Implementation of the in-field rerouting measures identified in the plan shall be completed within 5 years of license issuance. Monitor effectiveness of the rerouting.
3. Continue maintenance of culvert until rerouting of Snyder Creek into Hall Creek is complete.
4. Develop SREP and Snyder Creek passage plan and in consultation with NMFS. Include in the SREP and Snyder Creek passage plan all necessary BMPs to minimize detrimental effects to Chinook and coho salmon, steelhead, and Chinook, steelhead, and coho critical habitat from turbidity and sedimentation, interim operations, and handling effects associated with salvage and restoration and enhancement activities.
 - a. Inspection of erosion controls. During construction, the operator must monitor instream turbidity and inspect all erosion controls daily during the rainy season (October through May) and weekly during the dry season (June through September), or more often as necessary, to ensure the erosion controls are working adequately.²
 - i. If monitoring or inspection shows that the erosion controls are ineffective, mobilize work crews immediately to make repairs, install replacements, or install additional controls as necessary.

² “Working adequately” means that project activities do not increase ambient stream turbidity by more than 10 percent above background 100 feet below the discharge, when measured relative to a control point immediately upstream of the turbidity-causing activity. The Licensee may request that this standard be adjusted by NMFS based on review of the WDEQ 401 Water Quality Certification for construction, and in coordination with WDEQ.

- ii. Remove sediment from erosion controls once it has reached one-third of the exposed height or capacity of the control.
- b. Construction discharge water. Treat all discharge water created by construction (e.g., concrete washout, pumping for work area isolation, vehicle wash water, drilling fluids) as follows:
 - i. Water quality. Design, build, and maintain facilities to collect and treat all construction discharge water, including any contaminated water produced by drilling, using the best available technology applicable to site conditions. Provide treatment to remove debris, nutrients, sediment, petroleum hydrocarbons, metals, and other pollutants likely to be present.
 - ii. Discharge velocity. If construction discharge water is released using an outfall or diffuser port, velocities will not exceed 4 feet per second, and the maximum size of any aperture will not exceed one inch.
 - iii. Spawning areas. Do not release construction discharge water within 300 feet upstream of spawning areas unless it is clean construction discharge water.
 - iv. Pollutants. Do not allow pollutants, including green concrete, contaminated water, silt, welding slag, sandblasting abrasive, or grout cured less than 24 hours to contact any wetland or the 2-year floodplain, except cement or grout when abandoning a drill boring or installing instrumentation in the boring.
- c. During completion of habitat enhancement activities, no pollutants of any kind (sewage, waste spoils, petroleum products, etc.) should come in contact with the water body or wetlands or their substrate below the mean high-high water elevation or 10-year flood elevation, whichever is greater.
- d. Treated wood.
 - i. Construction or habitat enhancement activities will not use treated wood if it may come in contact with flowing water or if it will be placed over water, except for pilings installed following NMFS' guidelines.

- ii. Visually inspect treated wood before final placement to detect and replace wood with surface residues and/or bleeding of preservative.
 - iii. Construction or habitat enhancement activities that require removal of treated wood will use the following precautions:
 - 1. Treated wood debris. Take steps designed to insure that no treated wood debris falls into the water. If treated wood debris does fall into the water, remove it immediately.
 - 2. Disposal of treated wood debris. Dispose of all treated wood debris removed during a project, including treated wood pilings, at an upland facility approved for hazardous materials of this classification or recycle or reuse the treated wood outside of aquatic and riparian habitat. Do not leave treated wood pilings in the water or stacked on the streambank.
- e. Preconstruction activity. Complete the following actions before significant alteration of the construction area:
- i. Marking. Flag the boundaries of clearing limits associated with site access and construction to prevent ground disturbance of critical riparian vegetation, wetlands, and other sensitive sites beyond the flagged boundary. Construction activity or movement of equipment into existing vegetated areas must not begin until clearing limits are marked.
 - ii. Minimize areas impacted by construction. Construction impacts will be confined to the minimum area necessary to complete the construction.
 - iii. Emergency erosion controls. Ensure that the following materials for emergency erosion control are on site:
 - 1. A supply of sediment control materials (e.g., silt fence, straw bales).
 - 2. An oil-absorbing, floating boom whenever surface water is present.

3. Temporary erosion controls. All temporary erosion controls will be in place and appropriately installed downslope of construction activity within the riparian buffer area until site rehabilitation is complete.
- f. Temporary access roads.
 - i. Steep slopes. Do not build temporary roads mid-slope or on slopes steeper than 30 percent.
 - ii. Minimizing soil disturbance and compaction. Low-impact, tracked drills will be walked to a survey site without the need for an access road. Minimize soil disturbance and compaction for other types of access whenever a new temporary road is necessary within 150 feet of a stream, water body, or wetland by clearing vegetation to ground level and placing clean gravel over geotextile fabric, unless otherwise approved in writing by NMFS.
 - g. Temporary stream crossings.
 - i. Do not allow equipment in the flowing water portion of the stream channel where equipment activity could release sediment downstream, except at designated stream crossings unless otherwise approved by NMFS.
 - ii. Minimize the number of temporary stream crossings.
 - iii. Design new temporary stream crossings as follows:
 1. Survey and map any potential spawning habitat within 300 feet downstream of a proposed crossing.
 2. Do not place stream crossings at known or suspected spawning areas or within 300 feet upstream of such areas if spawning areas may be affected.
 3. Design the crossing to provide for foreseeable risks (e.g., flooding and associated bedload and debris) to prevent the diversion of stream flow out of the channel and down the road if the crossing fails.
 4. Vehicles and machinery will cross riparian buffer areas and streams at right angles to the main channel wherever reasonably possible.

- iv. Obliteration. When the project is completed, obliterate all temporary access roads, stabilize the soil, and revegetate the site. Abandon and restore temporary roads in wet or flooded areas by the end of the inwater work period.
- h. Vehicles and heavy equipment. Restrict use of heavy equipment as follows:
 - i. Choice of equipment. When heavy equipment will be used, the equipment selected will have the least adverse effects on the environment (e.g., minimally sized, low ground pressure equipment).
 - ii. Vehicle and material staging. Store construction materials and fuel, and operate, maintain, and store vehicles as follows:
 1. To reduce the staging area and potential for contamination, ensure that only enough supplies and equipment to complete a specific job will be stored on-site.
 2. Complete vehicle staging, cleaning, maintenance, refueling, and fuel storage, except for that needed to service boats, in a vehicle staging area placed 150 feet or more from any stream, water body, or wetland, unless otherwise approved in writing by NMFS.
 3. Inspect all vehicles operated within 150 feet of any stream, water body, or wetland daily for fluid leaks before leaving the vehicle staging area. Repair any leaks detected in the vehicle staging area before the vehicle resumes operation. Document inspections in a record that is available for review on request by NMFS.
 4. Before activities begin and as often as necessary during construction activities, steam clean all equipment that will be used below the bankfull elevation until all visible external oil, grease, mud, and other visible contaminants are removed. Any washing of equipment must be conducted in a location that will not contribute

- untreated wastewater to any flowing stream or area that drains to a stream.
5. Diaper all stationary power equipment (e.g., generators, cranes, stationary drilling equipment) operated within 150 feet of any stream, waterbody, or wetland to prevent leaks, unless suitable containment is provided to prevent potential spills from entering any stream or water body.
 6. At the end of each work shift, vehicles must not be stored within or over the waterway.
- i. Site preparation. Conserve native materials for site rehabilitation.
 - i. Minimize alteration or disturbance of the streambanks and existing riparian vegetation to the greatest extent reasonably possible.
 - ii. Except within the exact footprint of the construction zone, all existing native vegetation within 150 feet of the edge of bank should be retained, to the greatest extent reasonably possible.
 - iii. If possible, leave native materials where they are found.
 - iv. If native materials are moved, damaged, or destroyed, replace them with a functional equivalent during site rehabilitation.
 - v. Stockpile any large wood, native vegetation, weed-free topsoil, and native channel material displaced by construction for use during site rehabilitation.
 - vi. Mechanical removal of undesired vegetation and root nodes is permitted. Herbicides may be used as part of habitat restoration work, provided no herbicide will be applied within 100 feet of the edge of the bank.
 - j. Isolation of in-water work area. If adult or juvenile Chinook, coho or steelhead are reasonably certain to be present, or if the work area is less than 300 feet upstream of salmonid spawning habitats, completely isolate the work area from the active flowing stream using inflatable bags, sandbags, sheet pilings, or similar materials, unless otherwise approved in writing by NMFS.
 - k. Earthwork. Complete earthwork (including drilling, excavation, dredging, filling, and compacting) as quickly as

reasonably possible.

- i. Excavation. Material removed during excavation will only be placed in locations where it cannot enter sensitive aquatic resources. Whenever topsoil is removed, it must be stored in an upland location and secured to prevent sediment-laden runoff from reentering streams or wetlands. Topsoil must be reused on site to the greatest extent reasonably possible. If riprap is used for protecting a culvert inlet or outlet, it will be class 350 metric or larger, and topsoil will be placed over the rock and planted with native woody vegetation.
 - ii. Site stabilization. Stabilize all disturbed areas, including obliteration of temporary roads, following any break in work, unless construction will resume within 4 days.
 - iii. Source of materials. Obtain boulders, rock, woody materials, and other natural construction materials used for the project outside the riparian buffer area. Spawning gravel for augmentation of spawning habitats must be washed (i.e. cleaned, rinsed rock) river rock, of suitable size for LCR Chinook, LCR coho, and LCR steelhead (as appropriate by location), and if possible, from a source within the local watershed.
1. Boulder placement.
 - i. Site selection. Boulder placement will be limited to stream reaches with the following features:
 1. An intact, well-vegetated riparian area, including trees and shrubs where those species would naturally occur, or that are part of riparian area restoration action.
 2. A stream bed that consists predominantly of coarse gravel or larger sediments.
 - ii. Installation. Boulders will be installed as follows:
 1. The cross-sectional area of boulders may not exceed 25 percent of the cross-sectional area of the low flow channel, or be installed to shift the

- stream flow to a single flow pattern in the middle or to the side of the stream.
2. Boulders will be machine-placed (no end dumping allowed).
 3. Permanent anchoring, including rebar or cabling, may not be used.
- m. Large wood restoration. Stabilizing or key pieces of large wood that will be relied on to provide streambank stability or redirect flows must be intact, hard, and undecayed to partly decaying, and should have untrimmed root wads to provide functional refugia habitat for fish. Use of decayed or fragmented wood found lying on the ground or partially sunken in the ground is not acceptable.
- n. Spawning gravel restoration.
- i. Gravel placement. Gravel augmentation is limited to areas where the natural supply has been eliminated or significantly reduced through anthropogenic means.
 - ii. Gravel source. Gravel to be placed in streams must be obtained from an upland source outside of the channel and riparian area (gravel from any instream source is prohibited) size such that 50 percent of the gradation becomes mobile at the dominant discharge event, rounded and uncrushed (less than 25 percent fractured face), and washed before instream placement.
- o. Site restoration. Any large wood, native vegetation, topsoil, and native channel material displaced by construction will be stockpiled for use during site restoration. When construction is finished, all streambanks, soils, and vegetation will be cleaned up and restored as necessary to renew ecosystem processes that form and maintain productive fish habitats. Fencing will be installed as necessary to prevent access to revegetated sites by livestock or unauthorized persons.
- p. Stormwater management: Prepare and carry out stormwater management practices for construction of any new or refurbished Project-related facility or habitat enhancement

project that will produce a new impervious surface or a land cover conversion that slows the entry of water into the soil.

- i. The goal is to avoid and minimize adverse effects due to the quantity and quality of stormwater runoff for initial construction, and throughout the life of the newly completed facility (e.g., fish ladder, new road, culvert, or habitat enhancement project that requires extensive land clearing) by maintaining or restoring natural runoff conditions. The following criteria and pertinent elements listed in this section “p” must be met to achieve the following functions:
 1. Minimize, disperse and infiltrate stormwater runoff onsite using sheet flow across permeable vegetated areas to the maximum extent reasonably possible without causing flooding, erosion impacts, or long-term adverse effects to groundwater.
 2. Pretreat stormwater from pollution generating surfaces, including bridge decks, to the extent reasonably possible, before infiltration or discharge into a freshwater system, as necessary to minimize any nonpoint source pollutant (e.g., debris, sediment, nutrients, petroleum hydrocarbons, metals) likely to be present in the volume of runoff predicted from a 6-month, 24-hour storm.
- ii. Runoffs/discharge into a freshwater system. When stormwater runoff will be discharged directly into fresh surface water or a wetland, or indirectly through a conveyance system, the following requirements apply.
 1. Maintain natural drainage patterns and, whenever reasonably possible, ensure that discharges from the work site occur at the natural location.
 2. Use a conveyance system comprised entirely of manufactured elements (e.g., pipes, ditches, outfall protection) that extends to the ordinary high water line of the receiving water.
 3. Stabilize any erodible elements of this

- conveyance system as necessary to prevent erosion. Do not divert surface water from, or increase discharge to, an existing wetland if that will cause a significant adverse effect to wetland hydrology, soils or vegetation.
4. The velocity of discharge water released from an outfall or diffuser port may not exceed 4 feet per second.
 5. Waste anesthetic-laden water must be disposed of in accordance with applicable laws.
- q. Construction activities associated with habitat enhancement and erosion control measures must meet or exceed BMPs and other performance standards contained in the applicable state and Federal permits.
- r. Construction monitoring and reporting. FERC will ensure that the Licensee submits an annual report to NMFS describing the status of restoration and enhancement activities, and if completed, the success in meeting the RPMs and associated terms and conditions of this incidental take statement. The report will include the following:
- i. Construction activities identification.
 1. Name of Licensee staff person responsible for construction activities, construction activities names, and detailed description of the activities.
 2. Construction activities' location by 5th or 6th field HUC and by latitude and longitude as determined from the appropriate USGS 7-minute quadrangle map.
 3. Starting and ending dates for the work completed, or expected completion date for ongoing construction activities.
 - ii. Photo documentation. Photo documentation of habitat conditions at the construction site before, during, and after completion.
 1. Include general views and close-ups showing details of the construction activities and affected site, including pre- and post-

construction.

2. Label each photo with date, time, construction activity name, photographer's name, and documentation of the subject activity.

iii. Project data:

1. Work cessation. Dates work ceased because of high flows, if any.
2. Pollution and erosion control. A summary of pollution and erosion control inspections, including any erosion control failures, contaminant releases, and correction efforts.
3. Description of site preparation.
4. Isolation of inwater work area, capture, and release of Chinook and coho salmon, and steelhead.
 - a. Supervisory fish biologist's name and address.
 - b. Methods of work area isolation and take minimization.
 - c. Stream conditions before, during, and within 1 week after completion of work area isolation.
 - d. Means of fish capture.
 - e. Number of Chinook and coho salmon, and steelhead captured.
 - f. Location and condition of all Chinook and coho salmon, and steelhead released.
 - g. Any incidence of observed injury or mortality of Chinook and coho salmon, and steelhead.
5. Stream protection
 - a. Type and amount of materials used.
 - b. Project size - one bank or two, width, and linear feet.
6. Site rehabilitation. Photo or other documentation that site rehabilitation

performance standards were met.

NMFS will be reviewing the detailed construction plans submitted to advise FERC regarding whether or not those plans are likely to meet the BMPs articulated in this incidental take statement's terms and conditions, or such additional BMPs that NMFS deems appropriate.

NMFS will be reviewing the detailed construction plans submitted to advise FERC regarding whether or not those plans are likely to meet the BMPs articulated in this incidental take statement's terms and conditions, or such additional BMPs that NMFS deems appropriate.

C. To carry out RPM #3, FERC or its Licensee must undertake the following Term and Condition 3:

1. Minimize incidental take from annual outage for Project maintenance by beginning outage on August 15 of each operating year, and resuming operation by September 15 or earlier if all necessary work has been completed.
2. Annually on August 13, Energy Northwest will conduct a comprehensive spawning survey of the tailrace slough area below the tailrace outflow utilizing trained personnel. Fish presence and spawning behavior will be documented and any redds present will be recorded and referenced (e.g., geolocation, etc.) so that personnel can return to assess the condition throughout the outage period without making location apparent. Data will be collected that enumerates numbers of fish observed, spawning behavior and redd presence. Immediately following the spawning survey, Energy Northwest will use block nets and working in a downstream direction, move fish out of the tailrace slough and into the mainstem Cowlitz. This herding effort will be duplicated once on August 14 and again on August 15 immediately before the project is shut down. Upon completion of the August 15 effort, block nets will be put in place at the confluence of the tailrace with the mainstem Cowlitz. Energy Northwest personnel will remain on site until the attraction flows from the project have subsided (approximately 12 hours) to confirm the integrity of the nets and persistent upstream blockage of the tailrace slough to fish from the mainstem Cowlitz River. Once attraction flows have ceased, the block nets will be removed.

Energy Northwest will implement these methods annually associated with the maintenance outage. An annual report will be developed. NMFS may require modifications to methodologies. Modifications to methodologies proposed by Energy Northwest for future years must have NMFS approval prior to implementation. If immediate concern related to effective implementation of this measure or fish health implications or both presents itself during a given year, Energy Northwest will immediately notify NMFS and implement additional methods to address these issues. Unless agreements are reached to modify or discontinue this measure, the methods described will continue. Given the variability of the channel in this area, the potential exists for methods that had been previously discontinued to be reimplemented or new methods to be employed. Energy Northwest personnel will walk the tailrace slough prior to August 10th annually to determine if dynamic changes to the slough have occurred that may require reimplementation or the employment of new methodology.

3. Inspect the tailrace slough prior to the annual outage, and immediately after an unplanned outage for adequate flows, and conduct fish rescue, if necessary, as well as record observed mortalities and dewatering of redds, when outages are anticipated to be greater than 24 hours.
4. Inspect the tailrace slough immediately after planned and unplanned outages for redds. If any redds are identified and there is not adequate water for redds, Energy Northwest will provide supplemental water to the redds until project flows are returned, when technically feasible. Energy Northwest will collaborate with and obtain approval from NMFS in advance of the first annual outage to reach agreement on an adaptive plan for protecting redds if they are documented in the tailrace slough prior to the annual outage on August 15.

D. To carry out RPM #4, FERC or its Licensee must implement Term and Condition 4 to ensure that any listed salmonids trapped or captured during restoration, maintenance, monitoring, or salvage operations are protected by undertaking the following:

1. Implement fish rescue within 12 hours of any planned outage and 36 hours of any unplanned outages in the tailrace slough if the slough is dependent on Project flows and the unplanned outage is not under a “speed no load” condition. A “speed no load” condition shall be defined as an outage where power generation

has ceased but flow continues down the tailrace canal and into the tailrace slough.

2. Take all appropriate steps to minimize the amount and duration of handling during Chinook and coho salmon, and steelhead capture and release operations. The operations must maintain captured fish in water to the maximum extent possible during seining/netting, handling, and transfer for release to prevent and minimize stress.
 - a. Intermittently during isolation of an in-water work area, fish trapped in the area must be captured using a trap, seine, electrofishing, or other methods as are prudent to minimize risk of injury, then released at a safe release site. The fish biologists for Energy Northwest or WDFW, or their subordinate staff, must conduct all fish salvage operations, unless otherwise approved in writing by NMFS.
 - b. Electrofishing- If electrofishing will be used to capture fish for salvage, NMFS' electrofishing guidelines will be followed (NMFS 2000). Those guidelines are available from the NMFS West Coast Region, Protected Resources Division, Portland, Oregon.
 - i. Do no electrofish near listed adult salmonids in spawning condition or near redds containing eggs.
 - ii. Keep equipment in good working condition. Complete manufacturer's preseason checks, follow all provisions, and record major maintenance work in a log.
 - iii. Train the crew by a crew leader with at least 100 hours of electrofishing experience in the field using similar equipment. Document the crew leader's experience in a logbook. Complete training in waters that do not contain listed fish before an inexperienced crew begins any electrofishing.
 - iv. Measure conductivity and set voltage as follows:

Conductivity ($\mu\text{S}/\text{cm}$)	Voltage
Less than 100	900 to 1100

100 to 300	500 to 800
Greater than 300	150 to 400

- vi. Use direct current (DC) at all times.
 - vii. Begin each session with pulse width and rate set to the minimum needed to capture fish. These settings should be gradually increased only to the point where fish are immobilized and captured. Start with a pulse width of 500 μ s and do not exceed 5 milliseconds. Pulse rate should start at 30 Hz and work carefully upward. In general, pulse rate should not exceed 40 Hz, to avoid unnecessary injury to the fish.
 - viii. The zone of potential fish injury is 0.5 meters from the anode. Care should be taken in shallow waters, undercut banks, or where fish can be concentrated, because in such areas the fish are more likely to come into close contact with the anode.
 - ix. Work the monitoring area systematically, moving the anode continuously in a herringbone pattern through the water. Do not electrofish one area for an extended period.
 - x. Have crew members carefully observe the condition of the sampled fish. Dark bands on the body and longer recovery times are signs of injury or handling stress. When such signs are noted, the settings for the electrofishing unit may need adjusting. End sampling if injuries occur or abnormally long recovery times persist.
 - xi. Whenever possible, place a block net below the area being sampled to capture stunned fish that may drift downstream.
 - xii. Record the electrofishing settings in a logbook along with conductivity, temperature, and other variables affecting efficiency. These notes, with observations on fish condition, will improve technique and form the basis for training new operators.
- c. Do not use seining or electrofishing if water temperatures exceed 18°C, or are expected to rise above 18°C, unless no other method of capture is available.
 - d. ESA-listed fish must be handled with extreme care, keeping

- fish in water to the maximum extent possible during seining and transfer procedures to prevent the added stress of out-of-water handling.
- e. Water quality conditions must be adequate in tanks, buckets, or in sanctuary nets that hold water to transport fish by providing circulation of clean, cold water, using aerators to provide DO, and minimizing holding times.
 - f. Fish must be released into a safe release site as quickly as possible, and as near as possible to capture sites. In general, any fish removed from the work area must be released back into the Cowlitz River immediately downstream of the work area, unless otherwise directed by NMFS or WDFW.
 - g. ESA-listed fish must not be transferred to anyone except the fish biologists for the Energy Northwest or WDFW, or their designated subordinate staff, unless otherwise approved in writing by NMFS.
 - h. All other Federal, state, and local permits necessary must be obtained to conduct the capture and release activity.
 - i. NMFS or its designated representative must be allowed to accompany the capture team during the capture and release activity, and to inspect the team's capture and release records and facilities.
 - j. An electronic copy of the Salvage Report Form must be submitted to NMFS within 10 calendar days of completion of the salvage operations, noting the quantities and species of fish salvaged, and mortalities observed.
3. Require a special seining operation be conducted when the Cowlitz River exceeds elevation of 1044 feet MSL, meeting or exceeding the height of the fish exclusion racks on the barrier (1044 feet MSL) or water is observed flowing into the tailrace canal upstream of the barrier, a seining operation will be conducted in the Project stilling basin as soon as waters recede to a level where fish salvage can be safely conducted.

E. To carry out RPM #5, FERC or its Licensee must undertake the following Term and Condition 5:

1. Complete tailrace and stilling basin sampling as described in (Energy Northwest 2009, FERC 2009a).

2. Maintain and monitor effectiveness of the tailrace fish barrier as required by NMFS (2007), and detailed in Tailrace Fish Barrier Facility Maintenance Plan (Energy Northwest 2009).
 - a. Ensure the Tailrace Fish Barrier Facility is monitored for fish or other wildlife mortalities and that the information is archived so it may be provided to FERC and NMFS in annual reports.
 - b. Notify NMFS of damage or other factors that may interrupt screen operations.
 - c. Respond to NMFS or WDFW requests for screen repair or maintenance within 48 hours.
 - d. Facilitate access to the fish barrier upon request by NMFS or WDFW.
 - e. Fish Screens: Have the fish screen operated and maintained according to the NMFS' fish screen criteria (NMFS 2011b).
 - f. Implement the station stormwater management plan if excessive runoff is observed entering the Cowlitz or tailrace adjacent to the fish barrier. Straw bales or silt fence will be deployed to filter sediment.
 - g. Prepare an annual monitoring report to summarize the results of biological monitoring and evaluations and summarize the upcoming year's activities, including all biological monitoring and evaluations. This report must be submitted to NMFS for review and comment by January of each year.

F. To carry out RPM #6, FERC or its Licensee must undertake the following Term and Condition 6:

1. Provide increased instream flows in Lake Creek in accordance with the schedule below.

Proposed minimum instream flows (cfs) for Lake Creek, as measured at the drop structure. (Source: Energy Northwest 2008).

Month	Instream Flow
January	4
February	4
March	4
April	7

May	15
June	10
July	15
August 1–15	15
August 16–September	20
September 16–30	15
October	10
November	7
December	4

2. Implement the Lake Creek Ramping Rate Plan for Reach 5 below the drop structure (Energy Northwest 2009). With this plan, Energy Northwest would limit all instream flow reductions associated with the minimum instream flows to a maximum of 2.5 cfs per hour. One exception to this procedure is the June 1 reduction in flow (from 15 cfs to 10 cfs), which would be completed in one hour during night-time hours.

Interim ramping rate guidelines for water diversions in Washington state ³ (Source: Hunter 1992).

Season	Daylight Rates	Night rates
Feb 16–June 15 (salmon fry)	No ramping	2 inches/hour
June 16–Oct 31 (steelhead and trout)	1 inch/hour	1 inch/hour
Nov 1–Feb 15	2 inches/hour	2 inches/hour

3. Provide a spill event of greater than or equal to 285 cfs for as long as lake inflows can sustain that flow for a target of 24 hours, every other water year or 3 out of 6 water years. Provide documentation and reporting of the spill events and, if the frequencies of the spill events cannot be achieved, the agencies (including NMFS, Forest Service, and WDFW) will be consulted for an alternate plan.
4. Provide gravel and wood recruitment stations in Reach 5 below the drop structure. Wood and gravel located at these structures would be carried downstream during the channel-forming flows provided as part of the aquatic habitat spill events described above.
5. Install flow measurement equipment at the Lake Creek Road Bridge and begin recording data within the first year of the issuance of any

³ Washington Department of Fish and Wildlife did not make a specific recommendation for ramping rates at the Packwood Project.

new license.

6. Develop and implement a threatened, endangered, and sensitive species management plan.
7. Develop and implement a resource coordination plan to coordinate the recommended management plans and associated requirements for the project with various agencies and include provisions for an annual coordination meeting.

G. To carry out RPM #7, FERC or its Licensee must undertake the following Term and Condition 7:

Considering that fall-run Chinook were recently introduced in the upper Cowlitz in 2010, it is important to assess that considerations for other species are consistent with fall-run Chinook.

1. Within a year after license issuance, the Licensee must develop a fall-run Chinook monitoring plan in consultation with NMFS to provide baseline information on fall-run Chinook population density in areas associated with, and potentially affected by, the Packwood Lake Hydroelectric Project. NMFS must approve the final plan. These investigations are intended to fill in data gaps related to distribution, life history strategies, and density of fall-run Chinook presence in the Project area.

H. To carry out RPM #8, FERC or its Licensee must undertake the following Term and Condition 8:

1. Implement the Tailrace Water Temperature Monitoring and Enhancement Plan filed with the Commission on June 6, 2008. The Tailrace Water Temperature Monitoring and Enhancement Plan calls for Energy Northwest to monitor water temperatures in the Project's lined tailrace, at the Packwood Lake outlet, the Cowlitz River, and the mouth of Lake Creek to determine the effect of the tailrace water on the Cowlitz River water temperature. Conduct the monitoring during the first 10 years following license issuance, unless the temperature criteria is met for 3 consecutive years, at which time Energy Northwest would consult with WDOE to suspend or modify the monitoring activities upon Commission approval. One exception for the previously stated monitoring would be to conduct monitoring

associated with the project outage between August 15 and September 14 annually for the duration of the new license. If the tailrace temperature under the proposed operating regime does not meet applicable standards, Energy Northwest would consult with the WDOE, NMFS, and other agencies on additional ways to address this issue.

2. Ensure Project modification and operations comply with the water quality DO criterion, and maintain an IGDO minimum of 8mg/L for the duration of the spawning, incubation and fry emergence periods, unless this concentration is unattainable due to atmospheric and temperature conditions.

I. **To carry out RPM #9, FERC or its Licensee must undertake the following Term and Condition 9:**

1. Within one year of the issuance of the new license, prepare, in consultation with NMFS, and overall approach to development of plan(s) and report(s) describing how listed species in the action area would be protected and/or monitored and to document the effects of the action on listed species in the action area annual. NMFS must approve the approach.

Document Content(s)

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