



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

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October 9, 2006

**CERTIFIED MAIL 7005 2570 0000 4819 7917**

Ms. Holly Harwood  
PacifiCorp  
825 Northeast Multnomah  
Portland, OR 97232

Re: **Merwin Hydroelectric Project (FERC No. 935)**  
401 Certification / Order No. 3678

Dear Ms. Harwood:

We have reviewed PacifiCorp's request for certification under Section 401 of the Federal Water Pollution Control Act (Clean Water Act 33 U.S.C. § 1341) for the licensing of the Merwin Hydroelectric Project (FERC No. 935) in Clark and Cowlitz Counties, Washington. On behalf of the State of Washington, the Department of Ecology (Ecology) certifies that reasonable assurance exists that the project will comply with applicable provisions of 33 U.S.C. §§ 1311, 1312, 1313, 1316, and 1317, and other appropriate requirements of State law; subject to and limited by the conditions stated by the enclosed Certification-Order.

This Certification-Order shall be deemed withdrawn if the Federal Energy Regulatory Commission does not issue a license for the project within five (5) years of the date of this issuance of this Certification-Order. This Certification-Order may be modified or withdrawn by Ecology prior to the issuance of the license based upon new information or changes to the water quality standards or appropriate requirements of state law. If the Certification-Order is withdrawn, PacifiCorp will then be required to reapply for state certification under Section 401 of the Clean Water Act.

If you have any questions, please contact Chris Maynard at 360/407-6484. Written comments and correspondence relating to this document should be directed to Kelly Susewind, Water Quality Program, Department of Ecology, Southwest Regional Office, P.O. Box 47600, Olympia, WA 98504. The enclosed Certification-Order may be appealed by following the procedures described in the Certification-Order.

Sincerely,

Kelly Susewind, P.E., P.G.  
Southwest Region Manager  
Water Quality Program

KS:CM:lmc  
Enclosure



**STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY**

**IN THE MATTER OF GRANTING A  
WATER QUALITY CERTIFICATION TO:**

PacifiCorp  
in accordance with 33 U.S.C. § 1341  
FWPCA § 401, RCW 90.48.120, RCW 90.48.260  
and WAC 173-201A

) **CERTIFICATION-ORDER**  
) **NO. 3678**  
) Licensing of the Merwin Hydro-  
) Electric Project (FERC No. 935),  
) Clark and Cowlitz Counties,  
) Washington

TO: Holly Harwood  
PacifiCorp  
825 NE Multnomah  
Portland, OR 97232

On December 2, 2005, PacifiCorp (Licensee) filed an application with the State of Washington Department of Ecology (Ecology) requesting issuance of a certification under the provisions of Section 401 of the Federal Water Pollution Control Act (Clean Water Act) (33 U.S.C. § 1341) to be submitted with its application for a license to the Federal Energy Regulatory Commission (FERC) for the Merwin Hydroelectric Project.

**1.0 Nature of Project**

The Merwin Hydroelectric Project (Merwin or Project) is one of a total of four hydroelectric projects on the North Fork of the Lewis River (Lewis River). Starting upstream and going downstream, the projects are Swift No. 1, Swift No. 2, Yale, and Merwin. The Lewis River flows west from the Cascade Mountain Range and its western foothills 93 miles into the Columbia River near the town of Woodland, Washington. Two volcanic peaks, Mount Adams and Mount St. Helens lie on the northern and eastern edges of the basin, respectively. The Project is managed for power generation, with a capacity of 136 megawatts and for flood control, recreation, and fish resources.

Merwin is located at river mile 19.5 on the North Fork of the Lewis River. Merwin includes a 313-foot high, 1,300 foot long concrete dam structure. Merwin Dam forms a 14.5 mile-long reservoir known as Lake Merwin. At full pool, the centers of the 15.5 foot diameter intakes to the turbines are 202.95 feet below the surface of the reservoir. Flows are directed through three turbines at the base of the dam into the Lewis River.

**2.0 Authorities**

In exercising authority under Section 401 of the Clean Water Act (33 U.S.C. § 1341), RCW 90.48.120 and RCW 90.48.260, Ecology has investigated this application pursuant to the following:

- 1) Conformance with all applicable water quality-based, technology-based, and toxic or pretreatment effluent limitations as provided under Sections 301, 302, 303, 306, and 307 of the Clean Water Act (33 U.S.C. §§ 1311, 1312, 1313, 1316, and 1317);
- 2) Conformance with any and all applicable provisions of Chapter 90.48 RCW, including the provision to use all known, available and reasonable methods to prevent and control pollution of state waters as required by RCW 90.48.010; and
- 3) Conformance with the state water quality standards as provided for in Chapter 173-201A WAC and as authorized by 33 U.S.C. § 1313 and Chapter 90.48 RCW, and with other appropriate requirements of state law.

### **3.0 Findings**

#### ***Background Information about the Project***

- 1) Merwin is managed for power generation, with a capacity of 11,470 cfs and 136 megawatts, and for flood control, recreation, and downstream fish enhancement.
- 2) The 'North Fork' Lewis River watershed is 93 miles long, covers 1050 square miles, and ranges in elevation from 12,281 feet above mean sea level (msl) at the summit of Mount Adams to eight (8) feet msl at the confluence with the Columbia River (RM 87.5) near the town of Woodland, Washington. The majority of the Lewis River basin is forested, with an area of approximately 30 square miles of upper basin denuded by the eruption of Mount St. Helens in 1980.
- 3) The mainstem of the Lewis River is known as the North Fork Lewis River, and flows southwesterly from its source at Mount St. Helens and Mount Adams through the Swift Creek Reservoir to Swift No. 1 Dam (RM 47.9); the Swift No. 2 canal bypassing three miles of the natural river channel to Swift No. 2 (RM 44); Yale Lake to Yale Dam (RM 34.2); and Lake Merwin to Merwin Dam (RM 19.5). PacifiCorp owns and operates Swift No. 1, Yale, and Merwin Dams. Cowlitz County PUD owns Swift No. 2 Dam which is currently operated under contract by PacifiCorp.
- 4) Construction of Merwin Dam began in 1929 and was initially completed with a single turbine in 1932. Two additional turbines were added in 1949 and 1958, respectively.
- 5) Merwin is operated in a coordinated system with Swift No. 1, Swift No. 2 and Yale hydroelectric projects. Merwin Dam typically passes water through its turbines to regulate flows from these upstream dams toward meeting minimum instream flows downstream in the Lewis River.
- 6) Merwin Lake levels usually fluctuate between 235 feet msl in the summer to 239.6 feet msl. Normal full pool is 239.6 feet msl. The lake usually fluctuates minimally due to peaking operations at Yale Dam. The minimum operating level is 165 feet msl.
- 7) Merwin Dam has structural facilities to allow for upstream migration of fish. However, since about 1945, this facility has been operated to collect broodstock for the hatchery program administered by the Washington Department of Fish and Wildlife.
- 8) Fish in the Lake Merwin include non-reproducing bull trout, sculpin, northern pike-minnow, tiger muskellunge, sturgeon, carp, bluegill, crappie, three-spined stickleback, cutthroat trout, Kokanee, rainbow trout, mountain whitefish, and largescale suckers. Anadromous fish remain limited to below Merwin Dam except those excess hatchery fish planted in the lake to supplement the sport fishery.
- 9) A Settlement Agreement was signed on November 30, 2004 and filed with FERC on December 9<sup>th</sup>, 2004. This agreement represented more than three years of collaboration between 26 parties interested in the Lewis River hydroelectric projects. In this agreement, PacifiCorp and Cowlitz PUD agreed to contribute resources towards the protection, mitigation and enhancement of fish resources, recreation, and aesthetics. Some of the requirements reflected in this Certification-Order are a direct result of the efforts and studies conducted by the parties involved. Ecology is not a party to the Settlement Agreement.

#### ***Compliance with Standards***

- 1) Existing Water Quality: Several water quality studies were performed to assess the existing water quality of the Lewis River hydropower projects. These studies analyzed the water quality characteristics of concern for each stretch of the Lewis River system. Relevant data regarding existing water quality is summarized in Table 1.

**Table 1. Existing Water Quality\***

<b>Parameter</b>	<b>Location</b>	<b>Existing Water Quality</b>
<b>Total dissolved gas (TDG)</b>	Merwin tailrace	TDG was <110% during turbine ramp up and ramp down.
	Merwin tailrace	TDG exceedances >110% may occur during large spills
<b>Temperature</b>	Merwin Lake, Merwin Dam forebay	Temperature profile with most pronounced stratification at ~35 feet from July through October with bottom temperatures ~8°C throughout the year and surface temperatures reaching 23°C in the summer. Little or no stratification seen in winter months.
	Upper Lake Merwin, Yale tailrace	In the tailrace and adjacent waters of Lake Merwin, water temperatures fluctuated quickly over a 10°C range in the mornings and evenings due to turbine flows when producing power during the day and shutting off flows at night. Temperatures during the day were cold due to deepwater stratified forebay temperatures at the turbine intakes. Warm night time summer temperatures reflect the stratified surface temperatures of Lake Merwin. Temperatures during the summer months dropped ~6°C within a period of one (1) hour and heated 6°C within two hours in the evenings.
	Merwin tailrace	Range: ~3-5°C in Feb/March to ~15°C in Sept
<b>Dissolved oxygen (D/O)</b>	Merwin forebay	Below 8 mg/L in August, September and October
	Merwin tailrace	Greater than 8 mg/L
<b>Turbidity</b>	Merwin forebay and tailrace	Less than 5 NTU over background turbidity
<b>pH</b>	Merwin forebay and tailrace	Between 6.5 and 8.5

\*Based on:

- 1 Preliminary Water Quality (WQ) Study, PacifiCorp Environmental Services July 1995
- 2 1996-1998 WQ Study found in Final Technical Report, Aquatic Resources, Yale Hydro-electrical Project, March 1999
- 3 Licensee's 2001 Technical Study Status Reports for the Lewis River Hydroelectric Projects, Volume 4, April, 2002

- 2) The turbines at Merwin were designed to use air to reduce cavitation on the turbine blades as the generators are powering up and powering down during electricity demand cycles at the beginning and end of each day. However, the continuous operation of the turbines using current operating procedures at Merwin to provide regulated flows in the Lewis River does not cause water quality criteria of 110% TDG exceedance.
- 3) TDG exceedances may occur below the dam when the dam spills water through the spillway to the Lewis River. This is because the 206-foot-long spillway structure has the potential to plunge water and thus entrain air into the tailwater pool to 60-foot depths. Flows above the 7-day 10-year flood (7Q10) are exempt from the Water Quality Standards (WAC 173 201A-060 (4)(a)).
- 4) For Merwin Dam, these river flows are calculated to be 32,884 cfs. Spills above the hydraulic capacity of the dam and below the 7Q10 flood flow are expected to occur an average of once or twice per year to control lake levels during periods of high rain and/or snowmelt. At lower spill

flows, the five tainter gates can be operated to reduce plunging flows and thus reduce IDG entrainment

- 5) This Certification-Order requires minimum instream flows, ramping rates, and plateau flows as specified in the Settlement Agreement (SA).
- 6) Dissolved oxygen levels below 50 meters in the forebay of the dam were less than 8 mg/L in September and October. While this does not exceed the water quality criterion for Lake Merwin, turbine-released water into the lower river has the potential to contain this low amount of dissolved oxygen, and thus exceed the water quality criterion for the river. However, to date, the lowest readings in the Lewis River below Merwin Dam during September and October were 9.7 mg/L, which were within the water quality criterion.
- 7) Temperatures in the top ~25 feet of Lake Merwin near the forebay of the dam were found to be greater than 18°C from July through September. The cool water released from the deep water intakes into the Lewis River maintains Lewis River water temperatures below 18°C during these months.
- 8) Temperature fluctuations of up to 10°C occur in the tailrace of Yale Dam/upper Merwin Lake. This occurs in the mornings when cold, deep-water turbine flows enter the epilimnion waters of Lake Merwin in the Yale tailrace and occurs again in the evenings when the turbines shut down, no water enters the tailrace, and the epilimnion waters of Lake Merwin flow back to the face of the dam.
- 9) Class A water quality standards apply downriver from Merwin Dam. Lake Class water quality standards apply from Merwin Dam at 236.9 feet msl to the Face of Yale Dam since Lake Merwin is a reservoir with a mean detention time of greater than 15 days. Mean detention time is calculated by dividing the reservoir's mean annual minimum total storage by the thirty-day ten-year low-flow from the reservoir. Lake class conditions for temperature require that the licensee maintaining the highest attainable water quality condition that is feasible to achieve to best protect the biota.
- 10) There is reasonable assurance that the other water quality characteristic uses listed in the 1997 water quality standards will be met.

#### **4.0 Conditions**

Through issuance of this Certification-Order, Ecology certifies that it has reasonable assurance that the operation of the Merwin Project, and activities associated with its continued operation as conditioned will be conducted in a manner that will not violate applicable water quality standards and other appropriate requirements of state law. In view of the foregoing and in accordance with 33 USC § 1341, RCW 90.48.120, RCW 90.48.260, and Chapter 173-201A WAC, this water quality certification is granted to PacifiCorp for the Merwin Hydroelectric Project (FERC No. 935) subject to the conditions within this Certification-Order.

Certification of this project does not authorize the Licensee to exceed applicable state water quality standards (Chapter 173-201A WAC). Furthermore, nothing in this Certification-Order shall absolve the Licensee from liability for contamination and any subsequent cleanup of surface waters, ground waters, or sediments occurring as a result of activities associated with Project operations and FERC license conditions

#### **4.1 General Requirements**

- 1) The project shall comply with all water quality standards approved by the Environmental Protection Agency (currently codified in ch. 173-201A WAC), ground water quality standards
- 2) (currently codified in ch. 173-200 WAC), and sediment quality standards (currently codified in ch. 173-204 WAC) and other appropriate requirements of state law. The conditions below set forth adaptive management processes and measures to achieve full compliance with standards and

constitute a water quality attainment plan under the 2003 WAC 173-201A-510(5) for TDG and temperature.

- 3) In the event of changes or amendments to the state water quality, ground water quality, or sediment standards, or changes in or amendments to the state Water Pollution Control Act (RCW 90.48), or changes in or amendments to the Clean Water Act, such provisions, standards, criteria, or requirements shall apply to this project and any attendant agreements, orders or permits. Ecology will notify the Licensee through an Administrative Order of any such changes or amendments applicable to its project.
- 4) Discharge of any solid or liquid waste to the waters of the state of Washington without approval from Ecology is prohibited.
- 5) The Licensee shall obtain Ecology review and approval before undertaking any change to the project or project operations that might significantly and adversely affect the water quality or compliance with any applicable water quality standard (including designated uses) or other appropriate requirement of state law.
- 6) This Certification-Order does not exempt compliance with other statutes and codes administered by federal, state, and local agencies.
- 7) A Hydraulic Project Approval (HPA) (under 77.55 RCW) shall be acquired from the Washington State Department of Fish and Wildlife (WDFW) prior to any work in waters of the State.
- 8) Ecology retains the right, by further Order, to modify schedules or deadlines provided under this Certification-Order or provisions it incorporates.
- 9) Ecology retains the right by Administrative Order to require additional monitoring, studies, or measures if it determines there is likelihood that violations of water quality standards or other appropriate requirements of state law have occurred or may occur, or insufficient information exists to make such determination.
- 10) Ecology reserves the right to amend this Certification-Order if it determines that the provisions hereof are no longer adequate to provide reasonable assurance of compliance with applicable water quality standards or other appropriate requirements of State law. Any such amended Certification-Order shall take effect immediately upon issuance, unless otherwise provided in the amended Certification-Order, and may be appealed to the Pollution Control Hearings Board (PCHB) under ch. 43.21B RCW.
- 11) Ecology reserves the right to issue administrative orders, assess or seek penalties, and to initiate legal actions in any court or forum of competent jurisdiction for the purposes of enforcing the requirements of this Certification-Order.
- 12) The conditions of this Certification-Order shall not be construed to prevent or prohibit the Licensee from either voluntarily or in response to legal requirements imposed by a court, the FERC, or any other body with competent jurisdiction, taking actions which will provide a greater level of protection, mitigation, or enhancement of water quality or of existing or designated uses.
- 13) If five (5) or more years elapse between the date this Certification-Order is issued and issuance of the new FERC license for the Project, this Certification-Order shall be deemed to be expired and denied without prejudice at such time and the Licensee shall send Ecology an updated application for a Clean Water Act Section 401 Certification that reflects then current conditions, regulations and technologies. This provision shall not be construed to otherwise limit the reserved authority of Ecology to withdraw, amend, or correct the Certification-Order before or after the issuance of a FERC license.
- 14) This Certification-Order may be modified or withdrawn by Ecology prior to the issuance of the license based upon significant new information or changes to water quality standards or appropriate requirements of state law.

- 15) Copies of this Certification-Order and associated permits, licenses, approvals and other documents shall be kept on the Project site and made readily available for reference by the Licensee, its contractors and consultants, and by Ecology.
- 16) The Licensee shall allow Ecology access to inspect the project and project records required by this Certification-Order for the purpose of monitoring compliance with its conditions. Access shall occur after reasonable notice, except in emergency circumstances.
- 17) The Licensee shall, upon request by Ecology, fully respond to all reasonable requests for materials to assist Ecology in making determinations under this Certification-Order and any resulting rulemaking or other process.
- 18) Any work that is out of compliance with the provisions of this Certification-Order, or conditions that result in distressed, dying or dead fish, or any discharge of oil, fuel, or chemicals into state waters, or onto land with a potential for entry into state waters, or turbidity greater than 5 NTU over background in Lake Merwin; or greater than 5 NTU over background conditions or greater than 10% below Merwin Dam if background conditions are greater than 50 NTU is prohibited. If these conditions occur, the Licensee shall immediately take the following actions:
  - a) Cease operations at the location of the violation to the extent such operations may reasonably be causing or contributing to the problem.
  - b) Assess the cause of the water quality problem and take appropriate measures to correct the problem and/or prevent further environmental damage.
  - c) Notify Ecology of the failure to comply. Oil or chemical spill events shall be reported immediately to Ecology's 24-Hour Spill Response Team at (800) 258-5990 within 24 hours. Other non-compliance events shall be reported to Ecology's Federal Permit Manager at 800 424-8802.
  - d) Submit a detailed written report to Ecology within five (5) days that describes the nature of the event, corrective action taken and/or planned, steps to be taken to prevent a recurrence, results of any samples taken, and any other pertinent information.
  - e) Observed violations at the project shall be highlighted in the annual monitoring report.

Compliance with these requirements does not relieve the Licensee from responsibility to maintain continuous compliance with the terms and conditions of this Certification-Order or the resulting liability from failure to comply.
- 19) The project shall meet the Class A standards below Merwin Dam and Lake Standards in Lake Merwin listed in WAC 173-201A-030.
- 20) A Water Quality Management Plan (WQMP) is required. All water quality related plans described below shall be included as separate sections of the WQMP.

#### **4.2 Instream Flows and Ramping Rates below Merwin Dam**

- 1) The project shall comply with the instream flow measures identified in Section 9.8 of the Settlement Agreement signed November 30, 2005, submitted to FERC December 9, 2005, and provided herein as Exhibit A.
- 2) Spill from Merwin will be calculated and reported for every change in gate opening in accordance with condition 4.8.3 of this Certification-Order under Monitoring and Reporting.

**4.3 Total Dissolved Gas (TDG)**

- 1) The Project shall not cause any exceedance of the TDG water quality criteria as specified in WAC 173-201A 030 (2)(c)(iii) below Merwin Dam, WAC 173-201A(5)(c)(iii) in Lake Merwin, and 173-201A-060 (4)(a) in any waters of the Project.
- 2) The Licensee shall operate Merwin Dam to maintain the TDG associated with air-injected to turbine flows to 110% or less TDG.
  - a) The Licensee shall perform water quality monitoring in turbine water below Merwin Dam for turbine air injection generated TDG in accordance with condition 4.8.3 of this Certification-Order under Monitoring and Reporting.
  - b) If, over the term of the license, turbines are replaced or modified, design such turbines to minimize TDG production.
- 3) The Licensee shall manage spill to limit TDG production to 110% or less saturation.
  - a) The Licensee shall monitor spill water beginning during the first spill event after this Certification-Order is issued and as specified in the monitoring plan in Exhibit C and in conditions 4.2.2 under Flows and 4.8.3 of this Certification-Order under Monitoring and Reporting.
  - b) Within six (6) months of the discovery of any exceedance of the 110% TDG criterion caused by spill, the Licensee shall submit a TDG Water Quality Attainment Plan (TDG WQAP) to Ecology for review and approval. The TDG WQAP plan shall include:
    - i. A description of standard Project operations with regard to minimizing TDG associated with spills;
    - ii. A description of how the Project will minimize all spills that produce TDG exceedances at the Project;
    - iii. An evaluation of all potential and preferred structural and operational improvements to minimize TDG production;
    - iv. A timeline showing when operational adjustments will occur;
    - v. A schedule for construction; and
    - vi. Monitoring plans to further evaluate TDG production and to test for effectiveness of gas abatement controls.
  - c) The Project shall operate according to the approved TDG WQAP with the objective of eliminating TDG exceedances.
  - d) Upon approval of the TDG WQAP, the Licensee shall immediately begin the necessary steps identified in the TDG WQAP to eliminate TDG criteria exceedances
  - e) If monitoring to test the effectiveness of gas abatement controls implemented through the TDG WQAP shows the TDG abatement measures identified in the Plan and subsequently employed are not successful in meeting the water quality criterion, then, within the first ten (10) years of discovery of TDG criterion exceedances caused by spill, Ecology will require further activities to meet the water quality criterion. Significant structural or operational revisions that may impose potentially unreasonable costs or create potentially unreasonable societal effects may be evaluated as part of a formal Use Attainability Analysis consistent with the federal and state water quality regulations after the ten (10) year compliance period has ended.
- 4) Provided that all reasonable operational efforts are made to minimize TDG exceedances and Ecology is notified within 24 hours after the onset of the spill, compliance with the 110% TDG criteria does not apply, when:



- a) Actual or predicted flows in the Lewis River exceed the rate equivalent to the 7Q10 flows as defined in WAC 173-201A-060(4)(a). At the writing of this Certification-Order, the 7Q10 flow for the Lewis River at Merwin Dam is 32,884 cfs. Either the Licensee or Ecology may reassess and propose a revised value for the 7Q10 flow. Modification and application of the 7Q10 flow requires Ecology's approval.

Because the Project exerts some control over the timing and amplitude of storm flows, a qualifying 7Q10 event for the purposes of the TDG criteria exemption includes flows accompanied by an actual or forecasted large storm event that provides an equivalent amount of water to the drainage basin, regardless of flows at Merwin Dam. Calculations of such qualifying events shall follow language contained in the Settlement Agreement pertaining to High Runoff Procedures (SA 12 8) which states:

*"PacifiCorp shall obtain 3-day river flow forecasts from a reputable third party forecasting organization (which may include the National Weather Service's River Forecasting Center) for the Lewis River Watershed. This 3-day river flow forecast shall be used by PacifiCorp in its forecast-based high runoff procedure as described below. PacifiCorp shall periodically evaluate the forecasts being used against other commonly available forecasts, with the goal of improving forecasting accuracy for flood management through the use of evolving technology, to the extent practicable."*

*"During the Flood Management Season, PacifiCorp shall calculate the "Forecasted Flow" for the Lewis River from the 3-day forecast by determining the forecasted flow that has an 85% probability of occurring. In the event that it appears that the Forecasted Flow will result in inflows significant enough to utilize a portion of the 17 feet of hole, as defined in the Manual, reserved for flood management purposes, PacifiCorp shall make a Pre-Release to provide additional capacity to store inflows into the reservoirs during the high-runoff event. Once the total hole is reduced to 17 feet, PacifiCorp shall continue to follow the flow release procedures contained in the Manual as of the Effective Date."*

Any observed spike of TDG at the Merwin Dam forebay shall not be considered a TDG criteria exceedance if it was formed during a qualifying 7Q10 event at Swift No. 1.

- b) Short term spills are necessary to protect public safety and respond to volcanic activity.
- 5) During high flows greater than the 7Q10, the Licensee shall manage spill levels and spill gate configuration to minimize TDG production.

#### **4.4 Temperature and Dissolved Oxygen**

- 1) Lewis River. The Project shall not cause any violation of the temperature and dissolved oxygen water quality criteria as specified for Class 'A' waters, WAC 173-201A-030(2)(c)(ii) and (iv) in and below Merwin Dam. The Licensee shall not cause these waters to exceed 18°C nor dissolved oxygen concentrations to go below 8 mg/L. If the presence or operation of the dam causes violation of these criteria, the Licensee shall modify its operation to the extent necessary to ensure that the Project does not cause such exceedance.
- 2) Lake Merwin. The Project shall not cause any violation of the temperature or dissolved oxygen water quality criteria as specified for Lake Class waters in WAC 173-201A-030(5)(c)(ii) and (iv) in Lake Merwin. If the presence or operation of the Merwin Dam causes violation of these criteria, the Licensee shall modify its operation to the extent necessary following the compliance schedule outlined below to ensure that the Project does not cause such exceedance. The Lake Class temperature and dissolved oxygen criteria that applies to the reservoir mandates no measurable change from natural conditions. The Merwin Dam has created artificial lake conditions over which the project has some control. In such circumstances, Ecology requires the

Licensee to use all reasonable and feasible measures to achieve conditions that best protect the designated or characteristic uses for fish and shellfish (WAC 173-201A(2)(b)(iii)) within the reservoir.

- 3) The Licensee shall develop a Temperature Water Quality Attainment Plan (TWQAP) for the Lake Merwin canyon (Canyon). A draft of the TWQAP shall be submitted for Ecology review and approval. This draft shall be submitted within one (1) year of license issuance.

The purpose of this TWQAP is to identify and maintain the highest attainable water quality conditions to provide a temperature fluctuation regime that is reasonable and feasible to achieve and which will best protect the cold-water biota. The TWQAP must include a reasonable compliance schedule for carrying out an adaptive process within ten (10) years of license renewal for evaluating feasible technical and operational changes to improve temperature for cold water biota using the steps outlined below:

- a) identify the Canyon's species of fish and macroinvertebrates (identified to the lowest practical level) and determine where they are found in the water column at different life stages and different times of day;
  - b) evaluate the temperature requirements of those organisms that use the upper water column;
  - c) evaluate the effects of the project-related temperature fluctuations on these organisms;
  - d) if necessary to protect the most sensitive beneficial uses, identify the target temperatures in the Canyon which will protect the organisms in the upper water column, lower water column and the benthos;
  - e) if necessary to protect the most sensitive beneficial uses, identify all reasonable and feasible methods to ensure that the water temperature fluctuation regime in the Canyon remains below levels which would harm the aquatic biota or limit the potential healthy cold water habitat; and
  - f) identify adaptive management strategies to further improve the temperature fluctuation regime for cold-water biota in the event that target temperatures are not achieved.
- 4) If it is determined through the TWQAP that steps must be taken in order to protect the most sensitive beneficial uses, the Licensee shall employ all reasonable and feasible methods identified in response to condition 2 (e and f) to ensure that the water temperature fluctuation regime in the Canyon remains below levels which would harm the aquatic biota or limit the potential healthy cold water habitat
- 5) The Licensee shall monitor temperature and dissolved oxygen in the forebay and tailrace of Merwin Dam in accordance with condition 4 8.3 of this Certification-Order under Monitoring and Reporting. This monitoring is in addition to any temperature monitoring required in the approved TWQAP.

#### **4.5 Construction Projects, Miscellaneous Discharges, and Habitat Modifications**

The following applies to all over-water or near-water work related to the Project that can impact surface- or ground-water quality. This includes, but is not limited to, construction, operation, and maintenance of fish collection structures, generation turbines, penstocks, hatcheries, transportation facilities, portable toilets, boat ramps, transmission corridors, structures, and staging areas. This also includes emergencies for all activities related to Project operation.

- 1) If water quality exceedances are predicted as being unavoidable during construction or maintenance of a project, a short-term modification must be applied for in writing to Ecology at least three (3) months prior to project initiation. If any project has a long-term impact on a regulated water quality parameter, characterization monitoring must be performed for the impacted parameter(s), and a monitoring plan must be outlined in the Water Quality Protection

Plan discussed below. This may require additional management practices to minimize impacts over the license period.

- 2) A Water Quality Protection Plan (WQPP) shall be prepared, and followed for all Project-related work that is in- or near-water that has the potential to impact surface- and/or groundwater quality. The WQPP shall include control measures to prevent contaminants from entering surface water and groundwaters, and shall include, but not be limited to, the following elements:
  - a) A Stormwater Pollution Prevention Plan (SWPPP) shall specify the Best Management Practices (BMPs) and other control measures to prevent contaminants entering the Project's surface water and groundwaters. The SWPPP shall address the pollution control measures for the Licensee's activities that could lead to the discharge of stormwater or other contaminated water from upland areas. The SWPPP must also specify the management of chemicals, hazardous materials and petroleum (spill prevention and containment procedures), including refueling procedures, the measures to take in the event of a spill, and reporting and training requirements.
  - b) An In-Water-Work Protection Plan (IWWPP) shall be consistent with the SWPPP and shall specifically address the BMPs and other control measures for the Licensee activities that require work within surface waters. Turbidity and dissolved oxygen shall be monitored upstream of the location where in-water construction is taking place and at the point of compliance (as defined in WAC 173 201A-110(3)(a-d)) during construction. Samples shall be taken at a minimum of once each day during construction in or adjacent to any water bodies within the Project area that may be affected by the construction. The IWWPP shall include all water quality protection measures consistent with a Hydraulics Project Approval (HPA) for the Project.
  - c) The WQPP shall include procedures for monitoring water quality, actions to implement should a water quality exceedance occur, and procedures for reporting any water quality violations to Ecology. The WQPP shall include all water quality protection measures consistent with a HPA for the Project. The WQPP shall be submitted to Ecology for review and approval at least three (3) months prior to Project initiation, and a copy of the WQPP shall be in the possession of the on-site construction manager, and available for review by Ecology staff, whenever construction work is under way.
  - d) When a construction project meets the coverage requirements of the National Pollution Elimination System (NPDES) permit and State Waste Discharge General Permit for Stormwater Discharges associated with construction activity, the Licensee shall either, at Ecology's discretion, apply for this permit and comply with the terms and conditions of the permit or apply for and comply with the terms of an individual NPDES permit.
- 3) Best Management Practices
  - a) Work in or near the reservoir, water within the dam, the river, or any wetlands shall include all reasonable measures to minimize the impacts of construction activity on waters of the state. Water quality constituents of particular concern are turbidity, suspended sediment, settleable solids, oil and grease, and pH. These measures include use of Best Management Practices (BMPs) to control erosion and sedimentation, proper use of chemicals, oil and chemical spill prevention and control, and clean-up of surplus construction supplies and other solid wastes.
  - b) During construction, all necessary measures shall be taken to minimize the disturbance of existing riparian, wetland, or upland vegetation.
  - c) All construction debris shall be properly disposed of on land so that the debris cannot enter a waterway or cause water quality degradation to state waters. Retention areas or swales shall be used to prevent discharging of water from construction placement areas.

- d) The Licensee shall ensure that any fill materials that are placed for the proposed habitat improvements in any waters of the state do not contain toxic materials in toxic amounts.
- 4) Maintain Turbidity Standards
  - a) Certification of this Project does not authorize the Licensee to exceed the turbidity standard beyond the mixing zone described in (b), (c), (d), and (e) below. Turbidity in Class A waters in and below Merwin Dam shall not exceed 5 NTU over background turbidity when turbidity is 50 NTU or less, or have more than a 10 percent increase in turbidity when the background turbidity is more than 50 NTU. Turbidity in Lake Class waters of Lake Merwin shall not exceed 5 NTU over background turbidity.
  - b) For Class A waters, , a mixing zone is established, consistent with WAC 173-201A-100(7) and -110(3), within which the turbidity standard is waived. The mixing zone is established to allow only temporary exceedances of the turbidity criteria during and immediately after in-water work. The temporary turbidity mixing zone shall be as follows:
    - i. For waters up to 10 cfs flow at the time of construction, the point of compliance shall be 100 feet downstream from activity causing the turbidity exceedance.
    - ii. For waters above 10 cfs up to 100 cfs flow at the time of construction, the point of compliance shall be 200 feet downstream from activity causing the turbidity exceedance
    - iii. For waters above 100 cfs flow at the time of construction, the point of compliance shall be 300 feet downstream from activity causing the turbidity exceedance.
  - c) For Lake Class waters, certification of this Project does not authorize the Licensee to exceed the turbidity standard beyond the mixing zone described in (d) and (e) below.
  - d) Step 1. Mixing zones shall not be allowed unless it can be demonstrated to the satisfaction of Ecology that:
    - i. Other siting, technological, and managerial options that would avoid the need for a lake mixing zone are not reasonably achievable;
    - ii. Overriding considerations of the public interest will be served; and
    - iii. All technological and managerial methods available for pollution reduction and removal that are economically achievable would be implemented prior to discharge
  - e) Step 2. Mixing zones, singularly or in combination with other mixing zones, shall comply with the most restrictive combination of the following:
    - i. Not exceed ten percent of the waterbody volume;
    - ii. Not exceed ten percent of the waterbody surface area (maximum radial extent of the plume regardless of whether it reaches the surface); and
    - iii. Not extend beyond fifteen percent of the width of the waterbody.
- 5) The above conditions do not relieve the Licensee from the need to obtain all the applicable permits. Activities that could discharge pollutants to waters of the state must use appropriate Best Management Practices to protect water quality.

#### **4.6 Oil Spill Prevention and Control**

- 1) No oil, fuel, or chemicals shall be discharged into waters of the state, or onto land with a potential for entry into waters of the state as prohibited by Ch. 90.56 RCW and Ch. 90.48 RCW.
- 2) Contain and remove from the water, visible floating oils released from construction or Project operation.

- a) In the event of a discharge of oil, fuel or chemicals into state waters, or onto land with a potential for entry into state waters, immediately begin and complete containment and clean-up efforts, taking precedence over normal work. Clean-up shall include proper disposal of any spilled material and used clean-up materials.
  - b) Do not use emulsifiers or dispersants in waters of the state without prior approval from Ecology, Southwest Regional Office.
  - c) Within three (3) months of receiving the license from FERC, establish an Ecology-approved on-site spill cleanup material inventory. Maintain this on-site inventory and a complete inventory list.
  - d) Project Operators shall be familiar with and trained on use of oil spill cleanup materials. In the event of an oil spill, properly dispose of used/contaminated materials and oil and as soon as possible restock new supplies. Include records of proper disposal in the oil consumption records and keep copies of disposal records of contaminated cleanup supplies on-site for inspection.
  - e) Ensure that operational work boats and trained boat operators are available on short notice in the event of a spill. Install mechanisms as appropriate to safely launch or lower work boats into areas where work boats would be deployed in the event of an oil spill. These mechanisms must be pre-approved by Ecology.
  - f) Keep SPCC Plans as required and historical spill records on-site. Provide these to Ecology immediately upon request.
  - g) Identify and map floor drains. Post these maps at the Project in a conspicuous location for use by Operators and other personnel in the event of an oil spill. Seal floor drains that are no longer needed.
  - h) Install, or have on site to deploy stair cases, ladders, etc. which will allow oil spill response staff to safely reach areas that could, in the event of an oil spill, need to be accessed to deploy sorbent pads and boom materials.
- 3) Oil-Water Separators (OWS)
- a) Within three months of issuance of the FERC license, submit a maintenance plan for the OWS to Ecology for approval. This maintenance plan must include a process to periodically test the oil-stop valves and provide assurance that they will work as designed. (See condition 4.8.3 of this Certification-Order under Monitoring and Reporting)
  - b) OWS shall only admit rain and water run-off that originates in the containment area that is intended to drain into the OWS.
  - c) Perform periodic and appropriate maintenance and inspection on a schedule to include sediment removal. (See condition 4.8.3 of this Certification-Order under Monitoring and Reporting)
  - d) Clean and service the OWS after each event where oil is introduced into the OWS.
  - e) Evaluate each OWS for inflows to account for the total volume of all transformers located in the containment area plus 10 per cent. Verify and conduct corrective action that will insure that oil would not be "washed through" the OWS if a failure of all containers in the containment area occurs during a major rain event.
- 4) Transformers
- a) Transformer deck containment area surfaces must be impervious. Conduct periodic inspections and resurface areas, fill cracks, caulk metal plate footings or otherwise ensure that containment areas will contain all spill fluids.

- b) Obtain prior approval from Ecology before breaching containment areas for reasons other than containment area maintenance.
  - c) Conform to industry standards for protecting water quality and preventing and containing oil spills when transporting transformers and transformer oil.
  - d) Snowy or icy conditions require daily inspections of transformer deck containment area including an inspection of the drains leading to the OWS for freeze-up conditions. Remove any observed rain water pooling in the containment areas. (See condition 4.8.3 of this Certification-Order under Monitoring and Reporting)
- 5) Sumps
- a) Locate oil sensors on the surface of the water in each sump in addition to the oil sensors located at the bottom of each pumping cycle. Inspect and test these sensors every three (3) months or sooner if needed to insure that they will work as designed. Include in the inspection provisions to verify that the oil sensors located at the bottom of each pumping cycle are properly placed at the proper level. Visually inspect all of these areas each week or immediately if oil is suspected to be present such as in the event of an oil sensor alarm or the observance of an oil or grease spill in the turbine pit of sufficient volume to reach the sump. Any oil detected in the sumps requires immediate cleanup and Emergency Management Division (EMD) and National Response Center (NRC) notification. (See condition 4.8.3 of this Certification-Order under Monitoring and Reporting)
  - b) Immediately repair oil leaks in the turbine pit that are of sufficient volume to reach the sump and that can not be contained by placing a container underneath the leak. Immediately repair water leaks located in the turbine pit area that are leaking at a volume of greater than one gallon per hour.
  - c) Install or deploy hand rails and mechanisms so the sump covers can be removed for a visual inspection of the sump. Provide water-proof lighting in the sumps or spotlights adequate to view the surface water in the sumps. Provide a mechanism to satisfactorily deploy and recover sorbent boom in the sumps at each project.
- 6) Oil, fuel and chemical storage containers, containment areas, and conveyance systems
- a) Provide proper containment around each storage container (including transformers) or around a combination of storage containers as appropriate and agreed upon by Ecology. Proper containment equals the volume of the container plus 10 per cent.
  - b) Recalculate required containment areas to insure proper containment still exists after major equipment changes. Example: when converting from water cooled transformer to an air cooled unit, re-calculate oil volume and compare to containment area. Calculate containment volumes from *maximum* storage volumes, not normal oil level volumes.
  - c) Provide external oil level gauges for governor oil tanks, transformers and other oil tanks that contain over 100-gallons of oil. Provide appropriate level markings for these gauges. Provide a sign or other means at each tank, near the tank level gauge, that describes these level markings and the relationship of each inch vs. how many gallons (in the case of a glass tube type of gauge). Dial gauges must also describe oil volume in gallons or have a sign or other indicator provided at each reservoir that adequately describes dial movement in relation to gallons. Provide a sign or other indication that shows  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , and full gauge readings or indications in gallons. If equipment must be placed in a special mode of operation, prior to level observance, this must also be posted. Example: wicker gate ram position or other hydraulic ram positions, prior to oil level reading. (See condition 4.8 of this Certification-Order under Monitoring and Reporting)

- d) Regularly check all fuel hoses, oil drums, oil or fuel transfer valves and fittings, etc, for drips and leaks. Maintain and properly store them to prevent spills into state waters. (See condition 4.8.3 of this Certification-Order under Monitoring and Reporting)
  - e) Do not refuel equipment within 50 feet of rivers, creeks, wetlands, or other waters of the state.
  - f) Provide full oil spill containment capacity plus 10 per cent when working on transformers and other equipment that might spill or drip oil.
  - g) Inspect containers once per week. Maintain container inspection sheets to include: maximum container volume and an exact reading recording of the oil level by the staff/operator conducting the inspection. Weekly inspection readings must be consistent; provide training to the staff/operator to ensure consistent and accurate readings. (See condition 4.8.3 of this Certification-Order under Monitoring and Reporting)
  - h) Keep oil consumption records maintained on-site; provide these records to Ecology immediately upon request and in the annual WQMP report.
  - i) In the event that the project modifies the oil transfer operation to include hard-plumbing to reservoirs such as the governor oil tank from the oil tank room, or other extensive modifications, the Licensee must notify and receive approval from Ecology.
  - j) Contain wash water containing oils, grease, or other hazardous materials resulting from wash-down of equipment or working areas for proper disposal, and do not discharge this water into state waters.
- 7) Other
- a) Maintain site security at the project site to reduce chance of oil spills.
  - b) Initiate, plan for, document, and train staff for the deployment of General Response Plan and boom strategies for each project. Review and update as needed annually.

#### **4.7 Pesticide Applications (see definition of pesticide in Exhibit B)**

- 1) Prior to the application of pesticides to waters of the state, coverage under applicable Aquatic Pesticides Permit shall be obtained, and conformance with any other applicable state requirement such as SEPA, shall be attained.
- 2) Best Management Practices and other control measures for the application of pesticides to waters of the state must be addressed in an In-Water-Work Protection Plan. An appropriate water quality monitoring plan shall be developed prior to the application and shall be implemented for all related work.
- 3) Prior to the use of pesticides adjacent to waters of the state, the Licensee shall follow Best Management Practices to avoid the entry of such materials into waters of the state. Applicable Best Management Practices include, but are not limited to, such actions as hand application and avoiding drift of materials into the water.

#### **4.8 Monitoring and Reporting**

- 1) The monitoring component of the Licensee's application to FERC is incorporated as a requirement of this Certification-Order and shall be followed except as further modified by this Certification-Order. Within 90 days of issuance of the new FERC license for the Project, the Licensee shall submit to Ecology for its review and approval a plan for any additional monitoring requirements set forth in this Certification-Order.

- 2) Monitoring pursuant to the requirements set forth in this Certification-Order shall begin as soon as practicable and in no event shall monitoring begin any later than one (1) year after issuance of the new FERC license for measures that do not specify a start date.
- 3) Representative water quality measurements shall be made for the parameters listed in Table 2 at the identified locations and frequencies. Further monitoring is required or may be required under compliance schedules or to respond to specific problems not identified at the time of this Certification-Order.

**Table 2. Water Quality Monitoring Schedule**

Parameter	Location	Depths (ft)	Frequency	Duration	Condition No.
Flow	Lewis River below Merwin Dam at USGS Ariel gauge	--	15 minutes	Ongoing for the term of the license	4.2.1 Flow
	Merwin Dam spill gates	Calculated using elevation of Lake Merwin times gate widths times gate heights	Every change in gate openings when spill occurs	Ongoing for the term of the license	4.2.2 Flow
Total Dissolved Gas (TDG)	Merwin Dam turbine Outlets	15'	Hourly	1 One month before and after planned departure from normal operations reallocate the duration or the quantity of air injected into the turbines to the point that the 110% criterion is likely exceeded. 2 Ongoing if exceedances occur until three months after such exceedances are corrected.	4.3.2a
	Merwin spill downriver of aeration zone	~10'-15'	During spill events through the spillway, hourly, as close to 24 hrs before as possible to 48 after the event	Ongoing unless TDG during spill is found not to exceed 110% during river flows approaching 33,884 cfs	4.3.3a and Exhibit C
Temperature	Merwin Forebay	1, 5, 10, 20, 40, 60, 100, 200	May 1–Oct 31: Hourly	Ongoing until temperature exceedances are found not to occur in the Merwin tailrace for a period of five consecutive years	4.4.5
	Merwin tailrace	1	Hourly all year	Ongoing	4.4.5



Parameter	Location	Depths (ft)	Frequency	Duration	Condition No.
	Upper Merwin/Yale tailrace	Profile	Hourly	Ongoing until temperature fluctuations in the upper Lake Merwin/Yale tailrace are sufficiently addressed per condition 4.4(3) of this Order	4.4.5
Dissolved Oxygen	Merwin tailrace	1	September and October hourly	Ongoing until dissolved oxygen sags are found not to exceed 8 m/L for a period of 5 consecutive years	4.4.5
Oil & Grease	Record amounts of oil, grease and hydraulic fluids used	n/a	Weekly	Ongoing for the term of the license	4.6.6h
	Sumps	Surface and bottom	At least weekly (visual) At least three months (test)	Ongoing for the term of the license	4.6.5a
	Trans-former deck	Drains	Daily during icy conditions	Ongoing for the term of the license	4.6.4d
	Oil tanks, transformers, other oil tanks >100 gallons	n/a	At least weekly	Ongoing for the term of the license	4.6.6c
	Fuel hoses, oil drums, oil & fuel transfer valves and fittings	n/a	Weekly	Ongoing for the term of the license	4.6.6d
	Oil-water separators	n/a	Periodically test oil stop valves	Ongoing for the term of the license	4.6.3a
	Oil-water separators	n/a	Regularly prior to cleaning	Ongoing for the term of the license	4.6.3c

- 4) All water quality monitoring shall meet accepted standards for data quality. The monitoring plan shall include monitoring and data evaluation procedures and objectives that ensure data quality. Data quality procedures shall be consistent with United States Environmental Protection Agency and Ecology guidance on this subject.
- 5) The monitoring plan shall be updated annually by amendment to reflect any changes in monitoring parameters, schedule, or methodology. These amendments, or a notification of no change, shall be included in the Annual Report described below in condition 4.8.6 and in Section 14.2.6 of the Settlement Agreement. Ecology will provide its revisions and approval for the monitoring plan within three (3) months after receipt of an amendment or notification.

- 6) Data from all water quality monitoring shall be summarized and reported in a format approved by Ecology and submitted annually. The monitoring report shall include sample dates, times, locations, and results. Any violation of numeric state water quality standards and flow conditions shall be highlighted. The report shall be included in the Annual Report provided to FERC as described in Section 14.2.6 of the Settlement Agreement; provided that if Ecology determines that the format of that report does not meet Ecology's needs, the Licensee shall modify or supplement the report so that it is acceptable to Ecology. Data reports shall be submitted to Ecology's, Water Quality Program, Southwest Regional Office.
- 7) The Licensee may request to modify or eliminate parts of the monitoring program after a minimum of the ongoing monitoring requirements or a period of five (5) years of reliable data collection following issuance of the new license. Modifications to this monitoring schedule can be requested by submitting to Ecology reasons for the modifications along with a modified monitoring plan.
- 8) A more rigorous water quality sampling program for the parameters listed in Table 2 or additional parameters may be required by Ecology if necessary to protect water quality in the future based on monitoring results, regulatory changes, changes in project operations and/or requirements of TMDLs, or to otherwise provide reasonable assurance of compliance with state water quality standards.

## **5.0 Order**

Any person who fails to comply with any provision of this Certification-Order shall be liable under the Clean Water Act for a penalty of up to twenty (20) thousand dollars per day, and under the state Water Pollution Control Act, for a penalty of up to ten (10) thousand dollars per day per violation or such other amount as may be authorized under state law as exists now or may be amended during the term of the license.

## **6.0 Appeal Process**

You have the right to appeal this Order to the Pollution Control Hearings Board. Pursuant to chapter 43.21B RCW, your appeal must be filed with the Pollution Control Hearings Board, and served on the Department of Ecology within thirty (30) days of the date of your receipt of this document.

To appeal this Order, your notice of appeal must contain a copy of the Ecology Order you are appealing.

Your appeal must be filed with:

The Pollution Control Hearings Board  
4224 - 6th Avenue SE, Rowe Six, Bldg. 2  
P.O. Box 40903  
Lacey, Washington 98504-0903

Your appeal must also be served on:

The Department of Ecology  
Appeals Coordinator  
P.O. Box 47608  
Olympia, Washington 98504-7608

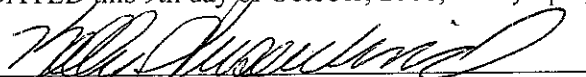
In addition, please send a copy of your appeal to:

Federal Permit Appeals Coordinator  
Department of Ecology  
P.O. Box 47600  
Olympia, Washington 98504-7600

For additional information Environmental Hearings Office Website: <http://www.eho.wa.gov>

Your appeal alone will not stay the effectiveness of this Order. Stay requests must be submitted in accordance with RCW 43.21B 320. These procedures are consistent with Ch. 43.21B RCW.

DATED this 9th day of October, 2006, at Olympia, Washington.

  
\_\_\_\_\_  
Kelly Susewind, P.E., P.G.  
Southwest Region Manager  
Water Quality Program

**Exhibit A**

***Section 6.2 of the Settlement Agreement Concerning Relicensing of the  
Lewis River Hydroelectric Projects signed November 30, 2005***

**6.2 Flow Fluctuations Below Merwin Dam**

Commencing upon Issuance of the New License for the Merwin Project, PacifiCorp shall implement the following operational regimes at Merwin Dam for the duration of the New License for the Merwin Project.

**6.2.1 Ramping Rates Below Merwin Dam.** All flow rates and Ramping rates described in this Section 6.2.1 shall be measured at the Ariel gage. "Ramping" means those Project-induced increases ("up-Ramping") and decreases ("down-Ramping") in river discharge and associated changes in river surface elevation over time below Merwin Dam caused by Project operations or for Project maintenance. Ramping rate is the rate of change in stage resulting in regulated discharges. Ramping rates in this Agreement are stated in inches or feet of change in the surface elevation of the river per hour. Restrictions on Ramping shall not apply to:

- a) changes in flows due to natural increases or decreases in tributary input or surface runoff occurring entirely in the reach between Merwin Dam and the Ariel gage (such as changes caused by snowmelt or rain events),
- b) PacifiCorp's operations to comply with high runoff procedures, or
- c) PacifiCorp's response to emergency conditions related to an imminent threat to life or property. PacifiCorp shall limit the up-Ramping rate to 1.5 feet per hour below Merwin Dam for all periods when flows below Merwin Dam are at or less than hydraulic capacity of the Merwin Project turbines. PacifiCorp shall limit the down-Ramping rate to 2 inches per hour below Merwin Dam for all periods when flows below Merwin Dam are at or less than 8,000 cfs; except that during the period from February 16 through June 15, no down-Ramping shall occur:
  - 1) commencing one hour before sunrise until one hour after sunrise and
  - 2) commencing one hour before sunset until one hour after sunset. PacifiCorp shall perform down-Ramping as gradually as practicable and shall avoid up-Ramping fluctuations during down-Ramping periods, to the extent practicable.

**6.2.2 Plateau Operations at Merwin Dam**

PacifiCorp shall further restrict daily fluctuation in flows below Merwin during the period of February 16 through August 15 of each year by maintaining flow plateaus (periods of near-steady discharge) as provided in this Section 6.2.2. Once a flow plateau is established, PacifiCorp shall maintain the flow plateau for as long a duration as practicable, but flow plateaus may be altered to a new level as a result of changes in natural flow or operational demands on the Lewis River power system, subject to the limitations of this Section 6.2.2. If any Party questions the duration of flow plateaus, they may request a meeting with appropriate PacifiCorp staff to review the information PacifiCorp used in determining when Plateau Steps were required. PacifiCorp shall cooperate in providing necessary information about and explanation of the actions taken. PacifiCorp shall limit changes in flow plateaus during the period of February 16 through August 15 as provided in (a) and (b) below:

- a) **Plateau Steps.** For the purposes of this Agreement, a "Plateau Step" shall be defined to be down-Ramping in flow below Merwin that would result in a change in river elevation of more than 0.2 (2/10) foot at the Ariel gage. A single Plateau Step event will begin when the elevation drops by more than 0.2 (2/10) foot and be deemed complete when:
  - i) the elevation rises by more than 0.2 (2/10) foot or
  - ii) does not change by more than plus or minus 0.2 (2/10) foot for more than 6 hours. Down-Ramping that results in changes in river elevation of less than or equal to 0.2 (2/10) foot shall not be considered a Plateau Step and will not be included in the accumulated total of Plateau Steps, provided that

down-Ramping that results in a change of more than 0.2 (2/10) foot in any six-hour period will be considered a Plateau Step. Plateau Steps shall be limited to no more than one change in any 24-hour period, no more than 4 in any seven-day period, and no more than six in any calendar month. If PacifiCorp is required to release flows from Merwin Dam pursuant to the high runoff procedure, then for each such release pursuant to the high runoff procedure, down-Ramping to return to a level maintained for more than 6 hours without decreasing river elevation by more than 0.2 (2/10) feet shall not be counted as a Plateau Step. During flood season, if there is less than 5 feet of storage capacity in addition to the required 17 feet of storage capacity under the high runoff procedure, then the first down-Ramping after each flow release to restore the storage capacity shall not count as a Plateau Step. If PacifiCorp uses more than a single release episode to reach or exceed 22 feet of storage capacity, only the down-Ramping after the first such release shall not count as a Plateau Step; the subsequent down-Rampings shall be counted as Plateau Steps. Finally, if PacifiCorp is asked to lower flows below Merwin Dam for public safety reasons or to facilitate aquatics studies, such changes in river level shall not be counted as Plateau Steps.

- b) **Plateau Changes.** An accumulation of Plateau Steps will result in a "Plateau Change" as further defined in this Section. PacifiCorp shall limit Plateau Changes to no more than 20 during the period February 16 through August 15. When flows are greater than or equal to 3,500 cfs below Merwin Dam, a Plateau Change shall occur when any series of consecutive Plateau Steps totals 1 foot of down-Ramping between February 16 through August 15. Any periods of up-Ramping during such period shall be ignored in such calculations. When flows are less than 3,500 cfs below Merwin Dam, a Plateau Change shall mean a series of consecutive Plateau Steps, during the period February 16 through August 15, totaling 0.5 (5/10) foot. Any periods of up-Ramping during such period shall be ignored in such calculations. If a single Plateau Step in a series would cause the total to exceed one foot (when flows are greater than or equal to 3,500 cfs) or one-half foot (when flows are less than 3,500 cfs), the excess shall be counted toward the next Plateau Changes. If a Plateau Step begins when flows are greater than 3,500 cfs and ends when flows are less than 3,500 cfs, the Plateau Change will be determined by adding the fractions of a Plateau Change occurring before and after the river discharge below Merwin Dam passes 3,500 cfs. For example, if a Plateau Step begins when flows are at 5,000 cfs and has measured 6 inches when flows reach 3,500 cfs (one-half of a Plateau Change for flows above 3,500 cfs) and continues to decline an additional 3 inches ending at 3,000 cfs (one-half of a Plateau Change for flows below 3,500 cfs), it would count as one full Plateau Change.

### 6.2.3 Stranding Study and Habitat Evaluation

By the third anniversary of the Issuance of the New License for the Merwin Project, PacifiCorp shall complete a stranding study and a habitat evaluation study below Merwin Dam to assess the potential effects of Project operations on steelhead, coho salmon, Chinook salmon, and chum salmon, and their habitats. The total cost to complete both the study and evaluation is estimated to be \$300,000. PacifiCorp shall develop the stranding study objectives in Consultation with the ACC, with final approval by NOAA Fisheries and USFWS. The stranding study shall identify measurable factors affecting potential stranding, the relationship of such factors to each other, and the timeframe and season within which stranding may occur. The habitat evaluation study shall evaluate spawning and rearing habitat from Merwin Dam to the downstream end of Eagle Island across a range of minimum flow operational conditions. The design of the study and evaluations shall be limited to the objectives developed above, must be operationally implementable, and any operational changes implemented for the study and evaluation shall not be considered a breach of any other operational restrictions provided in this Agreement, e.g., shall not be considered a Plateau Change under Section 6.2.2. Based upon the results of the study and evaluation, the ACC may recommend to PacifiCorp, subject to the approval of

NOAA Fisheries and USFWS, measures to minimize or mitigate stranding of salmonids below Merwin Dam. Such measures may include minor adjustments to instream flow levels, or minor adjustments to Merwin Project operations to address Project impacts below Merwin Dam. PacifiCorp shall consider any suggested adjustments to operations and flows of the Project, and shall make reasonable, good faith efforts to address such recommendations. In so doing, PacifiCorp should consider impacts on operational benefits of the Project, including, but not limited to, flood management, power generation, and recreational uses. If PacifiCorp determines not to implement the recommendations, because there would be significant impact on Project benefits, the ACC may elect to mitigate the impacts shown by the study and evaluation by development of habitat enhancement projects through the use of the Aquatics Fund.

#### **6.2.4 Minimum Flows Below Merwin Dam**

PacifiCorp shall provide the following minimum flows below Merwin Dam during the following time periods, subject to the limitations and requirements provided in Section 6.2.5:

- 1) July 31 through October 15, 1,200 cfs;
- 2) October 16 through October 31, 2,500 cfs;
- 3) November 1 through December 15, 4,200 cfs;
- 4) December 16 through March 1, 2,000 cfs;
- 5) March 2 through March 15, 2,200 cfs;
- 6) March 16 through March 30, 2,500 cfs;
- 7) March 31 through June 30, 2,700 cfs;
- 8) July 1 through July 10, 2,300 cfs;
- 9) July 11 through July 20, 1,900 cfs; and
- 10) July 21 through July 30, 1,500 cfs.

The above flows and timing were designed for the purpose of the maintaining and enhancing species downstream of Merwin Dam, including native fall Chinook. The preceding sentence shall not modify or be used to modify the obligations stated in this Section 6.2.4.

#### **6.2.5 Low Flow Procedures**

During years when PacifiCorp projects that sufficient water will not be available to appropriately balance the respective needs of fishery resources, recreation, flood management, and power production, PacifiCorp shall convene a Flow Coordination Committee (the "FCC") consisting of representatives from PacifiCorp, NOAA Fisheries, USFWS, WDFW, the CIT, and the Yakama Nation. PacifiCorp shall provide the FCC with relevant information, and the FCC shall independently evaluate available data regarding water availability during the projected low flow period and decrease or maintain the minimum flows levels provided in Section 6.2.4 as it deems appropriate. PacifiCorp shall maintain minimum flow levels provided in Section 6.2.4 unless such levels are temporarily decreased by Consensus of the FCC members; provided that if there is an impasse, determinations shall be made by a majority of the agency members of the FCC. Changes requested by the FCC shall not require PacifiCorp to violate its agreement with FEMA concerning high runoff management, as described in Section 12. The FCC shall consider the following interests in modifying minimum flow levels (the order of listing is not intended to indicate priority): (1) the needs of fish species, with a priority on ESA-listed species, including, without limitation, consideration for keeping redds watered, providing rearing habitat for wild fall Chinook, and pulse flows to assist in migration of juvenile fish if such pulse flows are shown to be effective; (2) the need to provide flood management benefits for down river areas; and (3) the desire to refill all Project reservoirs to achieve a combined target of 5 feet of available reservoir storage capacity by July 1, and a target of 15 feet of reservoir storage by Labor Day (to provide reasonable recreation uses between Memorial Day and Labor Day). The Counties and

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Day (to provide reasonable recreation uses between Memorial Day and Labor Day). The Counties and cities that are signatories to this Agreement may designate a local government liaison to the FCC. The liaison's purpose is to encourage communication between the FCC and local governments. PacifiCorp shall notify the local governments' liaison (a) when the FCC will be convened and (b) the general content of the agenda. The liaison may provide written comments to the FCC for its consideration.

**Exhibit B**  
**Definitions**

<b>7Q-10</b>	The high flow that is calculated to occur only once, for 7 consecutive days during any 10-year period.
<b>BMPs</b>	Best Management Practices to reduce pollution
<b>CWQPP</b>	Construction Water Quality Protection Plan – necessary for all construction projects in, over, or near water.
<b>FERC</b>	Federal Energy Regulatory Commission
<b>FWPCA</b>	Federal Water Pollution Control Act
<b>HPA</b>	Hydraulic Project Approval
<b>IWPP</b>	In Water Work Protection Plan. Part of the CWQPP as described above. This is for work in the water—such as boat ramps or cement work in the water. This does not apply inside the dam when before beginning the project, the water can be completely removed.
<b>MSL</b>	Mean Sea Level
<b>NTU</b>	Nephelometric Turbidity Units
<b>Pesticide</b>	<p>a) Any substance or mixture of substances intended to prevent, destroy, control, repel, or mitigate any insect, rodent, snail, slug, fungus, weed, and any other form of plant or animal life or virus, except virus on or in a living person or other animal which is normally considered to be a pest or which the director may declare to be a pest;</p> <p>b) Any substance or mixture of substances intended to be used as a plant regulator, defoliant or desiccant; and</p> <p>c) Any spray adjuvant, such as a wetting agent, spreading agent, deposit builder, adhesive, emulsifying agent, deflocculating agent, water modifier, or similar agent with or without toxic properties of its own intended to be used with any pesticide as an aid to the application or effect thereof, and sold in a package or container separate from that of the pesticide with which it is to be used <b>RCW</b> – Revised Code of Washington</p>
<b>RM</b>	River Mile
<b>SWPPP</b>	Stormwater Pollution Prevention Plan –Part of the CWQPP as described above. This is to prevent polluted stormwater from entering the reservoir or river.
<b>TDG</b>	Total Dissolved Gas
<b>TMDL</b>	Total Maximum Daily Load
<b>TWQAP</b>	Temperature Water Quality Attainment Plan
<b>USC</b>	United States Code
<b>USDA-FS</b>	Forest Service of the United States Department of Agriculture
<b>USGS</b>	United States Geological Survey
<b>USFWS</b>	United States Fish and Wildlife Service
<b>WAC</b>	Washington Administration Code
<b>WDFW</b>	Washington Department of Fish and Wildlife
<b>WQAP</b>	Water Quality Attainment Plan
<b>WQMP</b>	Water Quality Monitoring Plan
<b>WQS</b>	Water Quality Standards Rule, WAC 173 201A



**Exhibit C**  
**Total Dissolved Gas Spill Monitoring Plan**  
**for Swift No 1, Yale, and Merwin Dams**

This plan includes:

1. A quality assurance/quality control (QA/QC) plan;
2. A description of how spill events (including 7Q-10 events) will be anticipated;
3. A description of how equipment will be mobilized quickly prior to a spill event and timing of monitoring frequency and duration;
4. Location of monitoring equipment; and,
5. Reporting deadline.

**1) Quality Assurance/Quality Control**

Data Quality Objectives and Decision Criteria

Total Dissolved Gas meters can exhibit biased results depending on calibration, maintenance and/or field conditions. PacifiCorp staff will minimize bias by assuring proper maintenance and care of the TDG meters. Therefore, no Data Quality Objectives (DQOs) are being established.

TDG readings are expected to fall between 100% and 130% saturation. Washington State standard is 110% saturation. Measurement Quality Objectives (MQOs) are equivalent to DQOs and are equal to 1% saturation. MQOs will be met if the TDG meter readings are within 1 percent saturation or 5 mm HG of the expected value based on comparison to paired meters. If MQOs are not met for these pairs, the differences between paired data will be evaluated, including differences in the data quality procedures used, but the data will not be qualified or discarded unless other information indicates problems with the data.

Percent TDG measurements are dependent on barometric pressure readings, so secondary MQOs are also needed for the on-site barometric pressure readings. There are two weather stations at Yale and Swift so it is possible to obtain direct measurements of barometric pressure at those locations. A portable barometer will be employed at Merwin. The target for this monitoring effort will be an MQO of 5 mm HG for the field barometer readings. If the barometric pressure MQOs are exceeded, the data will be considered acceptable if the TDG percent saturation MQOs are met.

Temperature will also be collected during the monitoring periods. Since temperature is of secondary importance, DQOs will not be established but an MQO will be established to determine if data are acceptable for reporting. The MQO for temperature will be met and reported if post-calibration shows that the temperature is within 0.5 °C.

In terms of data quality the following acceptance criteria will be applied:

Data Reasonableness: Data will be reviewed to determine if the amount of variability is appropriate, based on expected values and comparison between data sets. Data with too much or reasonably too little variability will not be used.

Data Completeness: Data sets will be used that are reasonably complete during the period of sampling. Incomplete data sets will be used if they are considered representative of conditions during the sampling period.

Data Representation: Data will be used that are representative of the location or time period for sampling. Attention will be paid to the variations in meteorological conditions and to seasonal differences between high and low flow conditions.

Study Design and Field Procedures: All data will be collected using Hydrolab® Model MS5 remote TDG meters. Prior to deployment, instruments will be calibrated to ensure that total pressure (in air) equals

barometric pressure. Meters will be attached to a streamside structure such as the Ariel USGS gage house below Merwin and existing cabling, or a large rock or tree below Yale and Swift No. 1. The meters will be weighted such that they will maintain position in at least 10 feet of water (compensation depth) to prevent air bubble formation on the sensor membranes.

The Hydrolab® Model MS5 remote TDG meters will be checked for calibration before and after each deployment. Meters will be checked for performance at each site at the beginning and the end of each deployment.

Data Review, Quality Assessment, and Validation: Data will be downloaded from the Hydrolab® Model MS5 remote TDG meters to a spreadsheet and reviewed for reasonableness and any values exceeding the MQOs. Outliers will be evaluated for reasons behind unexpected deviation. Exceedances related to equipment malfunction result in rejection of the data.

Data sets will be considered complete if the data meet the MQOs at least 85 percent of the time. All data meeting MQOs will be accepted. Data will then be evaluated for compliance and acceptance criteria.

## **2) How spill events will be anticipated including 7Q-10 events**

PacifiCorp Energy will use prediction tools described below to determine when to deploy TDG meters for any anticipated spill event.

The following is a description of how PacifiCorp Energy anticipates spill events, including 7Q-10 events, at Merwin Dam, Yale Dam and Swift No. 1 Dam. PacifiCorp Energy regularly monitors weather and inflow forecasts from the National Weather Service and River Forecast Center as well as a number of private forecasting vendors. Based on expected inflows and current reservoir elevations, PacifiCorp Energy will target total Project releases, typically 2 to 3 days in advance, so as to minimize the frequency and magnitude of Project spill. Since the Lewis River Project has a large amount of storage compared to typical inflow, PacifiCorp Energy is often able to manage and re-regulate natural high flow events so as not to spill at the Projects thereby saving water for such purposes as generation, fishery needs and refill. PacifiCorp Energy has real time reservoir elevation indication in each of its three reservoirs. With this data, total available Project storage is calculated on an hourly basis and made available to staff involved in Project operations. Reservoir elevations, available storage, and inflow forecasts are routinely monitored by Hydro Control Operators as well as technical water management staff. This information is scrutinized carefully particularly during actual and potential high run off situations.

During the high run off season (November 1 - April 1) PacifiCorp Energy is required to maintain an aggregate of at least 70,000 AF of storage in the Lewis River reservoirs. If there is a reasonable threat of encroaching on this storage, PacifiCorp Energy typically spills at Merwin dam as necessary to manage the available flood control storage. The rate at which inflow encroaches on required available storage is updated using existing Project telemetry and inflow forecasts provided by NOAA's National Weather Service River Forecast Center, and/or a third party consultant. Telemetered inflow and reservoir instrumentation currently includes:

- PacifiCorp Energy and USGS stream gages on the river mainstem and tributaries
- PacifiCorp Energy lake stage gages
- PacifiCorp Energy and National Weather Service weather stations
- PacifiCorp Energy and Natural Resource Conservation Service snow stations

Some spill events are not driven by high flow events, and these are typically planned with enough time to provide ample opportunity for the installation of monitoring equipment. Examples include spilling for required periodic testing of the spill gates as well as meeting some special water management needs, including minimum flow requirements, when the generation units are out of service.

Rainfall is but one factor considered in forecasting inflows. Other factors include air temperature (which

will affect whether precipitation falls as rain or snow and at what elevations), wind, soil moisture and snowpack conditions. PacifiCorp Energy relies on the output of complex weather and streamflow models, typically managed by National Weather Service and third party consultants to assimilate these conditions as well as forecasted weather to predict streamflows, including 7Q-10 events.

### **3) Deployment, Timing of Monitoring, Frequency, and Duration**

PacifiCorp Energy staff will have meters and deployment equipment at the ready at all times. A test deployment will take place at each site prior to the high run off season. During the high run off season (November 1 - April 1) staff will be on alert to be prepared to deploy at any time. The MS5 meters will be programmed to record TDG and temperature on an hourly schedule. Meters will be deployed at approximately 24 hours before a spill event and continuing for 48 hours afterward. While the meters will be removed following spill events/periods, PacifiCorp Energy staff will be ready to deploy equipment as many times as needed to capture each event. Threat of vandalism or theft, and unwillingness to risk data loss drives the decision to remove equipment after each spill event.

### **4) Location of monitoring equipment**

Three meters will be deployed in spill water at the following locations:

- Approximately ¼ mile downstream of Merwin dam near the Ariel gage site;
- Approximately ½ mile downstream of Yale dam and upstream of the confluence with Canyon Creek; and,
- Approximately ½ mile downstream of Swift No.1 dam.

Placement will be far enough downstream of the dams to be outside the aeration area below each spillway in order to avoid air bubble accumulation on the sensing membrane.

### **5) Reporting**

Summary output of the streamflow forecast models, as well as inflow records, will be included in PacifiCorp Energy reports identifying and justifying periods of 7Q-10 exemptions identified in section 4.3.5.f. Likewise when Federal Energy Regulatory Commission license conditions or other safety and environmental requirements require spill not otherwise explicitly included in 7Q-10 exemptions, PacifiCorp Energy will document and report those events, including the basis of the operation. As called for in the Lewis River Settlement Agreement (Section 14.2.6), annual reporting of spill events and data analysis will be included in PacifiCorp Energy and Cowlitz PUD's Annual Aquatics Coordination Committee Report.